# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER- 20**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **E&TC**

COURSE CODE :- **ETG504 / ETF 502**

COURSE NAME :- **OPTICAL FIBER COMMUNICATION**

MAX. MARKS : **40** TIME : **1.5 Hrs** DATE :- 28/11/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | Co ETG 504 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define: 1) Light intensity 2) Critical angle | R | 1 | |
| | b) | State any two requirements of a good optical fiber connector. | R | 2 | |
| | c) | Define attenuation & write its unit. | R | 3 | |
| | d) | Draw a block diagram of optical fiber communication system | R | 1 | |
| | e) | Define splicing & list its types | R | 2 | |
| | f) | Define: 1) Intrinsic absorption 2) Non-linear scattering | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Calculate numerical aperture, acceptance & critical angle having core & cladding refractive indices 1.56 & 1.45 respectively. | A | 1 | |
| | b) | Explain with neat diagram light propagation in multimode step index fiber. | U | 2 | |
| | c) | List the two applications of tight buffered optical cable and draw the diagram of it. | U | 2 | |
| | d) | Describe in detail Rayleigh Scattering losses. | U | 3 | |
| | e) | Describe the Photodetector and rotating stage method of numerical aperture measurement. | U | 3 | |
| | f) | Describe with neat diagram cut back technique of attenuation measurement. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Discuss with neat diagram total internal reflection. | U | 1 | |
| | b) | Explain step and graded index fiber with suitable diagrams. | U | 2 | |
| | c) | Describe V-groove splicing with suitable diagram. | U | 2 | |
| | d) | Define optical coupler & describe any one type with suitable diagram. | U | 2 | |
| | e) | Explain fiber bend losses with suitable diagrams. | U | 3 | |
| | f) | An optical power of 100 μW is fed into an optical fiber of length 10 km. The output power is found to be 5 μW. Calculate the (1) Signal attenuation in dB (2) attenuation coefficient (α) | A | 3 | |
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**WINTER/SUMMER- 2023**

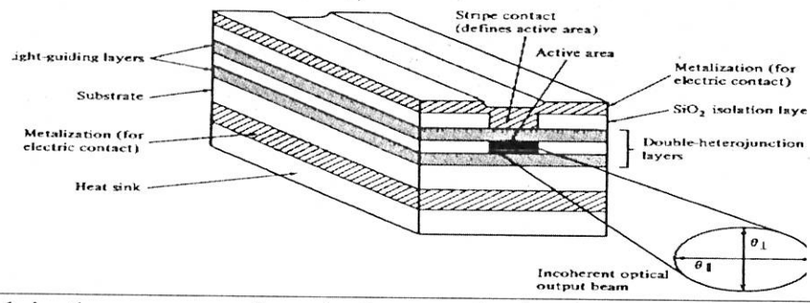
**EXAM SEAT NO.** | | | | | | |

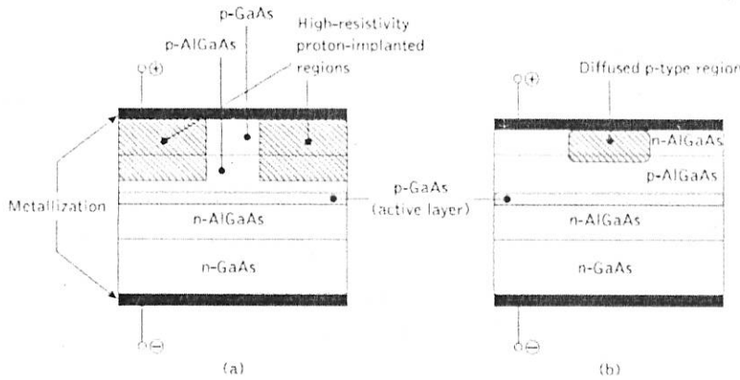
LEVEL : - **05** PROGRAM : ET

COURSE CODE :- **ETG504** / ETP562

COURSE NAME :- **Optical Fiber Communication**

MAX. MARKS : 40 TIME : 1.5**Hrs** DATE :- 28/11/**23**

| QN | SQN | SECTION –II | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State any four requirements of good optical source. | R | 4 | |
| | b) | Name the photodetector which has internal gain and give two disadvantages of the same. | A | 5 | |
| | c) | Define wavelength division multiplexing with diagram. | R | 6 | |
| | d) | Define stimulated emission. Name the type of source that works on the principle of stimulated emission. | A | 4 | |
| | e) | State any four applications of OTDR. | R | 6 | |
| | f) | Draw the labelled diagram of photodarlington pair and list any two applications of it. | R | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Identify the type of LED and describe the construction of following type of optical source. Also states its merits.   | A | 4 | |
| | b) | Explain the process of optical power budgeting . | U | 6 | |
| | c) | Compare between PIN and APD w.r.t following points: (i) Sensitivity (ii) Biasing voltage (iii)Gain (iv) Cost | A | 5 | |
| | d) | Draw the block diagram of optical receiver and explain its working. | U | 6 | |
| | e) | Explain the process of spontaneous emission and population inversion with neat diagram. | U | 4 | |
| | f) | Explain in brief the factors that limit the speed of response of a PIN photodiode. | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Compare between LED and LASER w.r.t following points (i) Principle of operation (ii) Output Beam (iiii)Spectral Width (iv) Compatible fibers | A | 4 | |
| | b) | Draw and explain operation of LED driving circuits for analog transmission of signal. | U | 6 | |
| | c) | With the help of neat diagram, explain operation of avalanche photodiode. | U | 5 | |
| | d) | Describe the following characteristics of LED (i) Optical Power Output (ii) Output Spectrum | U | 4 | |

| | | | | | |
|---|---|---|---|---|---|
| | e) | Explain I-V characteristics of PIN diode with the help of neat graph | U | 5 | |
| | f) | Identify the following type of optical source shown below and explain it in brief   | A | 4 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER- 20**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - FIFTH PROGRAM : **E&TC**

COURSE CODE :- **ETG504 /** ETF 502

COURSE NAME :- **OPTICAL FIBER COMMUNICATION**

MAX. MARKS : **40** TIME : **1.5 Hrs** DATE :- 28/11/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | Co ETG 504 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define: 1) Light intensity 2) Critical angle | R | 1 | |
| | b) | State any two requirements of a good optical fiber connector. | R | 2 | |
| | c) | Define attenuation & write its unit. | R | 3 | |
| | d) | Draw a block diagram of optical fiber communication system | R | 1 | |
| | e) | Define splicing & list its types | R | 2 | |
| | f) | Define: 1) Intrinsic absorption 2) Non-linear scattering | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Calculate numerical aperture, acceptance & critical angle having core & cladding refractive indices 1.56 & 1.45 respectively. | A | 1 | |
| | b) | Explain with neat diagram light propagation in multimode step index fiber. | U | 2 | |
| | c) | List the two applications of tight buffered optical cable and draw the diagram of it. | U | 2 | |
| | d) | Describe in detail Rayleigh Scattering losses. | U | 3 | |
| | e) | Describe the Photodetector and rotating stage method of numerical aperture measurement. | U | 3 | |
| | f) | Describe with neat diagram cut back technique of attenuation measurement. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Discuss with neat diagram total internal reflection. | U | 1 | |
| | b) | Explain step and graded index fiber with suitable diagrams. | U | 2 | |
| | c) | Describe V-groove splicing with suitable diagram. | U | 2 | |
| | d) | Define optical coupler & describe any one type with suitable diagram. | U | 2 | |
| | e) | Explain fiber bend losses with suitable diagrams. | U | 3 | |
| | f) | An optical power of 100 μW is fed into an optical fiber of length 10 km. The output power is found to be 5 μW. Calculate the (1) Signal attenuation in dB (2) attenuation coefficient (α) | A | 3 | |
| | | | | | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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**WINTER/SUMMER- 2023**

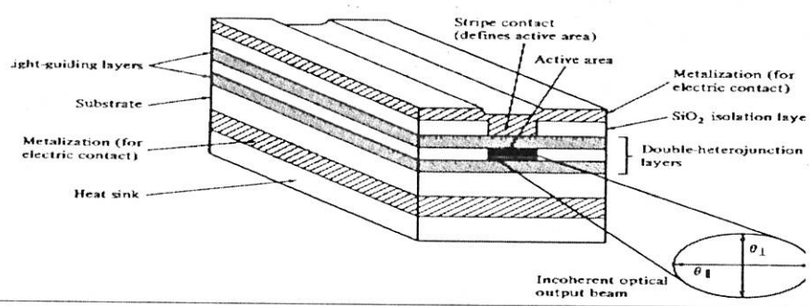
**EXAM SEAT NO.** | | | | | | |

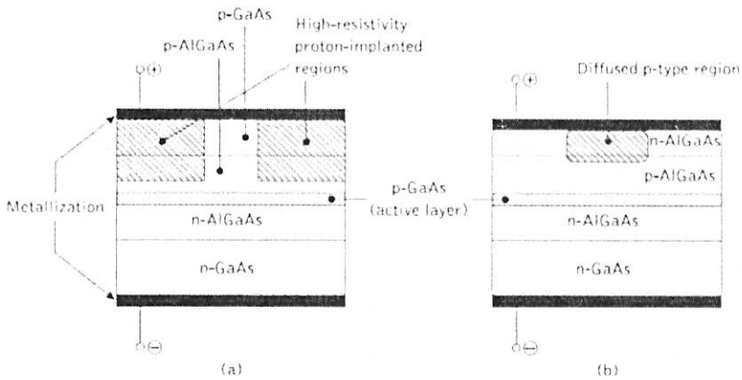
LEVEL : - **05** PROGRAM : ET

COURSE CODE :- **ETG504** / ETP502

COURSE NAME :- **Optical Fiber Communication**

MAX. MARKS : 40 TIME : 1.5 **Hrs** DATE :- 28/11/**23**

| QN | SQN | SECTION –II | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State any four requirements of good optical source. | R | 4 | |
| | b) | Name the photodetector which has internal gain and give two disadvantages of the same. | A | 5 | |
| | c) | Define wavelength division multiplexing with diagram. | R | 6 | |
| | d) | Define stimulated emission. Name the type of source that works on the principle of stimulated emission. | A | 4 | |
| | e) | State any four applications of OTDR. | R | 6 | |
| | f) | Draw the labelled diagram of photodarlington pair and list any two applications of it. | R | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Identify the type of LED and describe the construction of following type of optical source. Also states its merits.   | A | 4 | |
| | b) | Explain the process of optical power budgeting . | U | 6 | |
| | c) | Compare between PIN and APD w.r.t following points: (i) Sensitivity (ii) Biasing voltage (iii)Gain (iv) Cost | A | 5 | |
| | d) | Draw the block diagram of optical receiver and explain its working. | U | 6 | |
| | e) | Explain the process of spontaneous emission and population inversion with neat diagram. | U | 4 | |
| | f) | Explain in brief the factors that limit the speed of response of a PIN photodiode. | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Compare between LED and LASER w.r.t following points (i) Principle of operation (ii) Output Beam (iiii)Spectral Width (iv) Compatible fibers | A | 4 | |
| | b) | Draw and explain operation of LED driving circuits for analog transmission of signal. | U | 6 | |
| | c) | With the help of neat diagram, explain operation of avalanche photodiode. | U | 5 | |
| | d) | Describe the following characteristics of LED (i) Optical Power Output (ii) Output Spectrum | U | 4 | |

| | | | | | |
|---|---|---|---|---|---|
| | e) | Explain I-V characteristics of PIN diode with the help of neat graph | U | 5 | |
| | f) | Identify the following type of optical source shown below and explain it in brief   | A | 4 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/ WINTER-

EXAM SEAT NO. | | | | | | |

LEVEL : -
PROGRAM :
COURSE CODE :-EEG504
COURSE NAME :-Microcontroller & Application
MAX. MARKS : ~~80~~ 40
TIME : ~~03~~ 1 1/2 Hrs
DATE :-28/11/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | CO | Marks |
|---|---|---|---|---|---|
| Q.1 | | **Attempt any FOUR:** | | | 08 |
| | a) | Compare between microprocessor and microcontroller.(any 2 points) | U | EEG504-1 | |
| | b) | State any four features of 8051 | R | EEG504-2 | |
| | c) | State the use of A and B register. | U | EEG504-2 | |
| | d) | Draw the format of IP register of 8051 | R | EEG504-2 | |
| | e) | Identify addressing mode of following instruction<br>1) MOV DPTR, #3000H<br>2) MOVC A, @DPTR | A | EEG504-3 | |
| | f) | State the function of MUL AB and DIV AB instruction | A | EEG504-3 | |
| | | | | | |
| Q.2 | | **Attempt any FOUR:** | | | 16 |
| | a) | Draw and explain the general block diagram of microcomputer . | R | EEG504-1 | |
| | b) | What are the different types of buses? Explain each in brief. | R | EEG504-1 | |
| | c) | Draw the internal memory organization and explain it. | U | EEG504-2 | |
| | d) | State the alternate function of Port 3 pins of 8051 microcontroller | U | EEG504-2 | |
| | e) | With suitable example explain any four addressing | U | EEG504-3 | |

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|---|---|---|---|---|---|
| | | modes of 8051. | | | |
| | f) | Write an assembly language program to copy five bytes from internal RAM address 30H to internal RAM address 50H onwards. | A | EEG504-3 | |
| | | | | | |
| **Q.3** | | **Attempt any FOUR:** | | | **16** |
| | a) | Differentiate between microcontrollers 8051, 8052 and 8031 based on their features. | U | EEG504-1 | |
| | b) | Describe the function of following:<br>1)DPTR 2) Program Counter (PC)<br>3) Stack Pointer(SP) 4) PSW | U | EEG504-2 | |
| | c) | Write an assembly language program to find largest number among block of 10 bytes stored from internal RAM address 30H onwards. Store the largest number at 40H. | A | EEG504-3 | |
| | d) | Explain the operation of following instructions:<br>1)RRA 2)XCH A R1 3) XCHD A,@R0 4) MOV A,R2 | U | EEG504-3 | |
| | e) | Classify the instruction set of 8051.Also explain it with suitable example. | U | EEG504-3 | |
| | f) | Write an assembly language program to add to BCD numbers stored in external memory location 3000H and 3001H. Also store result at 3002H. | A | EEG504-3 | |
| | | | | | |

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**SUMMER/WINTER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - FIVE PROGRAM : IE & E&TC

COURSE CODE :- EEG504 COURSE NAME :- MICROCONTROLLER APPLICATION

MAX. MARKS : ~~80~~ 40 TIME : ~~03~~ 1.5 Hrs DATE :-28/11/2023

| QN | SQN | SECTION –II | R/U/A | Co EEG504 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the different modes of serial communication available for 8051 microcontroller. | R | 4 | |
| | b) | Write the functions of following pins of LCD<br>i) EN ii)RS | U | 5 | |
| | c) | What hexadecimal value should be loaded in IE SFR to enable<br>i) Timer 0 overflow interrupt, external interrupt1 and serial port interrupt. | R | 4 | |
| | d) | Draw the interfacing diagram of ADC0808 with 8051 microcontroller. | U | 5 | |
| | e) | Draw the interfacing diagram of relay with 8051 microcontroller. | U | 4 | |
| | f) | Write an assembly language program for 8051to toggle all the bits of port1 continuously with an interval of 100µsec. Crystal frequency=12MHz. | A | 4 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the format of IP SFR and explain the significance of each bit. | A | 4 | |
| | b) | Write an assembly language program (ALP) for 8051 microcontroller to perform the following using interrupts. Assume crystal frequency=12 MHz<br>i) Generate a square wave of frequency 5KHz at P2.1pin.<br>ii) Read the data from port2 send the data on port1 continuously. | A | 4 | |
| | c) | Draw the structure of port0 of 8051 microcontroller and explain its operation. | U | 4 | |
| | d) | Write an assembly language program to rotate the stepper motor through $360^0$ in clockwise direction. | A | 5 | |
| | e) | Consider the leds are interfaced to port0 of 8051.Write an assembly language program to perform the running display with an equal interval of time. | A | 4 | |
| | f) | Draw an interfacing diagram of seven segment display with 8051 microcontroller. | U | 4 | |
| | | | | | |
| Q.6 | | Attempt any **TWO** of the following. | | | **16** |
| | a) | Write an assembly language program (ALP) to generate a square wave with frequency 10KHz. Use timer 0 in mode 1 to generate the delay. The crystal frequency is 12 MHz. Also write necessary calculation. | A | 4 | |
| | b) | Write an assembly language program (ALP) to transmit the word "TYEE" serially at a baud rate of 2400. The crystal frequency is 11.0592 MHz. | A | 4 | |
| | c) | Draw an interfacing diagram of LCD with 8051microcontroller. Write an assembly language program (ALP) to display the message "INDIA" on LCD. | A | 5 | |

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SUMMER/ WINTER-

EXAM SEAT NO. | | | | | | |

LEVEL : -
PROGRAM :
COURSE CODE :-EEG504
COURSE NAME :-Microcontroller & Application
MAX. MARKS : ~~80~~ 40
TIME : ~~03~~ 1 1·5 Hrs
DATE :-28/11/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
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7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | CO | Marks |
|---|---|---|---|---|---|
| Q.1 | | **Attempt any FOUR:** | | | 08 |
| | a) | Compare between microprocessor and microcontroller.(any 2 points) | U | EEG504-1 | |
| | b) | State any four features of 8051 | R | EEG504-2 | |
| | c) | State the use of A and B register. | U | EEG504-2 | |
| | d) | Draw the format of IP register of 8051 | R | EEG504-2 | |
| | e) | Identify addressing mode of following instruction<br>1) MOV DPTR, #3000H<br>2) MOVC A, @DPTR | A | EEG504-3 | |
| | f) | State the function of MUL AB and DIV AB instruction | A | EEG504-3 | |
| | | | | | |
| Q.2 | | **Attempt any FOUR:** | | | 16 |
| | a) | Draw and explain the general block diagram of microcomputer . | R | EEG504-1 | |
| | b) | What are the different types of buses? Explain each in brief. | R | EEG504-1 | |
| | c) | Draw the internal memory organization and explain it. | U | EEG504-2 | |
| | d) | State the alternate function of Port 3 pins of 8051 microcontroller | U | EEG504-2 | |
| | e) | With suitable example explain any four addressing | U | EEG504-3 | |

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| | | | | | |
|---|---|---|---|---|---|
| | | modes of 8051. | | | |
| | f) | Write an assembly language program to copy five bytes from internal RAM address 30H to internal RAM address 50H onwards. | A | EEG504-3 | |
| | | | | | |
| **Q.3** | | **Attempt any FOUR:** | | | **16** |
| | a) | Differentiate between microcontrollers 8051, 8052 and 8031 based on their features. | U | EEG504-1 | |
| | b) | Describe the function of following:<br>1)DPTR 2) Program Counter (PC)<br>3) Stack Pointer(SP) 4) PSW | U | EEG504-2 | |
| | c) | Write an assembly language program to find largest number among block of 10 bytes stored from internal RAM address 30H onwards. Store the largest number at 40H. | A | EEG504-3 | |
| | d) | Explain the operation of following instructions:<br>1)RRA 2)XCH A R1 3) XCHD A,@R0 4) MOV A,R2 | U | EEG504-3 | |
| | e) | Classify the instruction set of 8051.Also explain it with suitable example. | U | EEG504-3 | |
| | f) | Write an assembly language program to add to BCD numbers stored in external memory location 3000H and 3001H. Also store result at 3002H. | A | EEG504-3 | |
| | | | | | |

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**SUMMER/WINTER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - FIVE PROGRAM : IE & E&TC

COURSE CODE :- EEG504 COURSE NAME :- MICROCONTROLLER APPLICATION

MAX. MARKS : ~~80~~ 40 TIME : ~~03~~ Hrs DATE :-28/11/2023

| QN | SQN | SECTION –II | R/U/A | Co EEG504 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the different modes of serial communication available for 8051 microcontroller. | R | 4 | |
| | b) | Write the functions of following pins of LCD<br>i) EN ii)RS | U | 5 | |
| | c) | What hexadecimal value should be loaded in IE SFR to enable<br>i) Timer 0 overflow interrupt, external interrupt1 and serial port interrupt. | R | 4 | |
| | d) | Draw the interfacing diagram of ADC0808 with 8051 microcontroller. | U | 5 | |
| | e) | Draw the interfacing diagram of relay with 8051 microcontroller. | U | 4 | |
| | f) | Write an assembly language program for 8051to toggle all the bits of port1 continuously with an interval of 100µsec. Crystal frequency=12MHz. | A | 4 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the format of IP SFR and explain the significance of each bit. | A | 4 | |
| | b) | Write an assembly language program (ALP) for 8051 microcontroller to perform the following using interrupts. Assume crystal frequency=12 MHz<br>i) Generate a square wave of frequency 5KHz at P2.1pin.<br>ii) Read the data from port2 send the data on port1 continuously. | A | 4 | |
| | c) | Draw the structure of port0 of 8051 microcontroller and explain its operation. | U | 4 | |
| | d) | Write an assembly language program to rotate the stepper motor through $360^0$ in clockwise direction. | A | 5 | |
| | e) | Consider the leds are interfaced to port0 of 8051.Write an assembly language program to perform the running display with an equal interval of time. | A | 4 | |
| | f) | Draw an interfacing diagram of seven segment display with 8051 microcontroller. | U | 4 | |
| | | | | | |
| Q.6 | | Attempt any **TWO** of the following. | | | **16** |
| | a) | Write an assembly language program (ALP) to generate a square wave with frequency 10KHz. Use timer 0 in mode 1 to generate the delay. The crystal frequency is 12 MHz. Also write necessary calculation. | A | 4 | |
| | b) | Write an assembly language program (ALP) to transmit the word "TYEE" serially at a baud rate of 2400. The crystal frequency is 11.0592 MHz. | A | 4 | |
| | c) | Draw an interfacing diagram of LCD with 8051microcontroller. Write an assembly language program (ALP) to display the message "INDIA" on LCD. | A | 5 | |

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**SUMMER/WINTER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - FOUR PROGRAM : IE & E&TC

COURSE CODE :- EIG402 COURSE NAME :- Embedded Systems

MAX. MARKS :40 TIME : 1.5 Hrs DATE :-28/11/23

| QN | SN | SECTION –II | R/ U/ A | Co EIG402 | Ma rks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR** of the following. | | | **08** |
| | a) | Draw the pin diagram of 14 pin LCD display | R | 4 | |
| | b) | Draw the diagram to interface LED to pin P1.2 of 8051. | U | 4 | |
| | c) | Write 'c' language program to make relay ON/OFF after certain delay. | A | 4 | |
| | d) | Explain function of following pins of ADC i)SOC ii)EOC. | R | 4 | |
| | e) | Define Watchdog timer | R | 5 | |
| | f) | Write 'c' program to rotate the DC motor continuously. Draw the interface diagram DC motor with 8051 micro controller. | A | 4 | |
| Q.5 | | Attempt any **FOUR** of the following. | | | **16** |
| | a) | Draw and explain format of IP resister. | R | 4 | |
| | b) | Draw the interfacing diagram DAC 0808 with 8051 microcontroller | U | 4 | |
| | c) | A 230V AC bulb is connected through a relay at P2.2.A light sensor is connected at P3.4.A light sensor produces logic high in dark condition.write a 'c' program to switch it' ON 'the bulb in 'dark' condition and switch it OFF in "LIGHT" condition. | A | 4 | |
| | d) | Write a 'c' program to send letters 'A','B',' C' to the LCD display using delays. | A | 4 | |
| | e) | Draw the diagram to interface Temperature sensor LM35 with micro controller 8051. | U | 4 | |
| | f) | Write a 'c' program of DS12887 in '8051 to show how to read the time, convert it to ASCII & send it to the PC via the serial port. | A | 5 | |
| Q.6 | | Attempt any **FOUR** of the following. | | | **16** |
| | a) | Draw the interfacing diagram of 8X8 matrix keyboard with 8051micro controller | U | 4 | |
| | b) | Explain functions of RTOS 1) scheduling 2) Resource allocation | R | 5 | |
| | c) | Explain characteristics of real time operating system. | R | 5 | |
| | d) | Write 'c'program to generate positive ramp voltage by using DAC 0808 | A | 4 | |
| | e) | Write c program to read temp from ADC0848,convert it to decimal and put it on P0 with some delay. | A | 4 | |
| | f) | Write 'c'language program to turn ON & OFF the LED connected to P2.1 of microcontroller after some delay. | A | 5 | |

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : -IV PROGRAM :Electronics & Telecommunication

COURSE CODE :- EIG402

COURSE NAME :Embedded System

MAX. MARKS: 40 TIME : 1.5 Hrs DATE :- 28/11/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | Co EIG 402 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Compare Harvard and Von-Neumann architecture. | R | 1 | |
| | b) | Write a C program to send out the value 44h serially one bit at a time via P1.0.MSB should go out first. | U | 2 | |
| | c) | Explain Data type sbit in 8051 embedded C. | R | 2 | |
| | d) | Write a C program to toggle all bits of Port 1for some delay using Logical operator. | A | 2 | |
| | e) | Compare $I^2C$ Bus and CAN bus.(two points) | R | 3 | |
| | f) | Enlist Applications of AVR and ARM microcontrollers in embedded systems. | R | 1 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Define embedded system. Draw Block diagram of Embedded system | U | 1 | |
| | b) | Give Classification of embedded system. Explain any two types of Embedded System. | A | 1 | |
| | c) | Write a C program to convert packed BCD to ASCII code. | A | 2 | |
| | d) | Write a C program to generate a square wave of 2.5khz on port P1.4 use Timer1,mode2 to create delay | A | 3 | |
| | e) | Explain RS232 serial communication standard. | A | 3 | |
| | f) | Draw and Explain USB protocol. | U | 3 | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and Explain each phase of Embedded system Life Cycle | A | 1 | |
| | b) | A door sensor is connected to pin P1.1and Buzzer is connected to P.7.Write C program to sound the buzzer for 0.5 sec. When it opens door. | A | 2 | |
| | c) | Write a C program to transmit data 'GPKP' Serially. Using serial communication interrupt using baud rate 4800 bps. | A | 3 | |
| | d) | Write a C program to toggle all pins of P1 continuously every 250 ms. Use timer0,mode2 | A | 3 | |
| | e) | Enlist data types Of Programming in C in Embedded System. Explain any one. | A | 2 | |
| | f) | Assume 1 HZ external clock is being fed into T1(P3.5).Write C program for counter1 in mode 2 to count up and display the state of TL1 count on P1 ,Start the count at 0h.Use interrupt. | U | 3 | |

P.T.O.

**GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.**

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - FOUR PROGRAM : IE & E&TC

COURSE CODE :- EIG402 COURSE NAME :- Embedded Systems

MAX. MARKS :40 TIME : 1.5Hrs DATE :-28/11/23

| QN | SN | SECTION –II | R/ U/ A | Co EIG402 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR** of the following. | | | **08** |
| | a) | Draw the pin diagram of 14 pin LCD display | R | 4 | |
| | b) | Draw the diagram to interface LED to pin P1.2 of 8051. | U | 4 | |
| | c) | Write 'c' language program to make relay ON/OFF after certain delay. | A | 4 | |
| | d) | Explain function of following pins of ADC i)SOC ii)EOC. | R | 4 | |
| | e) | Define Watchdog timer | R | 5 | |
| | f) | Write 'c' program to rotate the DC motor continuously. Draw the interface diagram DC motor with 8051 micro controller. | A | 4 | |
| Q.5 | | Attempt any **FOUR** of the following. | | | **16** |
| | a) | Draw and explain format of IP resister. | R | 4 | |
| | b) | Draw the interfacing diagram DAC 0808 with 8051 microcontroller | U | 4 | |
| | c) | A 230V AC bulb is connected through a relay at P2.2.A light sensor is connected at P3.4.A light sensor produces logic high in dark condition.write a 'c' program to switch it' ON 'the bulb in 'dark' condition and switch it OFF in "LIGHT" condition. | A | 4 | |
| | d) | Write a 'c' program to send letters 'A','B',' C' to the LCD display using delays. | A | 4 | |
| | e) | Draw the diagram to interface Temperature sensor LM35 with micro controller 8051. | U | 4 | |
| | f) | Write a 'c' program of DS12887 in '8051 to show how to read the time, convert it to ASCII & send it to the PC via the serial port. | A | 5 | |
| Q.6 | | Attempt any **FOUR** of the following. | | | **16** |
| | a) | Draw the interfacing diagram of 8X8 matrix keyboard with 8051micro controller | U | 4 | |
| | b) | Explain functions of RTOS 1) scheduling 2) Resource allocation | R | 5 | |
| | c) | Explain characteristics of real time operating system. | R | 5 | |
| | d) | Write 'c'program to generate positive ramp voltage by using DAC 0808 | A | 4 | |
| | e) | Write c program to read temp from ADC0848,convert it to decimal and put it on P0 with some delay. | A | 4 | |
| | f) | Write 'c'language program to turn ON & OFF the LED connected to P2.1 of microcontroller after some delay. | A | 5 | |

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : -IV PROGRAM :Electronics & Telecommunication

COURSE CODE :- EIG 402

COURSE NAME :Embedded System

MAX. MARKS: 40 TIME : 1.5 Hrs DATE :- 28/11/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | Co EIG 402 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Compare Harvard and Von-Neumann architecture. | R | 1 | |
| | b) | Write a C program to send out the value 44h serially one bit at a time via P1.0.MSB should go out first. | U | 2 | |
| | c) | Explain Data type sbit in 8051 embedded C. | R | 2 | |
| | d) | Write a C program to toggle all bits of Port 1for some delay using Logical operator. | A | 2 | |
| | e) | Compare $I^2C$ Bus and CAN bus.(two points) | R | 3 | |
| | f) | Enlist Applications of AVR and ARM microcontrollers in embedded systems. | R | 1 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Define embedded system. Draw Block diagram of Embedded system | U | 1 | |
| | b) | Give Classification of embedded system. Explain any two types of Embedded System. | A | 1 | |
| | c) | Write a C program to convert packed BCD to ASCII code. | A | 2 | |
| | d) | Write a C program to generate a square wave of 2.5khz on port P1.4 use Timer1,mode2 to create delay | A | 3 | |
| | e) | Explain RS232 serial communication standard. | A | 3 | |
| | f) | Draw and Explain USB protocol. | U | 3 | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and Explain each phase of Embedded system Life Cycle | A | 1 | |
| | b) | A door sensor is connected to pin P1.1and Buzzer is connected to P.7.Write C program to sound the buzzer for 0.5 sec. When it opens door. | A | 2 | |
| | c) | Write a C program to transmit data 'GPKP' Serially. Using serial communication interrupt using baud rate 4800 bps. | A | 3 | |
| | d) | Write a C program to toggle all pins of P1 continuously every 250 ms. Use timer0,mode2 | A | 3 | |
| | e) | Enlist data types Of Programming in C in Embedded System. Explain any one. | A | 2 | |
| | f) | Assume 1 HZ external clock is being fed into T1(P3.5).Write C program for counter1 in mode 2 to count up and display the state of TL1 count on P1 ,Start the count at 0h.Use interrupt. | U | 3 | |

P.T.O.

# GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

## ODD TERM END EXAM Winter -2023

**EXAM SEAT NO.** | | | | | | |

LEVEL: **THIRD** PROGRAM: **I. E. & E & T.C**

COURSE CODE: **EIG 305/EIF 305** COURSE NAME: **ANALOG COMMUNICATION**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **29/11 /2023**

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Instruction :-

1) Answer must be written in main answer book provided. (and supplements if required)
2) Illustrate your answers with sketches where ever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables will be made available on request.
5) Assume and mention suitable additional data necessary.
6) Use of Mobile is strictly prohibited.
7) **QN**-Question No, **SQN**-Sub-Question No, **R**- Remembering, **U**-Understanding, **A**-Application **CO**-Course outcome

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| QN | SQN | QUESTION TEXT | RUA | CO-EIG 305 | Marks |
|---|---|---|---|---|---|
| **Q.1** | | Attempt any **FOUR** | | | **(08)** |
| | a) | Classify communication systems. | U | 1 | |
| | b) | Define 1) Noise 2) Noise figure. | R | 1 | |
| | c) | Draw time domain representation of AM wave and lable it. | U | 2 | |
| | d) | Define modulation index in amplitude modulation. Write it's equation. | R | 2 | |
| | e) | Write mathematical expression of 1) FM wave 2) PM wave. | A | 3 | |
| | f) | Why do FM and PM are called as angle modulation techniques. | U | 3 | |
| **Q.2** | | Attempt any **TWO** | | | **(16)** |
| | a) | Draw basic electronic communication block diagram and describe function of each block in detail. | U | 1 | |
| | b) | With the help of block diagram, explain Filter method of SSB generation also write advantages and disadvantages of SSB techniques. | U | 2 | |
| | c) | Differentiate between direct and indirect methods of FM generation. Explain working principle of varactor diode modulator. | U | 3 | |
| **Q.3** | | Attempt any **FOUR** | | | **(16)** |
| | a) | Define modulation. State the need of modulation. | U | 1 | |
| | b) | A typical AM transmitter is transmitting AM wave with carrier power of 400w & depth of modulation is 75%. Calculate total transmitted power. | A | 2 | |
| | c) | Compare low level and high level AM transmitters. | U | 2 | |
| | d) | With the help of waveforms, describe the concept of vestigial sideband. | U | 2 | |
| | e) | Compare AM and FM on the basis of modulation index, transmitted power, bandwidth and noise. | U | 3 | |
| | f) | For modulation index of 5 and carrier frequency of 1 MHz, modulating frequency of 5KHz, Calculate bandwidth of FM signal. | A | 3 | |

P.T.O.

| QN | SQN | QUESTION TEXT | RUA | CO EIG 305 | Marks |
|---|---|---|---|---|---|
| **Q.4** | | Attempt any **FOUR** | | | **(08)** |
| | a) | State the principle of simple Automatic Gain Control. (AGC) | U | 4 | |
| | b) | Define the term bandwidth of an antenna and beamwidth of antenna. | R | 5 | |
| | c) | Draw the fidelity curve of the radio receiver. | U | 4 | |
| | d) | State two advantages and two disadvantages of ground wave propagation. | R | 6 | |
| | e) | Define the term maximum usable Frequency. (MUF) | R | 6 | |
| | f) | State two advantages and two applications of loop antenna. | R | 5 | |
| **Q.5** | | Attempt any **FOUR** | | | **(16)** |
| | a) | Explain the concept of actual height and virtual height of sky wave propagation with neat diagram. | U | 5 | |
| | b) | Draw basic ratio detector circuit and explain operation of it. | U | 4 | |
| | c) | Explain with block diagram TRF receiver. | U | 4 | |
| | d) | Compare the resonant and non-resonant antenna with parameters namely circuit, standing waves, reflection and radiation pattern. | R | 5 | |
| | e) | Draw the block diagram of FM receiver. State the functions of each block. | U | 4 | |
| | f) | Enlist properties of electromagnetic wave. Explain any one. | U | 6 | |
| **Q.6** | | Attempt any **FOUR** | | | **(16)** |
| | a) | Explain the sensitivity and selectivity performance characteristics of AM radio receiver with its curve. | R | 4 | |
| | b) | Draw the construction of parabolic reflector antenna and explain. | U | 5 | |
| | c) | Explain multi-path space wave propagation. | U | 6 | |
| | d) | Draw pre-emphasis and De-emphasis circuits and explain its working. | A | 4 | |
| | e) | Draw balanced slope detector and explain its working. | U | 4 | |
| | f) | Explain ground (surface) wave propagation. | R | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

## ODD TERM END EXAM Winter -2023

**EXAM SEAT NO.** | | | | | | |

LEVEL: **THIRD** PROGRAM: **I. E. & E & T.C**

COURSE CODE: **EIG 305/EIF 305** COURSE NAME: **ANALOG COMMUNICATION**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **29/11 /2023**

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Instruction :-

1) Answer must be written in main answer book provided. (and supplements if required)
2) Illustrate your answers with sketches where ever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables will be made available on request.
5) Assume and mention suitable additional data necessary.
6) Use of Mobile is strictly prohibited.
7) **QN**-Question No, **SQN**-Sub-Question No, **R**- Remembering, U-Understanding, **A**-Application **CO**-Course outcome

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| QN | SQN | QUESTION TEXT | RUA | CO -EIG 305 | Marks |
|---|---|---|---|---|---|
| **Q.1** | | Attempt any **FOUR** | | | **(08)** |
| | a) | Classify communication systems. | U | 1 | |
| | b) | Define 1) Noise 2) Noise figure. | R | 1 | |
| | c) | Draw time domain representation of AM wave and lable it. | U | 2 | |
| | d) | Define modulation index in amplitude modulation. Write it's equation. | R | 2 | |
| | e) | Write mathematical expression of 1) FM wave 2) PM wave. | A | 3 | |
| | f) | Why do FM and PM are called as angle modulation techniques. | U | 3 | |
| **Q.2** | | Attempt any **TWO** | | | **(16)** |
| | a) | Draw basic electronic communication block diagram and describe function of each block in detail. | U | 1 | |
| | b) | With the help of block diagram, explain Filter method of SSB generation also write advantages and disadvantages of SSB techniques. | U | 2 | |
| | c) | Differentiate between direct and indirect methods of FM generation. Explain working principle of varactor diode modulator. | U | 3 | |
| **Q.3** | | Attempt any **FOUR** | | | **(16)** |
| | a) | Define modulation. State the need of modulation. | U | 1 | |
| | b) | A typical AM transmitter is transmitting AM wave with carrier power of 400w & depth of modulation is 75%. Calculate total transmitted power. | A | 2 | |
| | c) | Compare low level and high level AM transmitters. | U | 2 | |
| | d) | With the help of waveforms, describe the concept of vestigial sideband. | U | 2 | |
| | e) | Compare AM and FM on the basis of modulation index, transmitted power, bandwidth and noise. | U | 3 | |
| | f) | For modulation index of 5 and carrier frequency of 1 MHz, modulating frequency of 5KHz, Calculate bandwidth of FM signal. | A | 3 | |

P.T.O.

| QN | SQN | QUESTION TEXT | RUA | CO EIG 305 | Marks |
|---|---|---|---|---|---|
| **Q.4** | | Attempt any **FOUR** | | | **(08)** |
| | a) | State the principle of simple Automatic Gain Control. (AGC) | U | 4 | |
| | b) | Define the term bandwidth of an antenna and beamwidth of antenna. | R | 5 | |
| | c) | Draw the fidelity curve of the radio receiver. | U | 4 | |
| | d) | State two advantages and two disadvantages of ground wave propagation. | R | 6 | |
| | e) | Define the term maximum usable Frequency. (MUF) | R | 6 | |
| | f) | State two advantages and two applications of loop antenna. | R | 5 | |
| **Q.5** | | Attempt any **FOUR** | | | **(16)** |
| | a) | Explain the concept of actual height and virtual height of sky wave propagation with neat diagram. | U | 5 | |
| | b) | Draw basic ratio detector circuit and explain operation of it. | U | 4 | |
| | c) | Explain with block diagram TRF receiver. | U | 4 | |
| | d) | Compare the resonant and non-resonant antenna with parameters namely circuit, standing waves, reflection and radiation pattern. | R | 5 | |
| | e) | Draw the block diagram of FM receiver. State the functions of each block. | U | 4 | |
| | f) | Enlist properties of electromagnetic wave. Explain any one. | U | 6 | |
| **Q.6** | | Attempt any **FOUR** | | | **(16)** |
| | a) | Explain the sensitivity and selectivity performance characteristics of AM radio receiver with its curve. | R | 4 | |
| | b) | Draw the construction of parabolic reflector antenna and explain. | U | 5 | |
| | c) | Explain multi-path space wave propagation. | U | 6 | |
| | d) | Draw pre-emphasis and De-emphasis circuits and explain its working. | A | 4 | |
| | e) | Draw balanced slope detector and explain its working. | U | 4 | |
| | f) | Explain ground (surface) wave propagation. | R | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - V PROGRAM : **IE & E&TC**

COURSE CODE :- **EIG512 / EIF 512**

COURSE NAME : **ADVANCE MICROCONTROLLERS**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-30/11/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION –I | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | State any two features of MSP430 Microcontroller. | R | 1 | |
| | b) | Enlist any two Special function registers (SFRs) of PIC18 microcontroller used for Timer/Counter . | R | 2 | |
| | c) | State the addressing modes of the following instructions :<br>1. ADDWF f, d, a 2. MOVLW 0X29 | U | 3 | |
| | d) | List the microcontrollers exist on Arduino UNO R3 board and give their significance | R | 1 | |
| | e) | State any 2 features of PIC18 microcontroller | R | 3 | |
| | f) | State the function of following pins of PIC18 microcontroller:<br>1. RB0/INT0 2. RC5/SDO | U | 2 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain instruction Size in case of PIC18 microcontroller with suitable example. | U | 3 | |
| | b) | Explain Arduino platform with suitable diagram. | U | 1 | |
| | c) | Write an assembly language program to arrange the 10 numbers in ascending order, the numbers are stored in file register at location 30H onwards. | A | 3 | |
| | d) | Explain the Bank switching in PIC18 Microcontroller with a suitable example | U | 2 | |
| | e) | Explain any two Bit oriented instruction of PIC18 microcontroller with suitable example. | A | 3 | |
| | f) | Draw the format of PIC 18 Status Register, also state the significance of each bit of it. | U | 2 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Write assembly language program to add two 16 bit number, the numbers are stored in file register at 20h (first number) and 22h(second number) , Store the result at location 31H and 32H and carry at 30H | A | 3 | |
| | b) | Explain following data format representation of numbers in the instructions.<br>1. Hex number 2. Binary number 3. Decimal number 4. ASCII character. | U | 2 | |
| | c) | Draw the architecture of MSP430 microcontroller. | R | 1 | |
| | d) | Explain any four RISC Architecture features of PIC18 microcontroller. | R | 2 | |
| | e) | Compare the peripheral features of any two from PIC18 family of microcontrollers. | U | 1 | |
| | f) | Explain the following instruction with an example:<br>1. RETLW K 2. CALL k, s | U | 3 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **V** PROGRAM : Industrial Electronics/ Electronics & Telecomm

COURSE CODE :- **EIG512 / EIF512**

COURSE NAME :- **Advance Microcontrollers**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-**30/11/23**

| QN | SQN | SECTION –II | R/U/A | CO | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw the format of T0CON SFR of PIC18 microcontroller? | U | EIG512-4 | |
| | b) | Draw the block diagram of Timer 2 of PIC18 microcontroller | R | EIG512-4 | |
| | c) | State the steps involved in executing an interrupt | U | EIG512-5 | |
| | d) | Draw the format of CCP1CON SFR of CCP module of PIC18 microcontroller | R | EIG512-5 | |
| | e) | State the function of Command and Control registers of 14 pin LCD | U | EIG512-6 | |
| | f) | State the features of DS1306 RTC chip | R | EIG512-6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the block diagram of Timer 1 of PIC18 microcontroller and Explain its operation | R | EIG512-4 | |
| | b) | Write a program to toggle bit 1 of PORTA, bit 2 of PORTB, bit 3 of PORTC continuously after some delay in between. | A | EIG512-4 | |
| | c) | Write a program to transfer string "GPK" serially at baud rate of 9600, 8 bit data, 1 stop bit continuously. Assume Crystal frequency=10 MHz. | A | EIG512-5 | |
| | d) | Write the steps involving in enabling and disabling the interrupts of PIC18 microcontroller | R | EIG512-5 | |
| | e) | Draw the interfacing diagram between 14 pin LCD and PIC18. Also state the significance of LCD pins RS, R/W and E | U | EIG512-6 | |
| | f) | Draw the interfacing diagram between DAC0808 with PIC18. Also write a program to generate sawtooth wave at the output of DAC0808.. | A | EIG512-6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the format of T1CON SFR of Timer 1of PIC18 microcontroller and Explain the function of each bit in it. | U | EIG512-4 | |
| | b) | Assuming that the crystal frequency=12 MHz. Write a program using Timer 2 to turn on LED connected to pin RB1 whenever TMR2 reaches value 50 (decimal). | A | EIG512-4 | |
| | c) | State the SFRs associated with the Serial port of PIC18 microcontroller and Explain any two SFRs in details | U | EIG512-5 | |
| | d) | State the steps for programming the serial port of PIC18 to receive data serially | U | EIG512-5 | |
| | e) | State the steps involved in programming on-chip ADC of PIC18 microcontroller. | U | EIG512-6 | |
| | f) | Write a program to get data from channel 2 (RA2) of on-chip ADC of PIC18 microcontroller and Display the converted result on PORTC and PORTD. Do this continuously after each ¼ th second. | A | EIG512-6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - V PROGRAM : **IE & E&TC**

COURSE CODE :- **EIG512 / EIF 512**

COURSE NAME : **ADVANCE MICROCONTROLLERS**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-**30/11/2023**

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION –I | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | State any two features of MSP430 Microcontroller. | R | 1 | |
| | b) | Enlist any two Special function registers (SFRs) of PIC18 microcontroller used for Timer/Counter . | R | 2 | |
| | c) | State the addressing modes of the following instructions :<br>1. ADDWF f, d, a 2. MOVLW 0X29 | U | 3 | |
| | d) | List the microcontrollers exist on Arduino UNO R3 board and give their significance | R | 1 | |
| | e) | State any 2 features of PIC18 microcontroller | R | 3 | |
| | f) | State the function of following pins of PIC18 microcontroller:<br>1. RB0/INT0 2. RC5/SDO | U | 2 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain instruction Size in case of PIC18 microcontroller with suitable example. | U | 3 | |
| | b) | Explain Arduino platform with suitable diagram. | U | 1 | |
| | c) | Write an assembly language program to arrange the 10 numbers in ascending order, the numbers are stored in file register at location 30H onwards. | A | 3 | |
| | d) | Explain the Bank switching in PIC18 Microcontroller with a suitable example | U | 2 | |
| | e) | Explain any two Bit oriented instruction of PIC18 microcontroller with suitable example. | A | 3 | |
| | f) | Draw the format of PIC 18 Status Register, also state the significance of each bit of it. | U | 2 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Write assembly language program to add two 16 bit number, the numbers are stored in file register at 20h (first number) and 22h(second number) , Store the result at location 31H and 32H and carry at 30H | A | 3 | |
| | b) | Explain following data format representation of numbers in the instructions.<br>1. Hex number 2. Binary number 3. Decimal number 4. ASCII character. | U | 2 | |
| | c) | Draw the architecture of MSP430 microcontroller. | R | 1 | |
| | d) | Explain any four RISC Architecture features of PIC18 microcontroller. | R | 2 | |
| | e) | Compare the peripheral features of any two from PIC18 family of microcontrollers. | U | 1 | |
| | f) | Explain the following instruction with an example:<br>1. RETLW K 2. CALL k, s | U | 3 | |

P.T.O.

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **V** PROGRAM : Industrial Electronics/ Electronics & Telecomm

COURSE CODE :- **EIG512 / EIF512**

COURSE NAME :- **Advance Microcontrollers**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-30/11/23

| QN | SQN | SECTION –II | R/U/A | CO | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw the format of T0CON SFR of PIC18 microcontroller? | U | EIG512-4 | |
| | b) | Draw the block diagram of Timer 2 of PIC18 microcontroller | R | EIG512-4 | |
| | c) | State the steps involved in executing an interrupt | U | EIG512-5 | |
| | d) | Draw the format of CCP1CON SFR of CCP module of PIC18 microcontroller | R | EIG512-5 | |
| | e) | State the function of Command and Control registers of 14 pin LCD | U | EIG512-6 | |
| | f) | State the features of DS1306 RTC chip | R | EIG512-6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the block diagram of Timer 1 of PIC18 microcontroller and Explain its operation | R | EIG512-4 | |
| | b) | Write a program to toggle bit 1 of PORTA, bit 2 of PORTB, bit 3 of PORTC continuously after some delay in between. | A | EIG512-4 | |
| | c) | Write a program to transfer string "GPK" serially at baud rate of 9600, 8 bit data, 1 stop bit continuously. Assume Crystal frequency=10 MHz. | A | EIG512-5 | |
| | d) | Write the steps involving in enabling and disabling the interrupts of PIC18 microcontroller | R | EIG512-5 | |
| | e) | Draw the interfacing diagram between 14 pin LCD and PIC18. Also state the significance of LCD pins RS, R/W and E | U | EIG512-6 | |
| | f) | Draw the interfacing diagram between DAC0808 with PIC18. Also write a program to generate sawtooth wave at the output of DAC0808.. | A | EIG512-6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the format of T1CON SFR of Timer 1of PIC18 microcontroller and Explain the function of each bit in it. | U | EIG512-4 | |
| | b) | Assuming that the crystal frequency=12 MHz. Write a program using Timer 2 to turn on LED connected to pin RB1 whenever TMR2 reaches value 50 (decimal). | A | EIG512-4 | |
| | c) | State the SFRs associated with the Serial port of PIC18 microcontroller and Explain any two SFRs in details | U | EIG512-5 | |
| | d) | State the steps for programming the serial port of PIC18 to receive data serially | U | EIG512-5 | |
| | e) | State the steps involved in programming on-chip ADC of PIC18 microcontroller. | U | EIG512-6 | |
| | f) | Write a program to get data from channel 2 (RA2) of on-chip ADC of PIC18 microcontroller and Display the converted result on PORTC and PORTD. Do this continuously after each ¼ th second. | A | EIG512-6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - FOURTH PROGRAM : ELECTRONICS AND TELECOMMUNICATION
INDUSTRIAL ELECTRONICS

COURSE CODE :-EIG 403 / EIF406

COURSE NAME :-ELECTRONICS CIRCUIT DESIGN

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-30 / 11 / 2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION –I | R/U/A | CO | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Specify the importance of $R_1$ , $R_2$ and $V_{cc}$ as well as $R_E$ in Emitter current bias circuit | R | EIG403-3 | |
| | b) | Identify the factors that affect on the regulator performance | U | EIG403-2 | |
| | c) | Identify a fixed frequency transformer. State the use of it. | U | EIG403-1 | |
| | d) | Define the following parameters of FET:<br>i) Pinch of voltage ii) Peak point voltage | R | EIG403-1 | |
| | e) | Identify a transformer who couple the signal to the load without changing the properties. State the use of it. | U | EIG403-1 | |
| | f) | Define i) Test current of Zener diode and ii). Zener resistance | R | EIG403-1 | |
| Q.2 | | Attempt any **TWO:** | | | **16** |
| | a) | Design a single stage common emitter amplifier for the quiescent condition of ( 6.0V, 1.5mA). If bandwidth is 25 Hz -20 KHz and $R_i \geq 4$ KΩ . Also calculate the stability factor. | A | EIG403-3 | |
| | b) | i) Design an emitter follower regulator to meet the following specifications. Input voltage = 20V to 35 V , output voltage 15V, load current =60 mA.<br>ii) Draw the CE equivalent h-parameter model and define input resistance , output conductance, forward current transfer ratio and reverse voltage transfer ratio. | A<br>R | EIG403-2 EIG403-3 | 4<br>4 |
| | c) | i) Design a regulator using IC 723 to give the output of 15V at 90 mA. The input voltage is given as 35 +/- 10% V and $V_{sc}$ =0.65 V.<br>ii) State the use of intermediate frequency transformer | A<br>R | EIG403-2 EIG403-1 | 6<br>2 |
| Q.3 | | Attempt any **TWO:** | | | **16** |
| | a) | Design a two stage RC coupled amplifier to meet the following specifications : source resistance $R_s$ = 600Ω ; load resistance is 4 KΩ; output voltage $10V_{pp}$ with supply voltage of 12 V, lower 3 dB frequency is 50 Hz. | U | EIG403-3 | |
| | b) | Design a voltage regulator for output voltage of 12V to 20V at 400mA the load current from the unregulated input voltage as 12V using IC 723 | U | EIG403-2 | |
| | c) | i) Design a Zener regulator to provide 9 V output from 15 V unregulated power supply. Also calculate line and load regulation<br>ii) On which parameters, the collector current of amplifier employing a transistor is sensitive?. | A<br>U | | 6<br>2 |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER- 22**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - PROGRAM : IE & E&TC

COURSE CODE :- EIG403 / EIF406

COURSE NAME :- ELECTRONIC CIRCUIT DESIGN

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-30 /11/2023

| QN | SQN | SECTION –II | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define collector efficiency of power amplifier & state its value for transformer coupled class A power amplifier. | R | 4 | |
| | b) | State any two characteristics of class B power amplifier. | R | 4 | |
| | c) | State condition of sustained oscillations. | R | 5 | |
| | d) | Draw the well labeled circuit diagram of Hartley oscillator & write the equation for frequency of oscillations. | U | 5 | |
| | e) | State the function of following pins of IC 555 (i) Trigger (ii) Control voltage | R | 6 | |
| | f) | List any four applications of multivibrator circuits. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Design the RC phase shift oscillator using 741 Op-Amp with a $\pm$10V to produce a 1KHz output frequency. | A | 5 | |
| | b) | Design a transformer coupled class A power amplifier to meet the following requirement. Po=45mW, RL=4Ω, Vcc=9 V. | A | 4 | |
| | c) | Draw circuit of class B power amplifier.and state its disadvantages | U | 4 | |
| | d) | Design a monostable multivibrator using IC555 for pulse duration of 10 ms with reference voltage of 5V. Use Vcc=15V. | A | 6 | |
| | e) | Design an astable multivibrator using 555 to give output frequency fo=10 KHz, duty cycle of 0.6 and supply voltage is $\pm$6V. | A | 6 | |
| | f) | Draw circuit of Wein bridge oscillator using BJT and explain its operation | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Describe the operation of Complementary symmetry push pull type of power amplifier with the help of neat sketch. | U | 4 | |
| | b) | Design the wein bridge oscillator to produce a 100KHz, $\pm$9V output. Design the amplifier to have a closed loop gain of 3. | A | 5 | |
| | c) | Design a Hartley oscillator using 741 to produce a 100KHz output frequency with an amplitude of approximately $\pm$8V.For simplicity assume that there is no mutual inductance between L1 & L2. | A | 5 | |
| | d) | Describe the working of Bistable multivibrator with circuit diagram & waveform using IC555. | R | 6 | |
| | e) | Design an astable multivibrator using Op-Amp to give output frequency of fo=1KHz, supply voltage=$\pm$15V. | A | 6 | |
| | f) | Design Colpitt oscillatorusing BJT to produce a 1MHz output frequency, and output voltage of 1 V rms | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - FOURTH PROGRAM : ELECTRONICS AND TELECOMMUNICATION
INDUSTRIAL ELECTRONICS

COURSE CODE :-EIG 403 / EIF406

COURSE NAME :-ELECTRONICS CIRCUIT DESIGN

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-30 / 11 / 2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION –I | R/U/A | CO | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Specify the importance of $R_1$ , $R_2$ and $V_{cc}$ as well as $R_E$ in Emitter current bias circuit | R | EIG403-3 | |
| | b) | Identify the factors that affect on the regulator performance | U | EIG403-2 | |
| | c) | Identify a fixed frequency transformer. State the use of it. | U | EIG403-1 | |
| | d) | Define the following parameters of FET:<br>i) Pinch of voltage ii) Peak point voltage | R | EIG403-1 | |
| | e) | Identify a transformer who couple the signal to the load without changing the properties. State the use of it. | U | EIG403-1 | |
| | f) | Define i) Test current of Zener diode and ii). Zener resistance | R | EIG403-1 | |
| Q.2 | | Attempt any **TWO:** | | | **16** |
| | a) | Design a single stage common emitter amplifier for the quiescent condition of ( 6.0V, 1.5mA). If bandwidth is 25 Hz -20 KHz and $R_L \geq 4$ KΩ . Also calculate the stability factor. | A | EIG403-3 | |
| | b) | i) Design an emitter follower regulator to meet the following specifications. Input voltage = 20V to 35 V , output voltage 15V, load current =60 mA.<br>ii) Draw the CE equivalent h-parameter model and define input resistance , output conductance, forward current transfer ratio and reverse voltage transfer ratio. | A<br>R | EIG403-2<br>EIG403-3 | 4<br>4 |
| | c) | i) Design a regulator using IC 723 to give the output of 15V at 90 mA. The input voltage is given as 35 +/- 10% V and $V_{sc}$ =0.65 V.<br>ii) State the use of intermediate frequency transformer | A<br>R | EIG403-2<br>EIG403-1 | 6<br>2 |
| Q.3 | | Attempt any **TWO:** | | | **16** |
| | a) | Design a two stage RC coupled amplifier to meet the following specifications : source resistance $R_s$ = 600Ω ; load resistance is 4 KΩ; output voltage $10V_{pp}$ with supply voltage of 12 V, lower 3 dB frequency is 50 Hz. | U | EIG403-3 | |
| | b) | Design a voltage regulator for output voltage of 12V to 20V at 400mA the load current from the unregulated input voltage as 12V using IC 723 | U | EIG403-2 | |
| | c) | i) Design a Zener regulator to provide 9 V output from 15 V unregulated power supply. Also calculate line and load regulation<br>ii) On which parameters, the collector current of amplifier employing a transistor is sensitive?. | A<br>U | | 6<br>2 |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER- 22**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - PROGRAM : IE & E&TC

COURSE CODE :- EIG403 / EIF406

COURSE NAME :- ELECTRONIC CIRCUIT DESIGN

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-30 /11/2023

| QN | SQN | SECTION –II | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define collector efficiency of power amplifier & state its value for transformer coupled class A power amplifier. | R | 4 | |
| | b) | State any two characteristics of class B power amplifier. | R | 4 | |
| | c) | State condition of sustained oscillations. | R | 5 | |
| | d) | Draw the well labeled circuit diagram of Hartley oscillator & write the equation for frequency of oscillations. | U | 5 | |
| | e) | State the function of following pins of IC 555 (i) Trigger (ii) Control voltage | R | 6 | |
| | f) | List any four applications of multivibrator circuits. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Design the RC phase shift oscillator using 741 Op-Amp with a $\pm$10V to produce a 1KHz output frequency. | A | 5 | |
| | b) | Design a transformer coupled class A power amplifier to meet the following requirement. Po=45mW, RL=4Ω, Vcc=9 V. | A | 4 | |
| | c) | Draw circuit of class B power amplifier.and state its disadvantages | U | 4 | |
| | d) | Design a monostable multivibrator using IC555 for pulse duration of 10 ms with reference voltage of 5V. Use Vcc=15V. | A | 6 | |
| | e) | Design an astable multivibrator using 555 to give output frequency fo=10 KHz, duty cycle of 0.6 and supply voltage is $\pm$6V. | A | 6 | |
| | f) | Draw circuit of Wein bridge oscillator using BJT and explain its operation | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Describe the operation of Complementary symmetry push pull type of power amplifier with the help of neat sketch. | U | 4 | |
| | b) | Design the wein bridge oscillator to produce a 100KHz, $\pm$9V output. Design the amplifier to have a closed loop gain of 3. | A | 5 | |
| | c) | Design a Hartley oscillator using 741 to produce a 100KHz output frequency with an amplitude of approximately $\pm$8V.For simplicity assume that there is no mutual inductance between L1 & L2. | A | 5 | |
| | d) | Describe the working of Bistable multivibrator with circuit diagram & waveform using IC555. | R | 6 | |
| | e) | Design an astable multivibrator using Op-Amp to give output frequency of fo=1KHz, supply voltage=$\pm$15V. | A | 6 | |
| | f) | Design Colpitt oscillatorusing BJT to produce a 1MHz output frequency, and output voltage of 1 V rms | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

## ODD TERM END EXAM Winter -2023

**EXAM SEAT NO.** | | | | | | |

LEVEL: **THIRD** PROGRAM: **E. & T. C**

COURSE CODE: **EIG 309** COURSE NAME: **MICROCONTROLLER**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **01/12 /2023**

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Instruction -

1) Answer must be written in main answer book provided. (and supplements if required)
2) Illustrate your answers with sketches where ever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables will be made available on request.
5) Assume and mention suitable additional data necessary.
6) Use of Mobile is strictly prohibited.
7) QN-Question No, SQN-Sub-Question No, R- Remembering, U-Understanding, A-Application CO-Course outcome

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| QN | SQN | QUESTION TEXT | RUA | CO EIG 309 | Marks |
|---|---|---|---|---|---|
| **Q.1** | | Attempt any **FOUR** | | | **(08)** |
| | a) | List any four MCS-51 family members. | R | 1 | |
| | b) | State any four features of 8051 microcontroller. | R | 1 | |
| | c) | State the function of data bus and control bus. | R | 2 | |
| | d) | State any four architectural features of 8051 microcontroller. | U | 2 | |
| | e) | Define the following terms: i) Machine language. Ii) Assembler. | R | 3 | |
| | f) | State the operations of following instructions of 8051. i) DAA ii) DJNZ Rn, label. | U | 3 | |
| **Q.2** | | Attempt any **FOUR** | | | **(16)** |
| | a) | Compare between microprocessor and microcontroller wrt. Following points i) Instruction set ii) Memory organization iii) I/O compatibility iv) Applications | A | 1 | |
| | b) | List the register banks used for 8051 microcontroller & give their address ranges. | U | 2 | |
| | c) | Explain Boolean processor features of 8051 microcontroller. | U | 2 | |
| | d) | List and explain addressing modes of 8051 with example. | U | 3 | |
| | e) | Find the value of register A after execution of the following instructions.<br>MOV A, # 25 H RR A RR A RR A RR A | A | 3 | |
| | f) | Explain the classifications of instruction types of 8051 with example. | U | 3 | |
| **Q.3** | | Attempt any **FOUR** | | | **(16)** |
| | a) | Compare 8051 µc, PIC µc, AVR µc & ARM µc with respect to following points. i) Bits ii) Memory iii) Instruction set iv) Memory architecture | A | 1 | |
| | b) | State and explain the need of the following development tools of micrpcontroller board. i) Editor ii) Assembler iii) Compiler iv) Linker | U | 1 | |
| | c) | Find the status of each flag bit of PSW register after execution of following instructions.<br>i) MOV A, # 0BFH ADD A, #1BH<br>ii) MOV A, # 0CDH ADD A, # 0FFH | A | 2 | |
| | d) | Explain the use of following assembler directives. i) EQU ii) ORG | U | 3 | |
| | e) | Find the contents of register A after execution of following code.<br>i) org 0000H CLR A ORL A, # 99H CPL A<br>ii) org 0000H MOV A, # 37H XRL A, # 0CAH | A | 3 | |
| | f) | Write an ALP for 8051 microcontroller to multiply two 8- bits numbers 23 H & 15 H ( Assume suitable memory addresses to store the result | A | 3 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : **-3** PROGRAM : **IE & E & TC**

COURSE CODE :- **EIG 309**

COURSE NAME :- **Microcontroller.**

MAX. MARKS :**80** TIME : **03 Hrs** DATE :- 01 / 12 / 23

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| QN | SQN | | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw the format for TMOD register along with its bit name. | R | 4 | |
| | b) | Draw the interfacing diagram of 8051 microcontroller with 4×4 matrix keyboard. | U | 5 | |
| | c) | Draw the format for SCON register along with its bit name. | R | 4 | |
| | d) | Enlist the interrupt sources and its vector address of 8051 microcontroller. | R | 4 | |
| | e) | Find how many address lines are required to access 4KB RAM and 8 KB ROM memory. | A | 4 | |
| | f) | What hex value should be loaded in TMOD SFR to configure the timer/counter<br>a) Timer 0 in mode0 and counter 1 in mode2<br>b) counter 0 in mode1 and timer 1 in mode3 | A | 4 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the structure of port 1 and explain its operation. | U | 4 | |
| | b) | Sketch interfacing diagram of 2 KB RAM and 2 KB EPROM with 8051. Draw the memory map. | U | 4 | |
| | c) | Write an assembly language program to transmit the message 'GPKP' through serial port of 8051 with baud rate of 9600 continuously. | A | 4 | |
| | d) | Draw an interfacing diagram of 16×2 LCD with 8051 microcontroller. Explain function of pins RS, EN, RW. | U | 5 | |
| | e) | Draw interfacing diagram of Seven segment display with 8051 microcontroller. Write a program to display values from 0 to 5 on it. | A | 4 | |
| | f) | Write an assembly language program to check bit P1.5, if it is high send FF H to port 2 otherwise send 00 H to port 2. Write the comments. | A | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | With the help of neat diagram explain the mode 1 of serial communication. | U | 4 | |
| | b) | Write an assembly language program to toggle the LED's after every 100 m sec, connected to P1.0 and P1.1. | A | 4 | |
| | c) | Draw an interfacing diagram of DAC with 8051. Write assembly language program to generate triangular waveform at the output of DAC. | A | 5 | |
| | d) | Draw the interfacing Diagram of stepper motor with 8051 microcontroller. Write assembly language program to rotate motor in antilock wise direction. | A | 5 | |
| | e) | Draw an interfacing Diagram of relay with 8051 microcontroller. Write assembly language program to turn on and off the LED connected to it with certain delay. | A | 4 | |
| | f) | Write an assembly language program to generate two square wave of 1KHz and 2 KHz at port pin P2.1& P2.2 resp. Assume crystal frequency = 12 MHz. | A | 4 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

## ODD TERM END EXAM Winter -2023

**EXAM SEAT NO.** | | | | | | |

LEVEL: **THIRD** PROGRAM: **E. & T. C**

COURSE CODE: **EIG 309** COURSE NAME: **MICROCONTROLLER**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **01/12 /2023**

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Instruction -

1) Answer must be written in main answer book provided. (and supplements if required)
2) Illustrate your answers with sketches where ever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables will be made available on request.
5) Assume and mention suitable additional data necessary.
6) Use of Mobile is strictly prohibited.
7) QN-Question No, SQN-Sub-Question No, R- Remembering, U-Understanding, A-Application CO-Course outcome

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| QN | SQN | QUESTION TEXT | RUA | CO EIG 309 | Marks |
|---|---|---|---|---|---|
| **Q.1** | | Attempt any **FOUR** | | | **(08)** |
| | a) | List any four MCS-51 family members. | R | 1 | |
| | b) | State any four features of 8051 microcontroller. | R | 1 | |
| | c) | State the function of data bus and control bus. | R | 2 | |
| | d) | State any four architectural features of 8051 microcontroller. | U | 2 | |
| | e) | Define the following terms: i) Machine language. Ii) Assembler. | R | 3 | |
| | f) | State the operations of following instructions of 8051. i) DAA ii) DJNZ Rn, label. | U | 3 | |
| **Q.2** | | Attempt any **FOUR** | | | **(16)** |
| | a) | Compare between microprocessor and microcontroller wrt. Following points i) Instruction set ii) Memory organization iii) I/O compatibility iv) Applications | A | 1 | |
| | b) | List the register banks used for 8051 microcontroller & give their address ranges. | U | 2 | |
| | c) | Explain Boolean processor features of 8051 microcontroller. | U | 2 | |
| | d) | List and explain addressing modes of 8051 with example. | U | 3 | |
| | e) | Find the value of register A after execution of the following instructions.<br>MOV A, # 25 H RR A RR A RR A RR A | A | 3 | |
| | f) | Explain the classifications of instruction types of 8051 with example. | U | 3 | |
| **Q.3** | | Attempt any **FOUR** | | | **(16)** |
| | a) | Compare 8051 µc, PIC µc, AVR µc & ARM µc with respect to following points. i) Bits ii) Memory iii) Instruction set iv) Memory architecture | A | 1 | |
| | b) | State and explain the need of the following development tools of micrpcontroller board. i) Editor ii) Assembler iii) Compiler iv) Linker | U | 1 | |
| | c) | Find the status of each flag bit of PSW register after execution of following instructions.<br>i) MOV A, # 0BFH ADD A, #1BH<br>ii) MOV A, # 0CDH ADD A, # 0FFH | A | 2 | |
| | d) | Explain the use of following assembler directives. i) EQU ii) ORG | U | 3 | |
| | e) | Find the contents of register A after execution of following code.<br>i) org 0000H CLR A ORL A, # 99H CPL A<br>ii) org 0000H MOV A, # 37H XRL A, # 0CAH | A | 3 | |
| | f) | Write an ALP for 8051 microcontroller to multiply two 8- bits numbers 23 H & 15 H ( Assume suitable memory addresses to store the result | A | 3 | |

P.T.O.

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : **-3** PROGRAM : **IE & E & TC**

COURSE CODE :- **EIG 309**

COURSE NAME :- **Microcontroller.**

MAX. MARKS :**80** TIME : **03 Hrs** DATE :- 01 / 12 / 23

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| QN | SQN | | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw the format for TMOD register along with its bit name. | R | 4 | |
| | b) | Draw the interfacing diagram of 8051 microcontroller with 4×4 matrix keyboard. | U | 5 | |
| | c) | Draw the format for SCON register along with its bit name. | R | 4 | |
| | d) | Enlist the interrupt sources and its vector address of 8051 microcontroller. | R | 4 | |
| | e) | Find how many address lines are required to access 4KB RAM and 8 KB ROM memory. | A | 4 | |
| | f) | What hex value should be loaded in TMOD SFR to configure the timer/counter<br>a) Timer 0 in mode0 and counter 1 in mode2<br>b) counter 0 in mode1 and timer 1 in mode3 | A | 4 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the structure of port 1 and explain its operation. | U | 4 | |
| | b) | Sketch interfacing diagram of 2 KB RAM and 2 KB EPROM with 8051. Draw the memory map. | U | 4 | |
| | c) | Write an assembly language program to transmit the message 'GPKP' through serial port of 8051 with baud rate of 9600 continuously. | A | 4 | |
| | d) | Draw an interfacing diagram of 16×2 LCD with 8051 microcontroller. Explain function of pins RS, EN, RW. | U | 5 | |
| | e) | Draw interfacing diagram of Seven segment display with 8051 microcontroller. Write a program to display values from 0 to 5 on it. | A | 4 | |
| | f) | Write an assembly language program to check bit P1.5, if it is high send FF H to port 2 otherwise send 00 H to port 2. Write the comments. | A | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | With the help of neat diagram explain the mode 1 of serial communication. | U | 4 | |
| | b) | Write an assembly language program to toggle the LED's after every 100 m sec, connected to P1.0 and P1.1. | A | 4 | |
| | c) | Draw an interfacing diagram of DAC with 8051. Write assembly language program to generate triangular waveform at the output of DAC. | A | 5 | |
| | d) | Draw the interfacing Diagram of stepper motor with 8051 microcontroller. Write assembly language program to rotate motor in antilock wise direction. | A | 5 | |
| | e) | Draw an interfacing Diagram of relay with 8051 microcontroller. Write assembly language program to turn on and off the LED connected to it with certain delay. | A | 4 | |
| | f) | Write an assembly language program to generate two square wave of 1KHz and 2 KHz at port pin P2.1& P2.2 resp. Assume crystal frequency = 12 MHz. | A | 4 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER / SUMMER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 4 PROGRAM : ENTC

COURSE CODE :- ETG-405 / ETF 403 / ETE 403

COURSE NAME :- DATA COMMUNICATION AND NETWORKING

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | List the five components of a data communications system | R | ETG405-1 | 02 |
| | b) | Draw diagram of star topology and write its advantages. (any two) | R | ETG405-2 | 02 |
| | c) | Define switch. Classify the switching networks. | R | ETG405-3 | 02 |
| | d) | Enlist various topologies. Describe hybrid network topology. | R | ETG402-2 | 02 |
| | e) | Define Bursty Data. | R | ETG405-3 | 02 |
| | f) | Draw a hybrid topology with a star backbone and three ring networks. | R | ETG405-2 | 02 |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | State: (a) Nyquist Bit Rate Formula (b) Shannon Formula for Highest Data Rate. | U | ETG402-1 | 04 |
| | b) | Draw the block schematic of modem and describe its function. Write various standards used in modem. | U | ETG402-2 | 04 |
| | c) | Compare a circuit switched network and a packet switched network, on the basis of : 1) OSI layer 2) communication phases 3) delay 4) application | U | ETG402-3 | 04 |
| | d) | Compare baseband transmission and broadband transmission of digital signal, on the basis of (a) Definition (b) Bandwidth (c) applications (d) diagram | A | ETG402-1 | 04 |
| | e) | Describe 1) MAN 2) WAN with reference to diagram, area covered and application. | A | ETG402-2 | 04 |
| | f) | Write any four features of circuit switched network. | U | ETG402-3 | 04 |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Define:- (a) Protocol (b) standards | A | ETG402-1 | 04 |
| | b) | Draw TCP/IP protocol suite and describe the function of each layer. | U | ETG402-2 | 04 |
| | c) | Describe the concept of routing table in datagram switching. | U | ETG402-3 | 04 |
| | d) | Compare simplex, half duplex, and full duplex data transmission modes on the basis of:- (a) definition (b) complexity (c) applications (d) diagram. | A | ETG402-1 | 04 |
| | e) | Compare twisted pair cable with co-axial cable on the basis of (a) constructional details (b) strength (c) connectors (d) performance | U | ETG402-2 | 04 |
| | f) | Describe set up phase of virtual circuit switching with reference to set-up request and acknowledgement sub-phases. | U | ETG402-3 | 04 |

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - PROGRAM : **E&TC**

COURSE CODE :- **ETG405** / ETF403 / ETE403

COURSE NAME :- **DATA COMMUNICATION AND NETWORKING**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION –II | R/U/A | Co ETG405 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the types of errors. | R | ETG405-4 | |
| | b) | Define piggybacking. | R | ETG405-4 | |
| | c) | Define cryptography. | R | ETG405-5 | |
| | d) | State any four IEEE standards. | R | ETG405-5 | |
| | e) | State any two applications of SMTP. | R | ETG405-6 | |
| | f) | Give any two examples of World wide web. | R | ETG405-6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain Stop-N-wait protocol. | U | ETG405-4 | |
| | b) | Explain the concept of framing in data link control layer. | U | ETG405-4 | |
| | c) | Explain the operation of PCF in MAC layer of IEEE802.11 standard with suitable diagram. | U | ETG405-5 | |
| | d) | Explain FHSS with respect to IEEE 802.11 standard. | U | ETG405-5 | |
| | e) | Draw and explain file transfer protocol. | U | ETG405-6 | |
| | f) | Explain SNMP protocol with suitable block diagram. | U | ETG405-6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain Go-Back-N ARQ protocol. | U | ETG405-4 | |
| | b) | Explain any one error detection method with suitable diagram. | U | ETG405-4 | |
| | c) | Explain the concept of Gigabit ethernet in wireless LAN. | U | ETG405-5 | |
| | d) | Draw and explain architecture of IEEE 802.11 standard. | U | ETG405-5 | |
| | e) | Explain Uniform resource locator with example. | U | ETG405-6 | |
| | f) | Explain the concept of Telnet. | U | ETG405-6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER / SUMMER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 4 PROGRAM : ENTC

COURSE CODE :- ETG-405 / ETF403 / ETE403

COURSE NAME :- DATA COMMUNICATION AND NETWORKING

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | List the five components of a data communications system | R | ETG405-1 | 02 |
| | b) | Draw diagram of star topology and write its advantages. (any two) | R | ETG405-2 | 02 |
| | c) | Define switch. Classify the switching networks. | R | ETG405-3 | 02 |
| | d) | Enlist various topologies. Describe hybrid network topology. | R | ETG402-2 | 02 |
| | e) | Define Bursty Data. | R | ETG405-3 | 02 |
| | f) | Draw a hybrid topology with a star backbone and three ring networks. | R | ETG405-2 | 02 |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | State: (a) Nyquist Bit Rate Formula (b) Shannon Formula for Highest Data Rate. | U | ETG402-1 | 04 |
| | b) | Draw the block schematic of modem and describe its function. Write various standards used in modem. | U | ETG402-2 | 04 |
| | c) | Compare a circuit switched network and a packet switched network, on the basis of : 1) OSI layer 2) communication phases 3) delay 4) application | U | ETG402-3 | 04 |
| | d) | Compare baseband transmission and broadband transmission of digital signal, on the basis of (a) Definition (b) Bandwidth (c) applications (d) diagram | A | ETG402-1 | 04 |
| | e) | Describe 1) MAN 2) WAN with reference to diagram, area covered and application. | A | ETG402-2 | 04 |
| | f) | Write any four features of circuit switched network. | U | ETG402-3 | 04 |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Define:- (a) Protocol (b) standards | A | ETG402-1 | 04 |
| | b) | Draw TCP/IP protocol suite and describe the function of each layer. | U | ETG402-2 | 04 |
| | c) | Describe the concept of routing table in datagram switching. | U | ETG402-3 | 04 |
| | d) | Compare simplex, half duplex, and full duplex data transmission modes on the basis of:- (a) definition (b) complexity (c) applications (d) diagram. | A | ETG402-1 | 04 |
| | e) | Compare twisted pair cable with co-axial cable on the basis of (a) constructional details (b) strength (c) connectors (d) performance | U | ETG402-2 | 04 |
| | f) | Describe set up phase of virtual circuit switching with reference to set-up request and acknowledgement sub-phases. | U | ETG402-3 | 04 |

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - PROGRAM : **E&TC**

COURSE CODE :- **ETG405** / ETF403 / ETE403

COURSE NAME :- **DATA COMMUNICATION AND NETWORKING**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
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5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION –II | R/U/A | Co ETG405 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the types of errors. | R | ETG405-4 | |
| | b) | Define piggybacking. | R | ETG405-4 | |
| | c) | Define cryptography. | R | ETG405-5 | |
| | d) | State any four IEEE standards. | R | ETG405-5 | |
| | e) | State any two applications of SMTP. | R | ETG405-6 | |
| | f) | Give any two examples of World wide web. | R | ETG405-6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain Stop-N-wait protocol. | U | ETG405-4 | |
| | b) | Explain the concept of framing in data link control layer. | U | ETG405-4 | |
| | c) | Explain the operation of PCF in MAC layer of IEEE802.11 standard with suitable diagram. | U | ETG405-5 | |
| | d) | Explain FHSS with respect to IEEE 802.11 standard. | U | ETG405-5 | |
| | e) | Draw and explain file transfer protocol. | U | ETG405-6 | |
| | f) | Explain SNMP protocol with suitable block diagram. | U | ETG405-6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain Go-Back-N ARQ protocol. | U | ETG405-4 | |
| | b) | Explain any one error detection method with suitable diagram. | U | ETG405-4 | |
| | c) | Explain the concept of Gigabit ethernet in wireless LAN. | U | ETG405-5 | |
| | d) | Draw and explain architecture of IEEE 802.11 standard. | U | ETG405-5 | |
| | e) | Explain Uniform resource locator with example. | U | ETG405-6 | |
| | f) | Explain the concept of Telnet. | U | ETG405-6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 20**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - Fourth PROGRAM : Electronics and telecommunication

COURSE CODE :- EIG406 / EIF 404

COURSE NAME :- Principle

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
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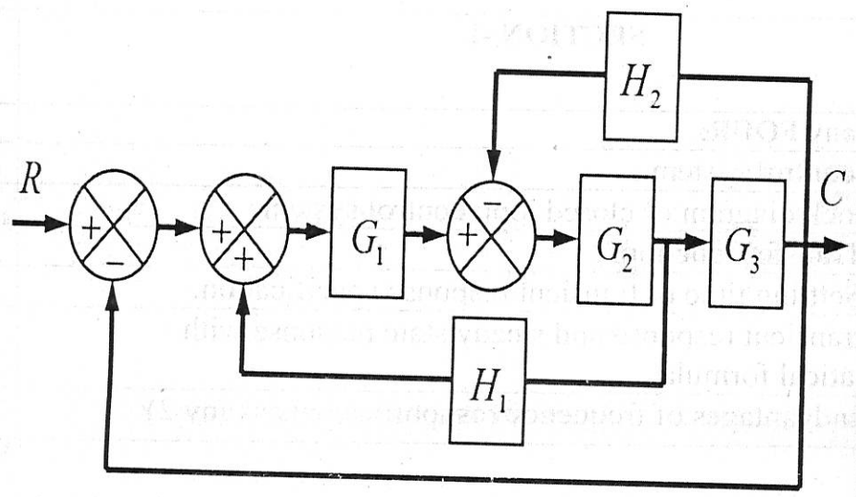
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | EIG406 | **08** |
| | a) | Define: control system. | R | 1 | |
| | b) | Draw block diagram of closed loop control system. | R | 1 | |
| | c) | Define Transfer function. | R | 1 | |
| | d) | Define Settling time of transient response specification. | R | 2 | |
| | e) | Define transient response and steady state response with mathematical formula. | U | 2 | |
| | f) | State disadvantages of frequency response analysis.(any 2) | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Derive the transfer function of closed loop control system. | U | 1 | |
| | b) | Explain any four block diagram reduction rules with neat diagram. | U | 1 | |
| | c) | For the given transfer function **T.F.**=$\frac{(S+2)}{S(S2+2S+2)(S^2+7S+12)}$ Find: i) Poles ii) Zeros iii) Characteristic equation iv) Pole- Zero plot. | A | 2 | |
| | d) | State the general procedure for constructing Bode plot. | U | 3 | |
| | e) | State the correlation between time and frequency domain specifications. | A | 3 | |
| | f) | Transfer function of 2nd order system is given by $\frac{C(S)}{R(S)}=\frac{16}{S^2+5S+16}$. Find i) Natural frequency of oscillation ii) Damping ratio iii) Peak time iv) Settling time. | A | 2 | |
| | | | | | |
| Q.3 | | Attempt any **TWO:** | | | **16** |
| | a) | Describe four standard test inputs of their Laplace transform with mathematical expression and waveform. | A | 2 | |
| | b) | Determine the stability of the system by plotting Bode plot for the system having open loop transfer function on semi log paper. G(S) H(S)= $\frac{10}{S(S+1)(S+10)}$ | A | 3 | |
| | c) | Derive the transfer function of block diagram shown in Fig.(a) | A | 1 | |

P.T.O.

Q3)c)

Reduce the Block Diagram.



# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 20**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - IV PROGRAM : ENTC/IE

COURSE CODE :-EIG 406 / EIF 404

COURSE NAME :-PRINCIPLES OF CONTROL SYSTEM

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02/12/23

| QN | SQN | SECTION –II | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR**: | | | **08** |
| | a) | Draw the rotary encoder. | R | 5 | |
| | b) | Define the term of stability. State the location of roots on S-plane for unstable system. | U | 4 | |
| | c) | Define the servo system and state types of it. | U | 5 | |
| | d) | List two applications of ON-OFF controller. | R | 6 | |
| | e) | State the two advantages of Routh's array. | R | 4 | |
| | f) | State two application of Routh's criteria. | U | 4 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR**: | | | **16** |
| | a) | Draw and explain ON-OFF controller with standard equation and draw waveform of it. | U | 6 | |
| | b) | Draw the diagram of armature-controlled DC servomotor. State the components of it and write the mathematical equation of angular displacement and back emf Eb. | U | 5 | |
| | c) | Explain the block diagram of process control system. | U | 6 | |
| | d) | A system has $G(S)\cdot H(S) = \frac{K}{S(S+2)(S+4)(S+6)}$ where K is positive. Find 1) Characteristics equation 2) Range of K value for stability. | A | 4 | |
| | e) | Comparison between stepper motor and DC servo motor (any four points). | R | 5 | |
| | f) | Calculate angle of asymptotes and centroid for $G(s)H(s)=\frac{K}{(s+1)\,(s+2+2j)\,(s+2-2j)}$ and draw the diagram of it. | U | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR**: | | | **16** |
| | a) | Explain the operation of potentiometer as error detector with help of diagram. | U | 5 | |
| | b) | Draw and explain the proportional controller using op – amp. State equation of it. | U | 6 | |
| | c) | Obtain stability of system whose characteristics equation is $s^5 + s^4 + 3s^3 + 9s^2 + 16s + 10 = 0$ use Routh's criteria. | A | 4 | |
| | d) | Draw and explain the block diagram DC position of control system. | U | 5 | |
| | e) | Explain the steps to draw the root locus. | U | 4 | |
| | f) | Compare I and D control action with respect to<br>(i) Nature of output (iii) Equation<br>(ii) Response of error (iv) Application | R | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 20**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - Fourth PROGRAM : Electronics and telecommunication

COURSE CODE :- EIG406 / EIF 404

COURSE NAME :- Principle

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
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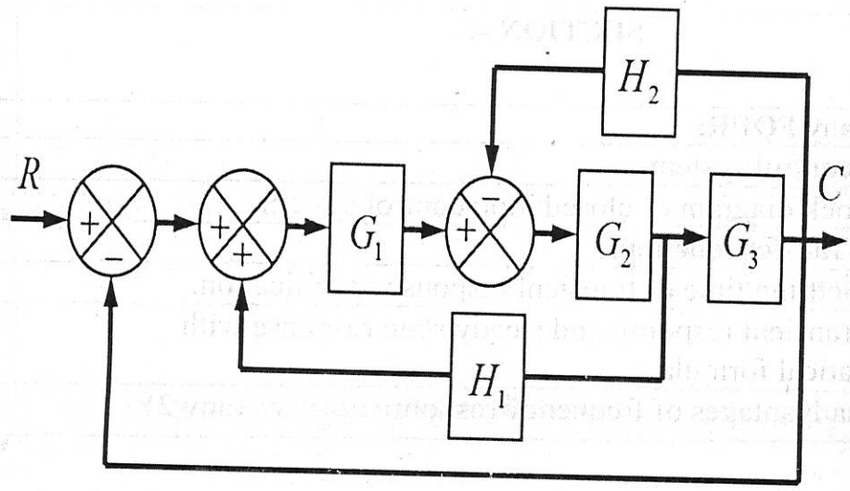
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | EIG406 | **08** |
| | a) | Define: control system. | R | 1 | |
| | b) | Draw block diagram of closed loop control system. | R | 1 | |
| | c) | Define Transfer function. | R | 1 | |
| | d) | Define Settling time of transient response specification. | R | 2 | |
| | e) | Define transient response and steady state response with mathematical formula. | U | 2 | |
| | f) | State disadvantages of frequency response analysis.(any 2) | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Derive the transfer function of closed loop control system. | U | 1 | |
| | b) | Explain any four block diagram reduction rules with neat diagram. | U | 1 | |
| | c) | For the given transfer function **T.F.**=$\frac{(S+2)}{S(S2+2S+2)(S^2+7S+12)}$ Find: i) Poles ii) Zeros iii) Characteristic equation iv) Pole- Zero plot. | A | 2 | |
| | d) | State the general procedure for constructing Bode plot. | U | 3 | |
| | e) | State the correlation between time and frequency domain specifications. | A | 3 | |
| | f) | Transfer function of 2nd order system is given by $\frac{C(S)}{R(S)}=\frac{16}{S^2+5S+16}$. Find i) Natural frequency of oscillation ii) Damping ratio iii) Peak time iv) Settling time. | A | 2 | |
| | | | | | |
| Q.3 | | Attempt any **TWO:** | | | **16** |
| | a) | Describe four standard test inputs of their Laplace transform with mathematical expression and waveform. | A | 2 | |
| | b) | Determine the stability of the system by plotting Bode plot for the system having open loop transfer function on semi log paper. G(S) H(S)= $\frac{10}{S(S+1)(S+10)}$ | A | 3 | |
| | c) | Derive the transfer function of block diagram shown in Fig.(a) | A | 1 | |

P.T.O.

Q3)c)

Reduce the Block Diagram.



# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 20**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - IV PROGRAM : ENTC/IE

COURSE CODE :-EIG 406 / EIF 404

COURSE NAME :-PRINCIPLES OF CONTROL SYSTEM

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02/12/23

| QN | SQN | SECTION –II | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR**: | | | **08** |
| | a) | Draw the rotary encoder. | R | 5 | |
| | b) | Define the term of stability. State the location of roots on S-plane for unstable system. | U | 4 | |
| | c) | Define the servo system and state types of it. | U | 5 | |
| | d) | List two applications of ON-OFF controller. | R | 6 | |
| | e) | State the two advantages of Routh's array. | R | 4 | |
| | f) | State two application of Routh's criteria. | U | 4 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR**: | | | **16** |
| | a) | Draw and explain ON-OFF controller with standard equation and draw waveform of it. | U | 6 | |
| | b) | Draw the diagram of armature-controlled DC servomotor. State the components of it and write the mathematical equation of angular displacement and back emf Eb. | U | 5 | |
| | c) | Explain the block diagram of process control system. | U | 6 | |
| | d) | A system has $G(S)\cdot H(S) = \frac{K}{S(S+2)(S+4)(S+6)}$ where K is positive. Find 1) Characteristics equation 2) Range of K value for stability. | A | 4 | |
| | e) | Comparison between stepper motor and DC servo motor (any four points). | R | 5 | |
| | f) | Calculate angle of asymptotes and centroid for $G(s)H(s)=\frac{K}{(s+1)\,(s+2+2j)\,(s+2-2j)}$ and draw the diagram of it. | U | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR**: | | | **16** |
| | a) | Explain the operation of potentiometer as error detector with help of diagram. | U | 5 | |
| | b) | Draw and explain the proportional controller using op – amp. State equation of it. | U | 6 | |
| | c) | Obtain stability of system whose characteristics equation is $s^5 + s^4 + 3s^3 + 9s^2 + 16s + 10 = 0$ use Routh's criteria. | A | 4 | |
| | d) | Draw and explain the block diagram DC position of control system. | U | 5 | |
| | e) | Explain the steps to draw the root locus. | U | 4 | |
| | f) | Compare I and D control action with respect to<br>(i) Nature of output (iii) Equation<br>(ii) Response of error (iv) Application | R | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 3 PROGRAM : ENTC
COURSE CODE :- ETG310
COURSE NAME :- DIGITAL COMMUNICATION
MAX. MARKS : **80** TIME : **03 Hrs** DATE :04/12/2023

Instruction :-

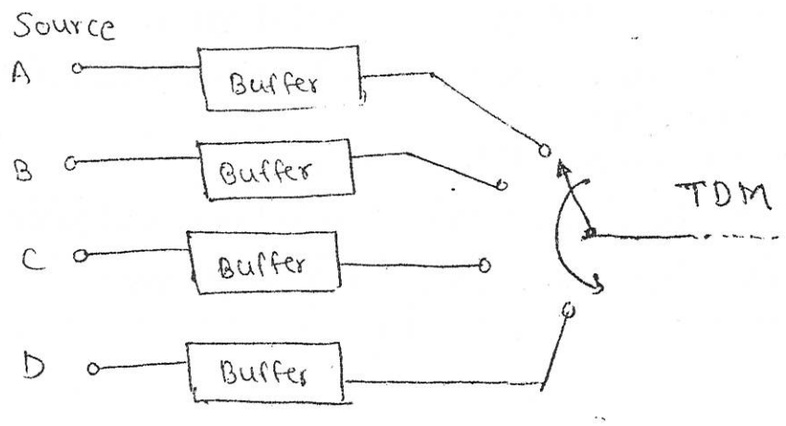
1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co ETG 310 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the two applications of digital communication. | R | 1 | 02 |
| | b) | Compare ASK with FSK (any 2 points). | U | 3 | 02 |
| | c) | State advantages of digital communication. | R | 1 | 02 |
| | d) | State sampling theorem. | U | 2 | 02 |
| | e) | List two advantages of M-ary signaling over binary modulation. | R | 3 | 02 |
| | f) | State the types of quantization. | R | 2 | 02 |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the block diagram of digital communication system. Explain function of source encoder and channel encoder. | U | 1 | 04 |
| | b) | Describe slope overload and granular noise in Delta Modulation system. | A | 2 | 04 |
| | c) | With suitable waveforms describe the term FSK and PSK. | A | 3 | 04 |
| | d) | Draw the block diagram of Adaptive Delta Modulation transmitter and explain its working. | U | 2 | 04 |
| | e) | Define ASK and FSK with waveforms. | R | 3 | 04 |
| | f) | Describe QAM transmitter with the block diagram. | U | 3 | 04 |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain flat top sampling with circuit diagram. | U | 2 | 04 |
| | b) | Describe PCM transmitter with block diagram. | U | 2 | 04 |
| | c) | State the two advantages and two disadvantages of digital communication. | R | 1 | 04 |
| | d) | Draw and explain QPSK transmitter. | U | 3 | 04 |
| | e) | Explain Differential Pulse Code Modulation with block diagram. | U | 2 | 04 |
| | f) | Differentiate between BPSK and QPSK. (4 points) | R | 3 | 04 |

P.T.O.

| QN | SQN | Question Text | R/U/A | Co ETG 310 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define Line coding. Give classification of line coding. | R | 4 | |
| | b) | Give advantages of TDMA over FDMA. | U | 5 | |
| | c) | Sketch the signal waveforms when data 11000010 is transmitted in polar Rz and manchester codes. | A | 4 | |
| | d) | Define multiplexing in communication system. Write its types. | R | 5 | |
| | e) | List out advantages and disadvantages of FHSS system. | R | 6 | |
| | f) | Draw the block diagram of direct sequence spread spectrum transmitter. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Identify the type of multiplexing shown in Fig. below and explain its operating principle. ( Please refer last page for diagram) | A | 5 | |
| | b) | A seven bit Hamming code is received as 1110101. What is the correct code? Assume the parity to be even. | A | 4 | |
| | c) | Explain fast frequency hopping with suitable diagram. | U | 6 | |
| | d) | Describe FDMA transmission system with suitable schematic diagram. | U | 5 | |
| | e) | Explain single bit error and burst error with suitable example. | U | 4 | |
| | f) | Describe the stepwise procedure in CRC generation. | U | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Generate CRC code for dataword 1101101001 by using divisor as 1101. | A | 4 | |
| | b) | Differentiate between FDMA and CDMA techniques based on following points i) Definition ii) Bandwidth iii) Synchronisation iv) Application | A | 5 | |
| | c) | Draw the block diagram of PN-sequence generator using A-D-flip-flop. Define the term: PN-sequence. | U | 6 | |
| | d) | Sketch the single waveforms for a binary sequence 10100110 for following single codes:- i) Polar Rz ii) Unipolar NRz iii) Unipolar Rz iv) Polar NRZ. | A | 4 | |
| | e) | Differentiate between DSSS and FHSS system with respect to following points i) Defination ii) Chip Rate iii) Modulation technique used iv) Effect of fading. | A | 6 | |
| | f) | Describe wavelength division multiplexing with neat diagram. | U | 5 | |

Q5. (a)



# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 3 PROGRAM : ENTC

COURSE CODE :- ETG310

COURSE NAME :- DIGITAL COMMUNICATION

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-04/12/2023

Instruction :-

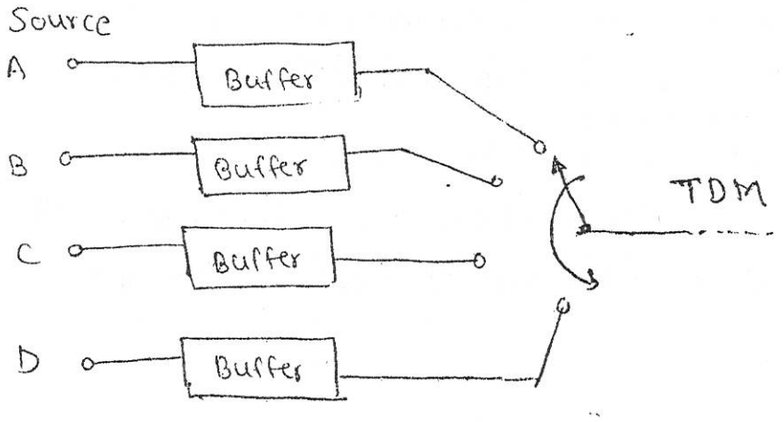
1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co ETG 310 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the two applications of digital communication. | R | 1 | 02 |
| | b) | Compare ASK with FSK (any 2 points). | U | 3 | 02 |
| | c) | State advantages of digital communication. | R | 1 | 02 |
| | d) | State sampling theorem. | U | 2 | 02 |
| | e) | List two advantages of M-ary signaling over binary modulation. | R | 3 | 02 |
| | f) | State the types of quantization. | R | 2 | 02 |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the block diagram of digital communication system. Explain function of source encoder and channel encoder. | U | 1 | 04 |
| | b) | Describe slope overload and granular noise in Delta Modulation system. | A | 2 | 04 |
| | c) | With suitable waveforms describe the term FSK and PSK. | A | 3 | 04 |
| | d) | Draw the block diagram of Adaptive Delta Modulation transmitter and explain its working. | U | 2 | 04 |
| | e) | Define ASK and FSK with waveforms. | R | 3 | 04 |
| | f) | Describe QAM transmitter with the block diagram. | U | 3 | 04 |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain flat top sampling with circuit diagram. | U | 2 | 04 |
| | b) | Describe PCM transmitter with block diagram. | U | 2 | 04 |
| | c) | State the two advantages and two disadvantages of digital communication. | R | 1 | 04 |
| | d) | Draw and explain QPSK transmitter. | U | 3 | 04 |
| | e) | Explain Differential Pulse Code Modulation with block diagram. | U | 2 | 04 |
| | f) | Differentiate between BPSK and QPSK. (4 points) | R | 3 | 04 |

P.T.O.

| QN | SQN | Question Text | R/U/A | Co ETG 310 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define Line coding. Give classification of line coding. | R | 4 | |
| | b) | Give advantages of TDMA over FDMA. | U | 5 | |
| | c) | Sketch the signal waveforms when data 11000010 is transmitted in polar Rz and manchester codes. | A | 4 | |
| | d) | Define multiplexing in communication system. Write its types. | R | 5 | |
| | e) | List out advantages and disadvantages of FHSS system. | R | 6 | |
| | f) | Draw the block diagram of direct sequence spread spectrum transmitter. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Identify the type of multiplexing shown in Fig. below and explain its operating principle. ( Please refer last page for diagram) | A | 5 | |
| | b) | A seven bit Hamming code is received as 1110101. What is the correct code? Assume the parity to be even. | A | 4 | |
| | c) | Explain fast frequency hopping with suitable diagram. | U | 6 | |
| | d) | Describe FDMA transmission system with suitable schematic diagram. | U | 5 | |
| | e) | Explain single bit error and burst error with suitable example. | U | 4 | |
| | f) | Describe the stepwise procedure in CRC generation. | U | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Generate CRC code for dataword 1101101001 by using divisor as 1101. | A | 4 | |
| | b) | Differentiate between FDMA and CDMA techniques based on following points i) Definition ii) Bandwidth iii) Synchronisation iv) Application | A | 5 | |
| | c) | Draw the block diagram of PN-sequence generator using A-D-flip-flop. Define the term: PN-sequence. | U | 6 | |
| | d) | Sketch the single waveforms for a binary sequence 10100110 for following single codes:- i) Polar Rz ii) Unipolar NRz iii) Unipolar Rz iv) Polar NRZ. | A | 4 | |
| | e) | Differentiate between DSSS and FHSS system with respect to following points i) Defination ii) Chip Rate iii) Modulation technique used iv) Effect of fading. | A | 6 | |
| | f) | Describe wavelength division multiplexing with neat diagram. | U | 5 | |

Q5. (a)



# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 3 PROGRAM :Electronics And Telecommunication

COURSE CODE :- ETG306/ EIF 306

COURSE NAME :-Digital Techniques &Applications

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-04/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | S QN | **SECTION -I** | R/ U/ A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define number system | R | ETG306-1 | 02 |
| | b) | Compare positive and negative logic(any 2 points) | R | ETG306-1 | 02 |
| | c) | State De-morgan's second theorem. | R | ETG306-2 | 02 |
| | d) | State AND laws. | U | ETG306-2 | 02 |
| | e) | Define i) Noise margin ii) Propagation delay | R | ETG306-3 | 02 |
| | f) | List the disadvantages of CMOS logic family (any 2) | R | ETG306-3 | 02 |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Convert the following<br>i) $(204)_{10} = (----------)_2$ ii) $(4C8.2)_{16} = (----------)_2$ | U | ETG306-1 | 04 |
| | b) | Perform the following binary subtraction<br>$(1010011)_2 - (1011010)_2$ | A | ETG306-1 | 04 |
| | c) | State and Prove De-Morgan's first theorem | U | ETG306-2 | 04 |
| | d) | State Associative and Distributive law. | R | ETG306-2 | 04 |
| | e) | Compare TTL and CMOS logic family (any 4 points) | R | ETG306-3 | 04 |
| | f) | Explain the working of CMOS NOR gate. | A | ETG306-3 | 04 |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Perform binary subtraction using 2's complement<br>i) $(4)_{10} - (9)_{10}$ ii) $(1101)_2 - (1001)_2$ | A | ETG306-1 | 04 |
| | b) | Convert the following<br>i)$(648)_{10}$= ( $)_2$ ii) $(11010101111)_2 = (---------)_{16}$ | R | ETG306-1 | 04 |
| | c) | Explain the terms SOP and POS with examples. | A | ETG306-2 | 04 |
| | d) | Apply Boolean laws and show that<br>i)A'B'C'+A'BC'+AB'C'=C'(A'+B')<br>ii)XYZ'+XY+Y+X'Z=Y+X'Z | A | ETG306-2 | 04 |
| | e) | Simplify using K-map<br>$F(A,B,C,D)=\sum m\ (1,3,4,5,6,7,8,9,13,15)$ | A | ETG306-2 | 04 |
| | f) | Describe the working of CMOS inverter | A | ETG306-3 | 04 |

P.T.O.

| QN | SQN | Question Text | R/U/A | Co ETG 306 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | What is disadvantage of half adder? | R | 4 | |
| | b) | Draw logic diagram and write truth table for 2:1 multiplexer. | A | 4 | |
| | c) | Write truth table of SR Flip flop. | R | 5 | |
| | d) | What do you mean by edge triggered flip flop? | U | 5 | |
| | e) | Why A to D and D to A conversion is necessary in digital systems? | U | 6 | |
| | f) | Write any four types of ROM. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Which IC is used as 16:1 multiplexer? Write truth table for the same. | U | 4 | |
| | b) | Draw logic diagram and circuit diagram of 1:4 demultiplexer | A | 4 | |
| | c) | Write working of JK flip fop by using circuit diagram and truth table. | U | 5 | |
| | d) | Draw circuit diagram of 4 bit right and left shift register. | A | 5 | |
| | e) | Compare single slope and dual slope ADC (Any four points.) | U | 6 | |
| | f) | Differentiate static and dynamic memory (Any 4 points) | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw block schematic of 1:64 demux using 1:16 demux. | A | 4 | |
| | b) | Write operation of priority encoder IC 74147 using logic diagram. | U | 4 | |
| | c) | Write full adder circuit diagram and truth table. | R | 4 | |
| | d) | What is race around condition? How it can be overcome? | U | 5 | |
| | e) | Draw logic symbol of shift register.<br>i) SISO ii) SIPO iii) PISO iv) PIPO | A | 5 | |
| | f) | Draw timing diagram and write truth table for 4 bit ripple down counter. | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 3 PROGRAM :Electronics And Telecommunication

COURSE CODE :- ETG306/ EIF306

COURSE NAME :-Digital Techniques &Applications

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-04/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | S QN | **SECTION -I** | R/ U/ A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define number system | R | ETG306-1 | 02 |
| | b) | Compare positive and negative logic(any 2 points) | R | ETG306-1 | 02 |
| | c) | State De-morgan's second theorem. | R | ETG306-2 | 02 |
| | d) | State AND laws. | U | ETG306-2 | 02 |
| | e) | Define i) Noise margin ii) Propagation delay | R | ETG306-3 | 02 |
| | f) | List the disadvantages of CMOS logic family (any 2) | R | ETG306-3 | 02 |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Convert the following<br>i) $(204)_{10} = (----------)_2$ ii) $(4C8.2)_{16} = (----------)_2$ | U | ETG306-1 | 04 |
| | b) | Perform the following binary subtraction<br>$(1010011)_2 - (1011010)_2$ | A | ETG306-1 | 04 |
| | c) | State and Prove De-Morgan's first theorem | U | ETG306-2 | 04 |
| | d) | State Associative and Distributive law. | R | ETG306-2 | 04 |
| | e) | Compare TTL and CMOS logic family (any 4 points) | R | ETG306-3 | 04 |
| | f) | Explain the working of CMOS NOR gate. | A | ETG306-3 | 04 |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Perform binary subtraction using 2's complement<br>i) $(4)_{10} - (9)_{10}$ ii) $(1101)_2 - (1001)_2$ | A | ETG306-1 | 04 |
| | b) | Convert the following<br>i)$(648)_{10} = (\quad)_2$ ii) $(11010101111)_2 = (---------)_{16}$ | R | ETG306-1 | 04 |
| | c) | Explain the terms SOP and POS with examples. | A | ETG306-2 | 04 |
| | d) | Apply Boolean laws and show that<br>i)A'B'C'+A'BC'+AB'C'=C'(A'+B')<br>ii)XYZ'+XY+Y+X'Z=Y+X'Z | A | ETG306-2 | 04 |
| | e) | Simplify using K-map<br>$F(A,B,C,D)=\sum m\,(1,3,4,5,6,7,8,9,13,15)$ | A | ETG306-2 | 04 |
| | f) | Describe the working of CMOS inverter | A | ETG306-3 | 04 |

P.T.O.

| QN | SQN | Question Text | R/U/A | Co ETG 306 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | What is disadvantage of half adder? | R | 4 | |
| | b) | Draw logic diagram and write truth table for 2:1 multiplexer. | A | 4 | |
| | c) | Write truth table of SR Flip flop. | R | 5 | |
| | d) | What do you mean by edge triggered flip flop? | U | 5 | |
| | e) | Why A to D and D to A conversion is necessary in digital systems? | U | 6 | |
| | f) | Write any four types of ROM. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Which IC is used as 16:1 multiplexer? Write truth table for the same. | U | 4 | |
| | b) | Draw logic diagram and circuit diagram of 1:4 demultiplexer | A | 4 | |
| | c) | Write working of JK flip fop by using circuit diagram and truth table. | U | 5 | |
| | d) | Draw circuit diagram of 4 bit right and left shift register. | A | 5 | |
| | e) | Compare single slope and dual slope ADC (Any four points.) | U | 6 | |
| | f) | Differentiate static and dynamic memory (Any 4 points) | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | .a) | Draw block schematic of 1:64 demux using 1:16 demux. | A | 4 | |
| | b) | Write operation of priority encoder IC 74147 using logic diagram. | U | 4 | |
| | c) | Write full adder circuit diagram and truth table. | R | 4 | |
| | d) | What is race around condition? How it can be overcome? | U | 5 | |
| | e) | Draw logic symbol of shift register.<br>i) SISO ii) SIPO iii) PISO iv) PIPO | A | 5 | |
| | f) | Draw timing diagram and write truth table for 4 bit ripple down counter. | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : -5 PROGRAM : ETC

COURSE CODE :- ETG 511 / IEG 505 / IEF 502

COURSE NAME :- Programmable Logic Controller

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-05/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | **SECTION -I** | R/U/A | Co ETG 511 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw the block diagram of DCS. | R | 1 | |
| | b) | List any four benefits of automation. | U | 1 | |
| | c) | Give specification of AC input module. | U | 2 | |
| | d) | Give classification of timer and counter in PLC. | R | 3 | |
| | e) | List the arithmetic instructions used in PLC. | R | 3 | |
| | f) | Draw the waveform for non-retentive off delay timer. | U | 3 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Describe the PLC operation. | U | 1 | |
| | b) | Draw the structure of micro-PLC and explain it. | R | 1 | |
| | c) | Draw the block diagram of AC output module and explain working of each block. | R | 2 | |
| | d) | Draw and explain sinking and sourcing module in PLC. | U | 2 | |
| | e) | Draw and explain the format of ON Delay Timer with waveform. | A | 3 | |
| | f) | Draw and explain the use of up counter instruction with format and waveform. | A | 3 | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain the term speed of execution. | U | 1 | |
| | b) | Draw the structure of modular PLC and explain it. | R | 1 | |
| | c) | Explain the selection criterion of I/O module. | U | 2 | |
| | d) | With neat sketch explain discrete input module of a PLC. | R | 2 | |
| | e) | Draw and explain the format of OFF Delay Timer with waveform. | A | 3 | |
| | f) | Explain the Following instructions of PLC<br>i) SQI ii) NEG<br>iii) SQO iv) MOV | A | 3 | |

P.T.O.

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL: - Fifth PROGRAM: Electronics & Telecommunication Engineering

COURSE CODE: - ETG 511 / TEG505 / TEF502

COURSE NAME: - Programmable Logic Controller

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-05/12/2023

| QN | SQN | SECTION –II | R/U/A | Co ETG 511 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw the ladder diagram for NOR Gate and NAND Gate. | A | 4 | |
| | b) | List any four names of PLC programming languages. | R | 4 | |
| | c) | Draw the ladder diagram for given boolean equation Y = (A.B) + (C.D) | A | 4 | |
| | d) | List any four of Industrial applications of PLC | R | 5 | |
| | e) | List input output devices that are required to control the temperature of OVEN. | R | 5 | |
| | f) | Define noise suppression and grounding in PLC. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain ladder diagram for following boolean expressions:<br>i) $Y1 = (A+B).(\overline{C.D})$<br>ii) $Y2 = P.Q.R + \bar{S}.T$<br>iii) $Z = Y1 + Y2$ | U | 4 | |
| | b) | Two Motors are running in a sequence one by one for a particular time. If the start button is pressed Motors run in sequence such that 1st Motor stays ON for 5secs and then 2nd Motor is turned ON and stays ON for 5secs. And the cycle is repeated until it is interrupted. While motors are running in the sequence, if one motor is running and the button of other motor is pressed, then the running Motor should stop and the other motor should run. Implement this logic in PLC using Ladder Diagram programming language. | A | 5 | |
| | c) | Write a ladder logic program for stepper motor control to rotate the motor in anti-clock wise direction continuously until the stop push button is pressed. | U | 5 | |
| | d) | Illustrate the steps for PLC troubleshooting. | A | 6 | |
| | e) | Explain the following terms related to PLC installation:<br>i) Enclosures PLC installation.<br>ii) Leaky Inputs and Outputs. | U | 6 | |
| | f) | Explain architecture of SCADA. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Develop ladder diagram for 3 motor operations for following conditions<br>i) Start push button starts motors M1 and<br>ii) after 10 seconds motor M2 starts and<br>iii) after 10 seconds motor M3 starts<br>iv) Stop PB stops all motors. | A | 4 | |
| | b) | Write a ladder logic program for converting 400 $^0$Celcius to $^0$Fahrenheit. Using equation $^0F = {}^0C \times 9/5 + 32$. | A | 4 | |
| | c) | Write a ladder diagram for following conditions: A thumbwheel switch (Rotary encoder) is connected to the 4 inputs of PLC. When timer is OFF, load thumbwheel switch data as a preset value of timer. When timer times out start motor M1. | U | 4 | |
| | d) | A classroom has a capacity of maximum 120 students. There are two doors, one for Entry and the other for Exit. When number of students in the classroom is less than 120, Entry door has a Green light on it which remains ON. When number of students in the classroom is 120 or more than that, Red light goes ON turning OFF the Green light which indicates that the classroom has reached its maximum capacity and is full. | A | 5 | |
| | e) | Explain speed control of AC/ DC motor using programmable drives and PLC. | U | 5 | |
| | f) | Illustrate the various benefits of SCADA. | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : -5 PROGRAM : ETC

COURSE CODE :- ETG 511 / IEG 505 / IEF 502

COURSE NAME :- Programmable Logic Controller

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-05/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | **SECTION -I** | R/U/A | Co ETG 511 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw the block diagram of DCS. | R | 1 | |
| | b) | List any four benefits of automation. | U | 1 | |
| | c) | Give specification of AC input module. | U | 2 | |
| | d) | Give classification of timer and counter in PLC. | R | 3 | |
| | e) | List the arithmetic instructions used in PLC. | R | 3 | |
| | f) | Draw the waveform for non-retentive off delay timer. | U | 3 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Describe the PLC operation. | U | 1 | |
| | b) | Draw the structure of micro-PLC and explain it. | R | 1 | |
| | c) | Draw the block diagram of AC output module and explain working of each block. | R | 2 | |
| | d) | Draw and explain sinking and sourcing module in PLC. | U | 2 | |
| | e) | Draw and explain the format of ON Delay Timer with waveform. | A | 3 | |
| | f) | Draw and explain the use of up counter instruction with format and waveform. | A | 3 | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain the term speed of execution. | U | 1 | |
| | b) | Draw the structure of modular PLC and explain it. | R | 1 | |
| | c) | Explain the selection criterion of I/O module. | U | 2 | |
| | d) | With neat sketch explain discrete input module of a PLC. | R | 2 | |
| | e) | Draw and explain the format of OFF Delay Timer with waveform. | A | 3 | |
| | f) | Explain the Following instructions of PLC<br>i) SQI ii) NEG<br>iii) SQO iv) MOV | A | 3 | |

P.T.O.

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL: - Fifth PROGRAM: Electronics & Telecommunication Engineering

COURSE CODE: - ETG 511 /TEG505/TEF502

COURSE NAME: - Programmable Logic Controller

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-05/12/2023

| QN | SQN | SECTION –II | R/U/A | Co ETG 511 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw the ladder diagram for NOR Gate and NAND Gate. | A | 4 | |
| | b) | List any four names of PLC programming languages. | R | 4 | |
| | c) | Draw the ladder diagram for given boolean equation Y = (A.B) + (C.D) | A | 4 | |
| | d) | List any four of Industrial applications of PLC | R | 5 | |
| | e) | List input output devices that are required to control the temperature of OVEN. | R | 5 | |
| | f) | Define noise suppression and grounding in PLC. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain ladder diagram for following boolean expressions:<br>i) $Y1 = (A+B).(\overline{C.D})$<br>ii) $Y2 = P.Q.R + \bar{S}.T$<br>iii) $Z = Y1 + Y2$ | U | 4 | |
| | b) | Two Motors are running in a sequence one by one for a particular time. If the start button is pressed Motors run in sequence such that 1st Motor stays ON for 5secs and then 2nd Motor is turned ON and stays ON for 5secs. And the cycle is repeated until it is interrupted. While motors are running in the sequence, if one motor is running and the button of other motor is pressed, then the running Motor should stop and the other motor should run. Implement this logic in PLC using Ladder Diagram programming language. | A | 5 | |
| | c) | Write a ladder logic program for stepper motor control to rotate the motor in anti-clock wise direction continuously until the stop push button is pressed. | U | 5 | |
| | d) | Illustrate the steps for PLC troubleshooting. | A | 6 | |
| | e) | Explain the following terms related to PLC installation:<br>i) Enclosures PLC installation.<br>ii) Leaky Inputs and Outputs. | U | 6 | |
| | f) | Explain architecture of SCADA. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Develop ladder diagram for 3 motor operations for following conditions<br>i) Start push button starts motors M1 and<br>ii) after 10 seconds motor M2 starts and<br>iii) after 10 seconds motor M3 starts<br>iv) Stop PB stops all motors. | A | 4 | |
| | b) | Write a ladder logic program for converting 400 $^0$Celcius to $^0$Fahrenheit. Using equation $^0F = {}^0C \times 9/5 + 32$. | A | 4 | |
| | c) | Write a ladder diagram for following conditions: A thumbwheel switch (Rotary encoder) is connected to the 4 inputs of PLC. When timer is OFF, load thumbwheel switch data as a preset value of timer. When timer times out start motor M1. | U | 4 | |
| | d) | A classroom has a capacity of maximum 120 students. There are two doors, one for Entry and the other for Exit. When number of students in the classroom is less than 120, Entry door has a Green light on it which remains ON. When number of students in the classroom is 120 or more than that, Red light goes ON turning OFF the Green light which indicates that the classroom has reached its maximum capacity and is full. | A | 5 | |
| | e) | Explain speed control of AC/ DC motor using programmable drives and PLC. | U | 5 | |
| | f) | Illustrate the various benefits of SCADA. | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - Third PROGRAM : IE & ENTC

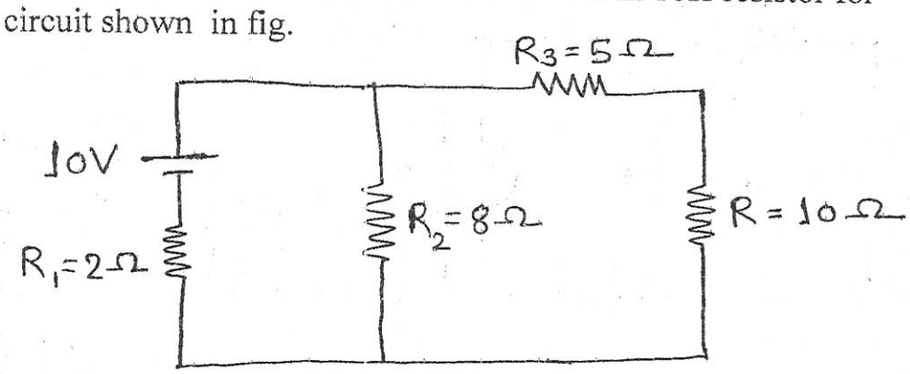
COURSE CODE :- EIG 308

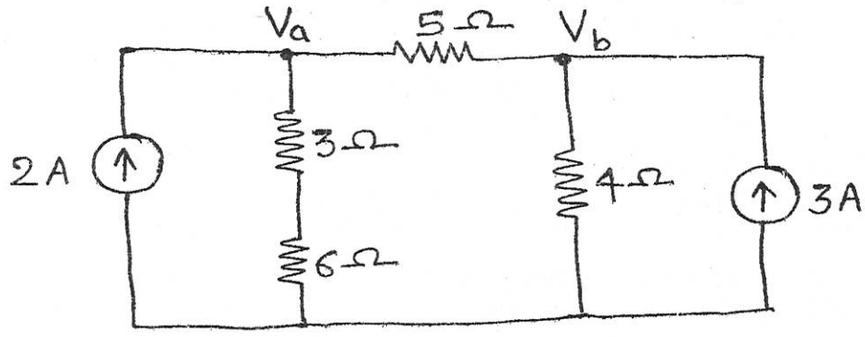
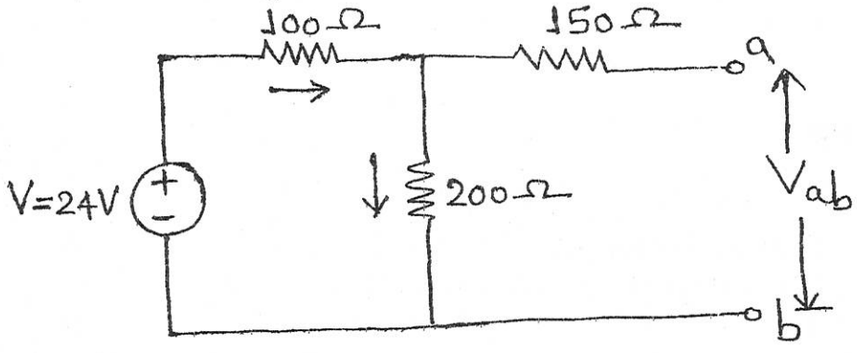
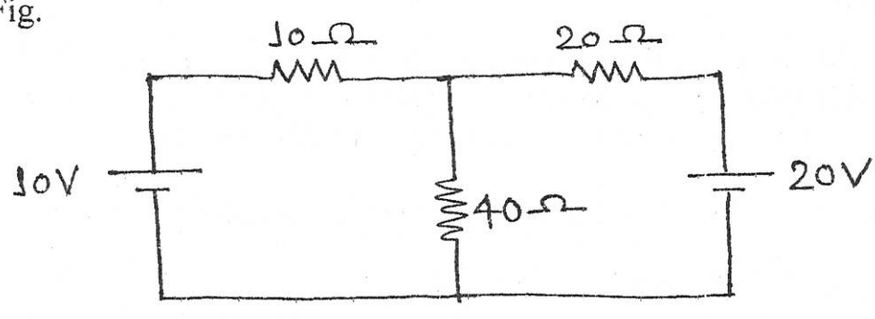
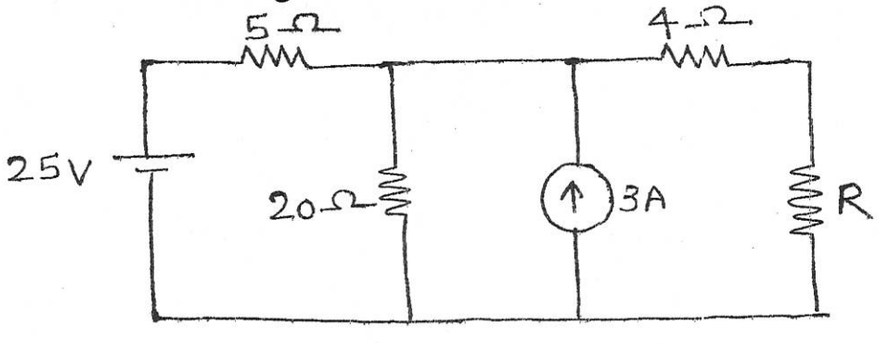
COURSE NAME :- Circuit & Network

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 6 / **12** / **2023**

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | | R/U/A | CO EIG 308 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | R | EIG 308-1 | **08** |
| | a) | Define terms i) Electric Charge ii) Resistance | A | EIG 308-2 | |
| | b) | Sketch Circuit with three resistors of values R1 , R2 & R3 connected in parallel & state its equivalent resistance formula | R | EIG 308-3 | |
| | c) | State Thevenin's theorem | R | EIG 308-1 | |
| | d) | State Kirchoff 's current Law | R | EIG 308-2 | |
| | e) | Draw circuit of practical voltage source & ideal current source | R | EIG 308-3 | |
| | f) | State Superposition Theorem. | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Calculate the value of current flowing through a 20Ω resistor connected in series with 40Ω resistor ,when the supply voltage across the series combination is 12 V DC. Also calculate voltage drop produced across each resistor. | A | EIG 308-3 | |
| | b) | Distinguish between short circuit & open circuit (Any 4 points) | U | EIG 308-1 | |
| | c) | Explain steps to solve example with Mesh analysis. | U | EIG 308-1 | |
| | d) | Explain maximum power transfer theorem with example. | U | EIG 308-2 | |
| | e) | Explain conversion of practical voltage source into practical current source. | U | EIG 308-3 | |
| | f) | Use Thevenin's theorem to find the current in 10Ω resistor for circuit shown in fig.   | A | EIG 308-2 | |

| Q.3 | | Attempt any **FOUR:** | | | 16 |
|---|---|---|---|---|---|
| | a) | Calculate the node voltage of given circuit shown in Fig.<br>  | A | EIG 308-2 | |
| | b) | Distinguish between series & parallel circuits. | U | EIG 308-2 | |
| | c) | Find Thevenin's equivalent circuit representation of following circuit shown in Fig.<br>  | A | EIG 308-3 | |
| | d) | Define following terms in DC circuits theory<br>i)Node ii)Loop iii)Mesh iv) Path | U | EIG 308-1 | |
| | e) | Find current flowing through 40Ω resistor by using KVL. Shown in Fig.<br>  | A | EIG 308-1 | |
| | f) | Find value of R (in ohms) for maximum power transfer in the network shown in Fig.<br>  | A | EIG 308-3 | |



P.T.O.

| QN | SQN | | R/U/A | CO EIG 308 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw R-L Low pass filter. | R | 6 | |
| | b) | Define i) Inductive reactance ii) Capacitive reactance. | R | 4 | |
| | c) | State condition for resonance of circuit . | R | 5 | |
| | d) | Give classification of filters. | R | 6 | |
| | e) | Define quality factor. Give it's equation. | R | 5 | |
| | f) | Find capacitive reactance. A sine wave applied to capacitor as shown in given fig. F. The frequency of sine wave 1KHz | A | 4 | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain charging of capacitor through resistor. Draw graph to show variation of capacitor voltage & charging current w.r.t. time | U | 4 | |
| | b) | Define Resonance. Derive condition for resonance in series circuit and series resonant frequency. | U | 5 | |
| | c) | Draw & explain R-L High pass filter. | U | 6 | |
| | d) | Determine capacitor voltage shown in Fig. G at a point at time 6 ms after the switch is closed. Sketch the discharging curve. | A | 4 | |
| | e) | Define quality factor (Q) If band widh is 100 KHz & resonant frequency is 10 KHz. Find Q. | A | 5 | |
| | f) | Determine i) o/p voltage magnitude at frequency ii) The bandwidth for the filter shown in Fig. H | A | 6 | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Describe band stop filter. Explain parallel resonant band stop filter. | U | 6 | |
| | b) | Determine the average power & reactive power for given circuit shown in Fig. I | A | 4 | |
| | c) | Determine the impedance magnitude at resonance at 1000Hz above resonance and at 1000Hz below resonance. Refer Fig J | A | 5 | |
| | d) | Find the output voltage magnitude at $f_r$ and bandwidth for given circuit shown in Fig K | A | 6 | |
| | e) | Find the voltage across each capacitor when $C_1=0.1\mu f$ $C_2=0.5\mu f$ $C_3=0.2\ \mu f$ are connected in series supply voltage $V_S=25V$ | A | 4 | |
| | f) | Define the formula for cut off frequencies. Draw the response curve showing -3dB points. | A | 6 | |

********** 3/4

Q. 4 f

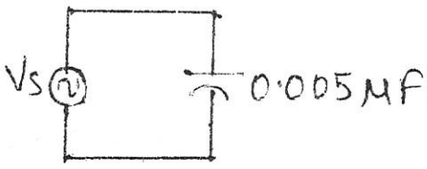



Fig. F.

Q. 5 d

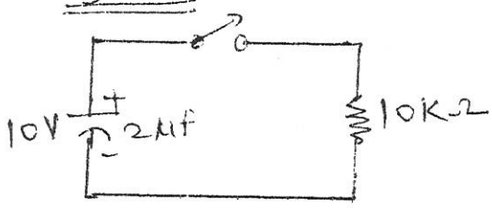



Fig. G.

Q. 6 b

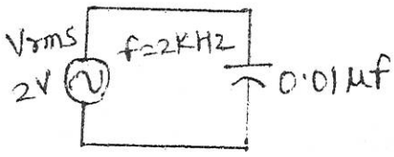



Fig. I

Q. 5 f

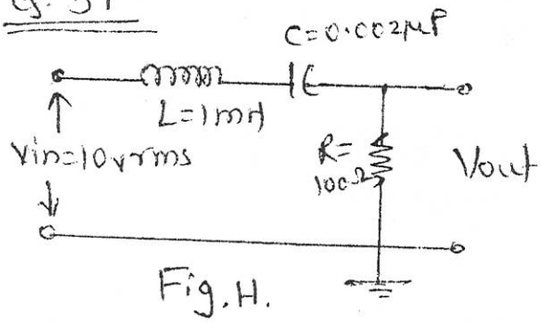



Fig. H.

Q. 6 d

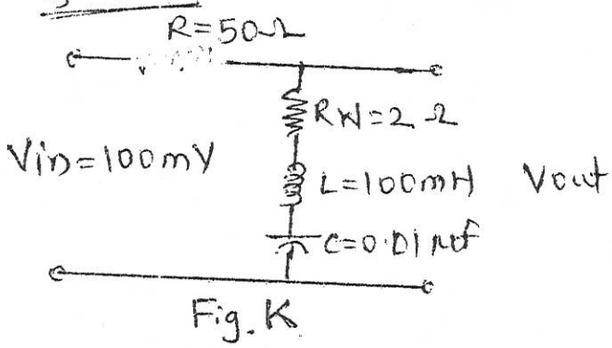



Fig. K

Q. 6 C

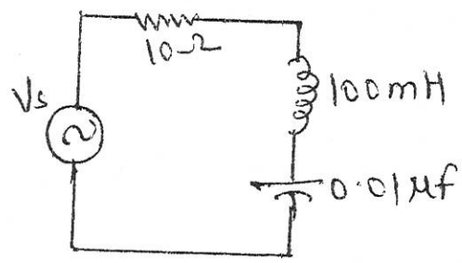



Fig. J.

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - Third PROGRAM : IE & ENTC

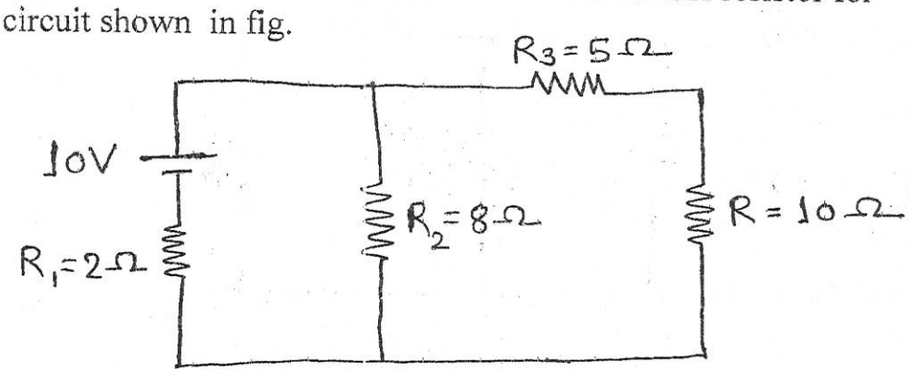
COURSE CODE :- EIG 308

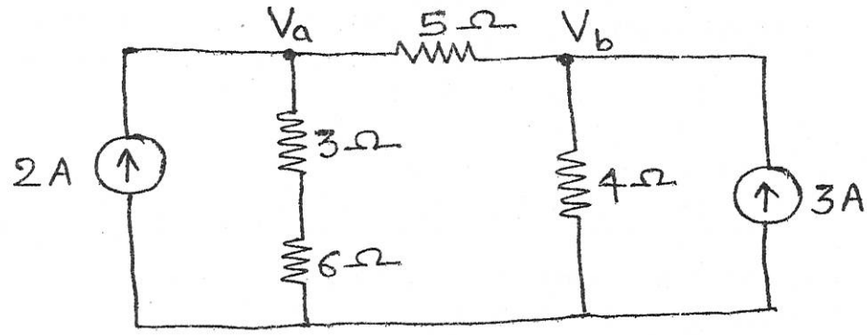
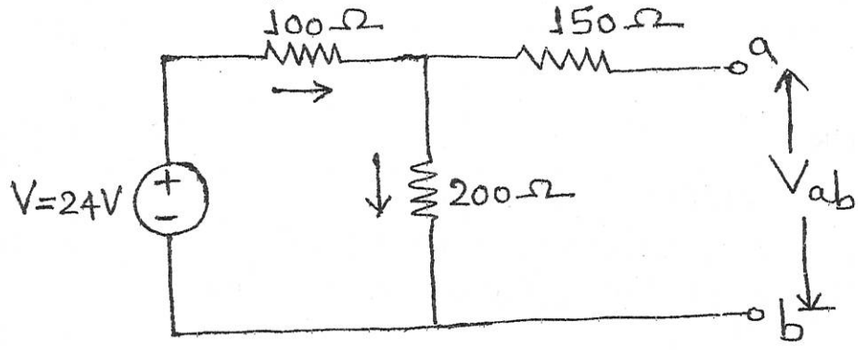
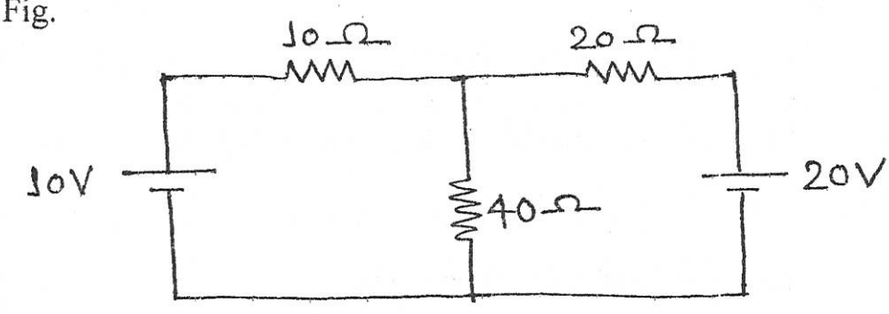
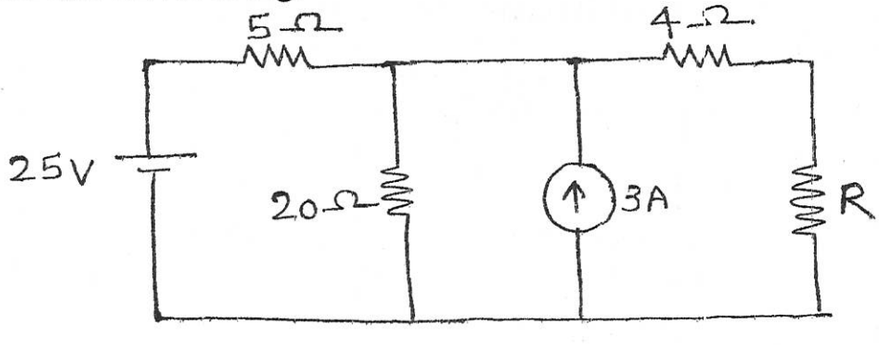
COURSE NAME :- Circuit & Network

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 6 / **12** / **2023**

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | | R/U/A | CO EIG 308 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | R | EIG 308-1 | **08** |
| | a) | Define terms i) Electric Charge ii) Resistance | A | EIG 308-2 | |
| | b) | Sketch Circuit with three resistors of values R1 , R2 & R3 connected in parallel & state its equivalent resistance formula | R | EIG 308-3 | |
| | c) | State Thevenin's theorem | R | EIG 308-1 | |
| | d) | State Kirchoff 's current Law | R | EIG 308-2 | |
| | e) | Draw circuit of practical voltage source & ideal current source | R | EIG 308-3 | |
| | f) | State Superposition Theorem. | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Calculate the value of current flowing through a 20Ω resistor connected in series with 40Ω resistor ,when the supply voltage across the series combination is 12 V DC. Also calculate voltage drop produced across each resistor. | A | EIG 308-3 | |
| | b) | Distinguish between short circuit & open circuit (Any 4 points) | U | EIG 308-1 | |
| | c) | Explain steps to solve example with Mesh analysis. | U | EIG 308-1 | |
| | d) | Explain maximum power transfer theorem with example. | U | EIG 308-2 | |
| | e) | Explain conversion of practical voltage source into practical current source. | U | EIG 308-3 | |
| | f) | Use Thevenin's theorem to find the current in 10Ω resistor for circuit shown in fig.   | A | EIG 308-2 | |

| Q.3 | | Attempt any **FOUR:** | | | 16 |
|---|---|---|---|---|---|
| | a) | Calculate the node voltage of given circuit shown in Fig.   | A | EIG 308-2 | |
| | b) | Distinguish between series & parallel circuits. | U | EIG 308-2 | |
| | c) | Find Thevenin's equivalent circuit representation of following circuit shown in Fig.   | A | EIG 308-3 | |
| | d) | Define following terms in DC circuits theory<br>i)Node ii)Loop iii)Mesh iv) Path | U | EIG 308-1 | |
| | e) | Find current flowing through 40Ω resistor by using KVL. Shown in Fig.   | A | EIG 308-1 | |
| | f) | Find value of R (in ohms) for maximum power transfer in the network shown in Fig.   | A | EIG 308-3 | |

| QN | SQN | | R/U/A | CO EIG 308 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw R-L Low pass filter. | R | 6 | |
| | b) | Define i) Inductive reactance ii) Capacitive reactance. | R | 4 | |
| | c) | State condition for resonance of circuit . | R | 5 | |
| | d) | Give classification of filters. | R | 6 | |
| | e) | Define quality factor. Give it's equation. | R | 5 | |
| | f) | Find capacitive reactance. A sine wave applied to capacitor as shown in given fig. F. The frequency of sine wave 1KHz | A | 4 | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain charging of capacitor through resistor. Draw graph to show variation of capacitor voltage & charging current w.r.t. time | U | 4 | |
| | b) | Define Resonance. Derive condition for resonance in series circuit and series resonant frequency. | U | 5 | |
| | c) | Draw & explain R-L High pass filter. | U | 6 | |
| | d) | Determine capacitor voltage shown in Fig. G at a point at time 6 ms after the switch is closed. Sketch the discharging curve. | A | 4 | |
| | e) | Define quality factor (Q) If band widh is 100 KHz & resonant frequency is 10 KHz. Find Q. | A | 5 | |
| | f) | Determine i) o/p voltage magnitude at frequency ii) The bandwidth for the filter shown in Fig. H | A | 6 | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Describe band stop filter. Explain parallel resonant band stop filter. | U | 6 | |
| | b) | Determine the average power & reactive power for given circuit shown in Fig. I | A | 4 | |
| | c) | Determine the impedance magnitude at resonance at 1000Hz above resonance and at 1000Hz below resonance. Refer Fig J | A | 5 | |
| | d) | Find the output voltage magnitude at $f_r$ and bandwidth for given circuit shown in Fig K | A | 6 | |
| | e) | Find the voltage across each capacitor when $C_1$=0.1μf $C_2$= 0.5μf $C_3$ = 0.2 μf are connected in series supply voltage Vs= 25V | A | 4 | |
| | f) | Define the formula for cut off frequencies. Draw the response curve showing -3dB points. | A | 6 | |

********** 3/4

Q. 4 f

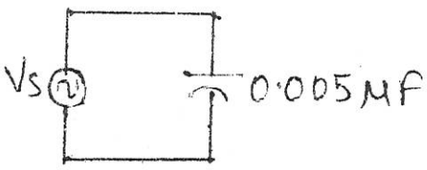



Fig. F.

Q. 5 d

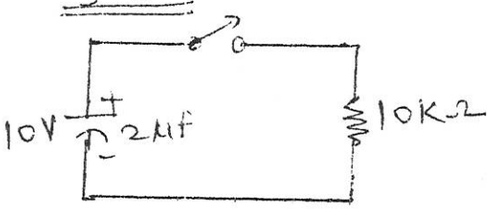



Fig. G.

Q. 6 b

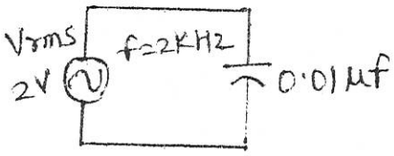



Fig. I

Q. 5 f

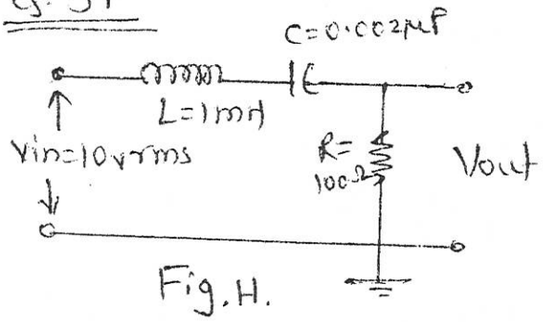



Fig. H.

Q. 6 d

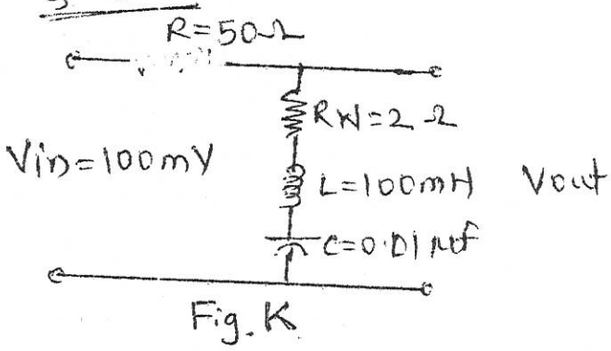



Fig. K

Q. 6 C

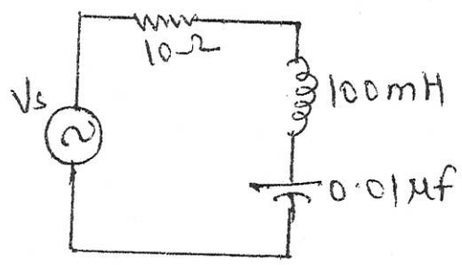



Fig. J.

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - V PROGRAM : Electronics and Telecommunication Engineering

COURSE CODE :- ETG407

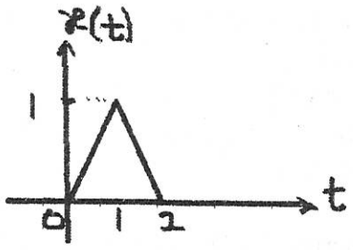
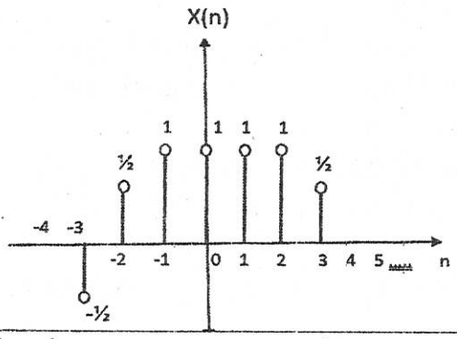
COURSE NAME :- Signals and Systems

MAX. MARKS : **80** TIME : **03 Hrs** DATE :05/12/203

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | CO (ETG407) | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR** : | | | **08** |
| | a) | Define continuous time signal and classify it (any 2 ). | R | ETG407-1 | |
| | b) | Sketch the signal and write the equation of the following discrete time signals<br>i) Unit Impulse Signal ii) Unit Step Signal | U | ETG407-1 | |
| | c) | Sketch x[-n], for Discrete time signal x[n]=2^n…<br>for $-2 \leq n \leq 2$ | U | ETG407-2 | |
| | d) | Explain time shifting property for continuous time unit step signal u(t). | R | ETG407-2 | |
| | e) | Compare between Continuous time and discrete time systems (any 2 points) | R | ETG407-3 | |
| | f) | Determine whether the following discrete time systems are causal or non causal.<br>i) y(n)= x(n)+n*x(n+1)<br>ii) y(n)= $x(n^2)$ | U | ETG407-3 | |
| Q.2 | | Attempt any **FOUR** : | | | **16** |
| | a) | Sketch and label following operations on Discrete time signals<br>x(n)= { 1,1,1,1,2}<br>⬆<br>(a) x[n]*u[n-1]<br>(b) x[3-n] | A | ETG407-2 | |
| | b) | Determine whether the following systems are stable or not<br>i) y[n]= cos [x(n)]<br>ii) y[n]= x[n]+x[n-1]+y[n-1] | A | ETG407-3 | |
| | c) | Solve for a given continuous time signals x1[t] = u(t-2) and x2[t] = u(t-1)<br>i) Signal addition : x1[t] + x2[t] and<br>ii) Signal multiplication: x1[t] * x2[t]<br>where u(t) is unit step response | U | ETG407-2 | |
| | d) | Sketch and explain symbols used in block diagram representation of discrete time system. (any 4) | U | ETG407-3 | |
| | e) | Sketch and label following operations on continuous time signal u(t)<br>i) y(t)= 2u(t-1)<br>ii) y1(t)= -2u(t-2) | U | ETG407-2 | |

| | | | | | |
|---|---|---|---|---|---|
| | f) | Compare between the following systems (2 points each)<br>i) Static system and dynamic system<br>ii) Causal system and non causal system | U | ETG407-3 | |
| Q.3 | | Attempt any **TWO** : | | | **16** |
| | a) | i) Determine and sketch the even and odd part of the following continuous time signal x(t),<br>  <br><br>ii) Compare between Energy and Power signals (any 4 points) | A | ETG407-1 | |
| | b) | Sketch and label following discrete time signals for x[n]<br>i) x[n-3]<br>ii) x[3-n]<br>iii) x[2n]<br>iv) x[n]* u[3-n]<br>  <br> | A | ETG407-2 | |
| | c) | I ] Determine whether the following systems are static or dynamic<br>i) y[n]= n*x[n]<br>ii) y[n]= $x(n^2)$<br><br>II] Determine whether the following systems are time variant or time Invariant<br><br>i) y[n]= $x(n^2)$<br>ii) y[n]= x[- n] | A | ETG407-3 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - Fourth PROGRAMME : ELECTRONICS & TELECOMMUNICATION

COURSE CODE :- ETG407

COURSE NAME :- **SIGNALS AND SYSTEMS**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-05/12/2023

| QN | SQN | SECTION –II | R/U/A | Co ETG 407 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any FOUR: | | | 08 |
| | a) | Define Region of Convergence.(ROC) | R | 6 | |
| | b) | State the steps to perform convolution. | R | 4 | |
| | c) | State associative law and distributive law for convolution. | A | 4 | |
| | d) | State and prove Linearity property of the discrete Fourier series. | A | 5 | |
| | e) | State and prove Time shifting property of the discrete Fourier series. | A | 5 | |
| | f) | State and prove Frequency shifting property of the discrete Fourier transform. | A | 6 | |
| Q.5 | | Attempt any FOUR: | | | 16 |
| | a) | Prove that " LTI system is completely characterized by unit impulse response h(n)" | A | 4 | |
| | b) | Determine the auto-correlation of finite length sequences of $x(n) = \{ 1,2,\underset{\uparrow}{3},2,1\}$ | A | 4 | |
| | c) | State and prove Multiplication and Convolution property of the discrete Fourier transform with meaning. | A | 6 | |
| | d) | Derive the relationship between z-transform and Fourier transform. | A | 6 | |
| | e) | Find the convolution of $x_1(n)=\{\underset{\uparrow}{1},2,0,1\}$ , $x_2(n)=\{\underset{\uparrow}{2},2,1,1\}$ using tabular method. | A | 4 | |
| | f) | Find the Fourier transform of unit step function. | A | 6 | |
| Q.6 | | Attempt any TWO: | | | 16 |
| | a) | Determine the convolution sum of two sequences $x(n) = \{ \underset{\uparrow}{1},2,3,4,5\}$ and $h(n) = \{\underset{\uparrow}{1},2,1,2\}$ using Graphical method | A | 4 | |
| | b) | i) Explain development of Fourier Series derivation. | U | 5 | |
| | | ii)State and prove time scaling and multiplication property of Fourier series | A | 5 | |
| | c) | i) State and prove Linearity and time shifting property of the discrete Fourier transform with meaning. | A | 6 | |
| | | ii) Find z-transform and ROC of the causal sequence<br>i) $x(n) = \{ \underset{\uparrow}{2},-1,3,2,0,1\}$ ii) $x(n) = \{ \underset{\uparrow}{3},2,-1,-4,1\}$ | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER-**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - V PROGRAM : Electronics and Telecommunication Engineering

COURSE CODE :- ETG407

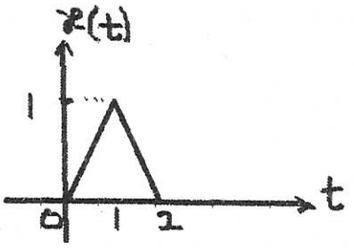
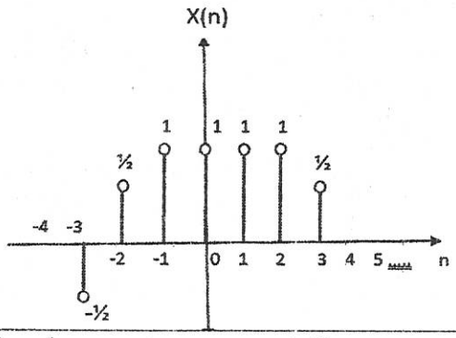
COURSE NAME :- Signals and Systems

MAX. MARKS : **80** TIME : **03 Hrs** DATE :05/12/203

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | CO (ETG407) | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR** : | | | **08** |
| | a) | Define continuous time signal and classify it (any 2 ). | R | ETG407-1 | |
| | b) | Sketch the signal and write the equation of the following discrete time signals<br>i) Unit Impulse Signal ii) Unit Step Signal | U | ETG407-1 | |
| | c) | Sketch x[-n], for Discrete time signal x[n]=2^n...<br>for $-2 \leq n \leq 2$ | U | ETG407-2 | |
| | d) | Explain time shifting property for continuous time unit step signal u(t). | R | ETG407-2 | |
| | e) | Compare between Continuous time and discrete time systems (any 2 points) | R | ETG407-3 | |
| | f) | Determine whether the following discrete time systems are causal or non causal.<br>i) y(n)= x(n)+n*x(n+1)<br>ii) y(n)= $x(n^2)$ | U | ETG407-3 | |
| Q.2 | | Attempt any **FOUR** : | | | **16** |
| | a) | Sketch and label following operations on Discrete time signals<br>x(n)= { 1,1,1,1,2}<br>⬆<br>(a) x[n]*u[n-1]<br>(b) x[3-n] | A | ETG407-2 | |
| | b) | Determine whether the following systems are stable or not<br>i) y[n]= cos [x(n)]<br>ii) y[n]= x[n]+x[n-1]+y[n-1] | A | ETG407-3 | |
| | c) | Solve for a given continuous time signals x1[t] = u(t-2) and x2[t] = u(t-1)<br>i) Signal addition : x1[t] + x2[t] and<br>ii) Signal multiplication: x1[t] * x2[t]<br>where u(t) is unit step response | U | ETG407-2 | |
| | d) | Sketch and explain symbols used in block diagram representation of discrete time system. (any 4) | U | ETG407-3 | |
| | e) | Sketch and label following operations on continuous time signal u(t)<br>i) y(t)= 2u(t-1)<br>ii) y1(t)= -2u(t-2) | U | ETG407-2 | |

| | | | | | |
|---|---|---|---|---|---|
| | f) | Compare between the following systems (2 points each)<br>i) Static system and dynamic system<br>ii) Causal system and non causal system | U | ETG407-3 | |
| Q.3 | | Attempt any **TWO** : | | | **16** |
| | a) | i) Determine and sketch the even and odd part of the following continuous time signal x(t),<br>  <br><br>ii) Compare between Energy and Power signals (any 4 points) | A | ETG407-1 | |
| | b) | Sketch and label following discrete time signals for x[n]<br>i) x[n-3]<br>ii) x[3-n]<br>iii) x[2n]<br>iv) x[n]* u[3-n]<br>  <br> | A | ETG407-2 | |
| | c) | I ] Determine whether the following systems are static or dynamic<br>i) y[n]= n*x[n]<br>ii) y[n]= $x(n^2)$<br><br>II] Determine whether the following systems are time variant or time Invariant<br><br>i) y[n]= $x(n^2)$<br>ii) y[n]= x[- n] | A | ETG407-3 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - Fourth PROGRAMME : ELECTRONICS & TELECOMMUNICATION

COURSE CODE :- ETG407

COURSE NAME :- **SIGNALS AND SYSTEMS**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-05/12/2023

| QN | SQN | SECTION –II | R/U/A | Co ETG 407 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any FOUR: | | | 08 |
| | a) | Define Region of Convergence.(ROC) | R | 6 | |
| | b) | State the steps to perform convolution. | R | 4 | |
| | c) | State associative law and distributive law for convolution. | A | 4 | |
| | d) | State and prove Linearity property of the discrete Fourier series. | A | 5 | |
| | e) | State and prove Time shifting property of the discrete Fourier series. | A | 5 | |
| | f) | State and prove Frequency shifting property of the discrete Fourier transform. | A | 6 | |
| Q.5 | | Attempt any FOUR: | | | 16 |
| | a) | Prove that " LTI system is completely characterized by unit impulse response h(n)" | A | 4 | |
| | b) | Determine the auto-correlation of finite length sequences of $x(n) = \{1,2,\underset{\uparrow}{3},2,1\}$ | A | 4 | |
| | c) | State and prove Multiplication and Convolution property of the discrete Fourier transform with meaning. | A | 6 | |
| | d) | Derive the relationship between z-transform and Fourier transform. | A | 6 | |
| | e) | Find the convolution of $x_1(n)=\{\underset{\uparrow}{1},2,0,1\}$ , $x_2(n)=\{\underset{\uparrow}{2},2,1,1\}$ using tabular method. | A | 4 | |
| | f) | Find the Fourier transform of unit step function. | A | 6 | |
| Q.6 | | Attempt any TWO: | | | 16 |
| | a) | Determine the convolution sum of two sequences $x(n) = \{\underset{\uparrow}{1},2,3,4,5\}$ and $h(n) = \{\underset{\uparrow}{1},2,1,2\}$ using Graphical method | A | 4 | |
| | b) | i) Explain development of Fourier Series derivation. | U | 5 | |
| | | ii)State and prove time scaling and multiplication property of Fourier series | A | 5 | |
| | c) | i) State and prove Linearity and time shifting property of the discrete Fourier transform with meaning. | A | 6 | |
| | | ii) Find z-transform and ROC of the causal sequence i) $x(n) = \{\underset{\uparrow}{2},-1,3,2,0,1\}$ ii) $x(n) = \{\underset{\uparrow}{3},2,-1,-4,1\}$ | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **THIRD** PROGRAM : **IE & E& TC**

COURSE CODE :- **EIG302**

COURSE NAME **APPLIED ELECTRONICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **06/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co EIG 302 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define feedback. State types of feedback. | R | 1 | |
| | b) | State need of crystal oscillator. | R | 2 | |
| | c) | Sketch circuit of differentiator and also its response for triangular wave input. | U | 3 | |
| | d) | State the equation for gain with i) Positive feedback ii) Negative feedback. | R | 2 | |
| | e) | State detail classification of waveshaping circuit. | R | 3 | |
| | f) | Sketch the circuit diagram of negative clamper and positive clipper. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw circuit diagram of RC phase shift oscillator. Explain how $360^0$ phase shift occurs in output. | U | 2 | |
| | b) | State effect of negative feedback on i) Feedback signal ii) Input impedance iii) Output impedance iv) Stability | U | 1 | |
| | c) | Explain working of Hartley oscillator with neat circuit diagram. | U | 2 | |
| | d) | Compare performance of voltage series and voltage shunt feedback amplifier with any four points. | A | 1 | |
| | e) | Identify the name of following circuit shown in figure. Also draw input and output waveforms. State any two applications if it. | A | 3 | |
| | f) | Explain combinational clippers with neat diagram. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Differentiate clipper and clamper ( any four points) | U | 3 | |
| | b) | In Hartley oscillator if $L_1 = 0.1mH$ $L_2 = 10\mu H$ & Mutual inductance is $20\mu H$. Calculate value of capacitor 'C' of oscillatory circuit to obtain frequency of 4110KHz. | A | 2 | |
| | c) | With neat diagram explain operation of voltage tripler circuit. | U | 3 | |
| | d) | Explain crystal oscillator with neat circuit diagram. | U | 2 | |
| | e) | Explain concept of Darlington pair and Darlington amplifier. | U | 1 | |
| | f) | Compare positive and negative feedback with respect to following points i) Overall phase shift. ii) Voltage Gain iii) Stability iv) Application. | A | 1 | |
| | | | | | |

**P.T.O**

| QN | SQN | Question Text | R/U/A | Co EIG 302 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State any two advantages of class-B push-pull amplifier. | U | 4 | |
| | b) | State the difference between voltage amplifier and power amplifier. | R | 4 | |
| | c) | State any four applications of multivibrators. | U | 5 | |
| | d) | State the types of time base circuits and its function. | R | 6 | |
| | e) | Write the applications sweep generators ( any two) | U | 6 | |
| | f) | State the difference between voltage amplifier and power amplifier( any two points) | U | 4 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | With the help of neat circuit diagram, explain the operation of transistor as a switch. | U | 5 | |
| | b) | Define the following terms with reference to transistor switching times. i) Delay time ($t_d$) ii) Rise time ($t_r$) iii) Turn-ON time ( $t_{ON}$) iv) Turn-OFF time ( $t_{OFF}$) | R | 5 | |
| | c) | Determine the time period and frequency of oscillations of an astable multivibrator having the component values of R1=R2=10kΩ & c1=C2=1000pF. | A | 5 | |
| | d) | Draw the circuit diagram of class – B power amplifier and explain its operation. | U | 4 | |
| | e) | State any four characteristics of class-A power amplifier. | R | 4 | |
| | f) | With the help of neat circuit diagram and waveforms, explain the working of UJT based sweep generator. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the circuit diagram of single tuned voltage amplifier and explain its operation. | U | 4 | |
| | b) | Draw a neat labelled frequency response of single tuned and double-tuned voltage amplifiers. | R | 4 | |
| | c) | With the help of neat circuit diagram, explain the operation of monostable multivibrator using transistor. | U | 5 | |
| | d) | Draw the circuit diagram of complementary symmetry class-B push-pull power amplifier and explain its working. | U | 4 | |
| | e) | State the method of generating time base waveforms ad write in brief about each method. | R | 6 | |
| | f) | Draw the circuit diagram of exponential sweep generator circuit and explain its operation. | U | 6 | |

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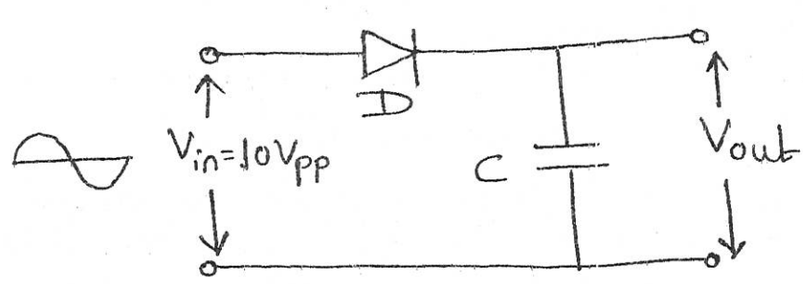
Q 2 e)



# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **THIRD** PROGRAM : **IE & E& TC**

COURSE CODE :- **EIG302**

COURSE NAME **APPLIED ELECTRONICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **06/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

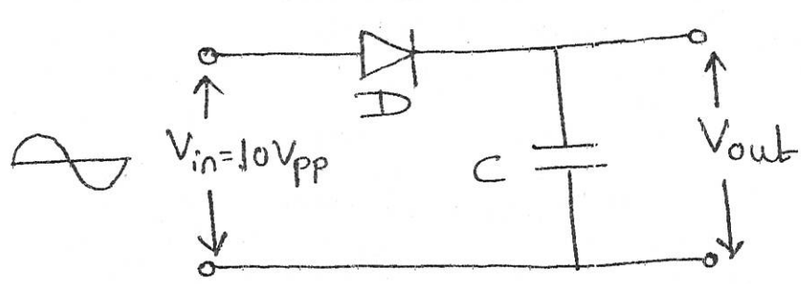
| QN | SQN | Question Text | R/U/A | Co EIG 302 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define feedback. State types of feedback. | R | 1 | |
| | b) | State need of crystal oscillator. | R | 2 | |
| | c) | Sketch circuit of differentiator and also its response for triangular wave input. | U | 3 | |
| | d) | State the equation for gain with i) Positive feedback ii) Negative feedback. | R | 2 | |
| | e) | State detail classification of waveshaping circuit. | R | 3 | |
| | f) | Sketch the circuit diagram of negative clamper and positive clipper. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw circuit diagram of RC phase shift oscillator. Explain how $360^0$ phase shift occurs in output. | U | 2 | |
| | b) | State effect of negative feedback on i) Feedback signal ii) Input impedance iii) Output impedance iv) Stability | U | 1 | |
| | c) | Explain working of Hartley oscillator with neat circuit diagram. | U | 2 | |
| | d) | Compare performance of voltage series and voltage shunt feedback amplifier with any four points. | A | 1 | |
| | e) | Identify the name of following circuit shown in figure. Also draw input and output waveforms. State any two applications if it. | A | 3 | |
| | f) | Explain combinational clippers with neat diagram. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Differentiate clipper and clamper ( any four points) | U | 3 | |
| | b) | In Hartley oscillator if $L_1$= 0.1mH $L_2$ = 10μH & Mutual inductance is 20μH. Calculate value of capacitor 'C' of oscillatory circuit to obtain frequency of 4110KHz. | A | 2 | |
| | c) | With neat diagram explain operation of voltage tripler circuit. | U | 3 | |
| | d) | Explain crystal oscillator with neat circuit diagram. | U | 2 | |
| | e) | Explain concept of Darlington pair and Darlington amplifier. | U | 1 | |
| | f) | Compare positive and negative feedback with respect to following points i) Overall phase shift. ii) Voltage Gain iii) Stability iv) Application. | A | 1 | |
| | | | | | |

**P.T.O**

| QN | SQN | Question Text | R/U/A | Co EIG 302 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State any two advantages of class-B push-pull amplifier. | U | 4 | |
| | b) | State the difference between voltage amplifier and power amplifier. | R | 4 | |
| | c) | State any four applications of multivibrators. | U | 5 | |
| | d) | State the types of time base circuits and its function. | R | 6 | |
| | e) | Write the applications sweep generators ( any two) | U | 6 | |
| | f) | State the difference between voltage amplifier and power amplifier( any two points) | U | 4 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | With the help of neat circuit diagram, explain the operation of transistor as a switch. | U | 5 | |
| | b) | Define the following terms with reference to transistor switching times. i) Delay time ($t_d$) ii) Rise time ($t_r$) iii) Turn-ON time ( $t_{ON}$) iv) Turn-OFF time ( $t_{OFF}$) | R | 5 | |
| | c) | Determine the time period and frequency of oscillations of an astable multivibrator having the component values of R1=R2=10kΩ & c1=C2=1000pF. | A | 5 | |
| | d) | Draw the circuit diagram of class – B power amplifier and explain its operation. | U | 4 | |
| | e) | State any four characteristics of class-A power amplifier. | R | 4 | |
| | f) | With the help of neat circuit diagram and waveforms, explain the working of UJT based sweep generator. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the circuit diagram of single tuned voltage amplifier and explain its operation. | U | 4 | |
| | b) | Draw a neat labelled frequency response of single tuned and double-tuned voltage amplifiers. | R | 4 | |
| | c) | With the help of neat circuit diagram, explain the operation of monostable multivibrator using transistor. | U | 5 | |
| | d) | Draw the circuit diagram of complementary symmetry class-B push-pull power amplifier and explain its working. | U | 4 | |
| | e) | State the method of generating time base waveforms ad write in brief about each method. | R | 6 | |
| | f) | Draw the circuit diagram of exponential sweep generator circuit and explain its operation. | U | 6 | |

**********

Q 2 e)



# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **05** PROGRAM : **ET**

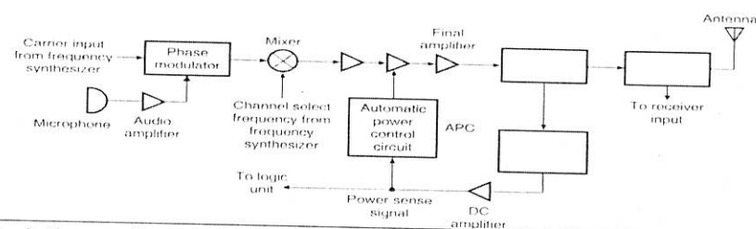
COURSE CODE :- **ETG505**/ETF 501

COURSE NAME :- **MOBILE AND WIRELSS COMMUNICATION**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-07/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define : Control Channel and Forward Channel | R | 1 | |
| | b) | List any four sensors used in mobile handset. | R | 2 | |
| | c) | State four features of CDMA 2000. | R | 1 | |
| | d) | Calculate system capacity if cluster size is 7 and per cell number of channels are 72, if 14 clusters are available. | A | 3 | |
| | e) | State the function of frequency synthesizer. | R | 2 | |
| | f) | Define the terms cell and cluster. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Describe working principle of paging system with neat block diagram. | U | 1 | |
| | b) | Identify and complete given block diagram and explain the function of missing blocks.   | A | 2 | |
| | c) | Explain Microcell zone concept. | U | 3 | |
| | d) | Compare between AMPS and GSM w.r.t following points:<br>(i) Type. (ii) Multiple Access Method<br>(iii)Type of Modulation (iv) Frequency band used | A | 1 | |
| | e) | Draw block diagram of control unit with handset and explain its operation in brief. | U | 2 | |
| | f) | Describe the adjacent channel interference in cellular system. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain the concept of hard handoff and soft handoff with necessary diagram. | U | 3 | |
| | b) | Draw the block diagram of 4G mobile unit. | U | 2 | |
| | c) | Describe call making procedure from mobile handset to landline phone(PSTN) with neat timing diagram. | U | 1 | |
| | d) | Design the frequency reuse pattern for cluster size N=7, N=12 | A | 3 | |
| | e) | Differentiate between Cellular phone system and Cordless Telephone system. | U | 1 | |
| | f) | Explain how cell sectoring improves capacity in cellular system. | A | 3 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - FIFTH PROGRAM : ENTC

COURSE CODE :- ETG505 / ETF501

COURSE NAME :- MOBILE AND WIRELESS COMMUNICATION

MAX. MARKS : **80** TIME : **03 Hrs** DATE :07 /12/2023

| QN | SQN | **SECTION –II** | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | List any four air interface specification of IS-95. | R | 5 | 02 |
| | b) | List important features of Bluetooth | R | 6 | 02 |
| | c) | List any four air interface specification of GSM. | R | 4 | 02 |
| | d) | List any four features of 4 G telephone systems | U | 6 | 02 |
| | e) | State different control channel used in GSM | R | 4 | 02 |
| | f) | State the functions of MSC or MTSO in cellular phone system | U | 4 | 02 |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw GSM system architecture and explain function of HLR and OMC units. | U | 4 | 04 |
| | b) | Draw neat block diagram of wireless local loop ( WLL ) network and state its importance . | R | 6 | 04 |
| | c) | Describe authentication process in GSM with neat diagram | U | 5 | 04 |
| | d) | Draw SS-7 protocol architecture. Write any two features of SS-7. | U | 6 | 04 |
| | e) | State type of handoff is used in IS-95. Describe it with diagram. | U | 5 | 04 |
| | f) | Describe the process of mobile originated call in GSM with neat call flow sequence diagram . | U | 4 | 04 |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Describe call processing stages in IS 95 | U | 5 | 04 |
| | b) | Compare GSM and IS 95 ( any 8 Points ) | R | 4 | 04 |
| | c) | Explain various GSM services . | R | 4 | 04 |
| | d) | Draw the architecture of IS 95 and describe functions of each block . | U | 5 | 04 |
| | e) | Describe forward channel structure in IS 95 with neat diagram | R | 5 | 04 |
| | f) | Describe GSM Traffic channels in detail | U | 4 | 04 |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

Winter 2023

**EXAM SEAT NO.** | | | | | | |

LEVEL : -5 PROGRAM : Industrial Electronics

COURSE CODE :-IEG- 504 / IEF501

COURSE NAME :- POWER ELECTRONIS-II

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-07/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | S QN | **SECTION -I** | R/ U/ A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | IEG 504 | **08** |
| | a) | State the applications of Power IGBT (any 2) | R | 1 | 02 |
| | b) | List any four specifications of power transistor. | R | 1 | 02 |
| | c) | Define duty cycle and its importance in chopper. | R | 2 | 02 |
| | d) | List any two applications of chopper | R | 2 | 02 |
| | e) | Differentiate between one-phase and three-phase cyclo-converter | U | 3 | 02 |
| | f) | State the need of regulator circuit. | R | 3 | 02 |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Sketch the symbol and V-I characteristics of Power MOSFET . | A | 1 | 04 |
| | b) | Explain the Construction power IGBT and describe it. | A | 1 | 04 |
| | c) | Explain current limit control with the help of a chopper circuit and neat waveform. | U | 2 | 04 |
| | d) | Explain the step-up chopper with the help of a circuit diagram and waveform. | U | 2 | 04 |
| | e) | Explain servo-type voltage regulator with neat circuit. | U | 3 | 04 |
| | f) | Illustrate the working of phase control type voltage regulator. | A | 3 | 04 |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the constructional detail of the Power GTO and describe it. | A | 1 | 04 |
| | b) | Specify the merits and demerits of Power MOSFET. | U | 1 | 04 |
| | c) | Describe the working of class-C chopper with its circuit diagram and its applications | A | 2 | 04 |
| | d) | Compare power MOSFET and IGBT.(any 4 ) | U | 2 | 04 |
| | e) | Illustrate the working of single-phase to single-phase bridge cyclo-converter with neat circuit diagram and waveform. | A | 2 | 04 |
| | f) | Illustrate the operating principle of SMPS with its block diagram. | A | 3 | 04 |

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**GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.**

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.**

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |

LEVEL : - FIVE PROGRAM : INDUSTRIAL ELECTRONICS

COURSE CODE :-IEG 504 / IEF 501

COURSE NAME :- POWER ELECTRONICS-II

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-07/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | **SECTION -II** | R/U/A | Co IEG 504 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the main disadvantages of parallel inverter. | R | 4 | |
| | b) | What is the meaning of i) transient response and , ii) response time of UPS. | R | 5 | |
| | c) | Mention the four important industrial application of inverter. | A | 4 | |
| | d) | Specify the need of protection circuits. | R | 6 | |
| | e) | Mention the disadvantages of induction heating. | R | 5 | |
| | f) | What are the causes of overcurrent in thyristor circuits? | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain the circuit of the harmonics reduction by transformer connection in inverters. Draw the waveform. | U | 4 | |
| | b) | Specify the causes of over-voltages and overcurrent in thyristor circuit. | R | 6 | |
| | c) | Explain circuit diagram of McMurray Half-bridge inverter. | U | 4 | |
| | d) | With the help of block diagram explain the operation of off-line interactive UPS system. | U | 5 | |
| | e) | Describe a circuit diagram of McMurray Bedford inverter, and explain them. | U | 4 | |
| | f) | Draw and explain the circuit diagram of SCR crowbar. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain a circuit diagram of McMurray Full-bridge inverter. | U | 4 | |
| | b) | Explain the principle of induction heating. | U | 6 | |
| | c) | Draw a diagram of parallel inverter. Explain the working of inverter with the help of voltage and current waveform ' | U | 4 | |
| | d) | Explain the circuit diagram of AC circuit breaker. | U | 6 | |
| | e) | List the merits and demerits of on-line UPS and off-line UPS. | A | 5 | |
| | f) | Explain the circuit diagram of Snubber circuit. | U | 6 | |
| | | | | | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

Winter 2023

**EXAM SEAT NO.** | | | | | | |

LEVEL : -5 PROGRAM : Industrial Electronics

COURSE CODE :-IEG- 504 / IEF501

COURSE NAME :- POWER ELECTRONIS-II

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-07/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/ U/ A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | IEG 504 | **08** |
| | a) | State the applications of Power IGBT (any 2) | R | 1 | 02 |
| | b) | List any four specifications of power transistor. | R | 1 | 02 |
| | c) | Define duty cycle and its importance in chopper. | R | 2 | 02 |
| | d) | List any two applications of chopper | R | 2 | 02 |
| | e) | Differentiate between one-phase and three-phase cyclo-converter | U | 3 | 02 |
| | f) | State the need of regulator circuit. | R | 3 | 02 |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Sketch the symbol and V-I characteristics of Power MOSFET . | A | 1 | 04 |
| | b) | Explain the Construction power IGBT and describe it. | A | 1 | 04 |
| | c) | Explain current limit control with the help of a chopper circuit and neat waveform. | U | 2 | 04 |
| | d) | Explain the step-up chopper with the help of a circuit diagram and waveform. | U | 2 | 04 |
| | e) | Explain servo-type voltage regulator with neat circuit. | U | 3 | 04 |
| | f) | Illustrate the working of phase control type voltage regulator. | A | 3 | 04 |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the constructional detail of the Power GTO and describe it. | A | 1 | 04 |
| | b) | Specify the merits and demerits of Power MOSFET. | U | 1 | 04 |
| | c) | Describe the working of class-C chopper with its circuit diagram and its applications | A | 2 | 04 |
| | d) | Compare power MOSFET and IGBT.(any 4 ) | U | 2 | 04 |
| | e) | Illustrate the working of single-phase to single-phase bridge cyclo-converter with neat circuit diagram and waveform. | A | 2 | 04 |
| | f) | Illustrate the operating principle of SMPS with its block diagram. | A | 3 | 04 |

P.T.O.

**GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.**

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 2023**

**EXAM SEAT NO.**

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |

LEVEL : - FIVE PROGRAM : INDUSTRIAL ELECTRONICS

COURSE CODE :-IEG 504 / IEF 501

COURSE NAME :- POWER ELECTRONICS-II

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-07/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | **SECTION -II** | R/U/A | Co IEG 504 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the main disadvantages of parallel inverter. | R | 4 | |
| | b) | What is the meaning of i) transient response and , ii) response time of UPS. | R | 5 | |
| | c) | Mention the four important industrial application of inverter. | A | 4 | |
| | d) | Specify the need of protection circuits. | R | 6 | |
| | e) | Mention the disadvantages of induction heating. | R | 5 | |
| | f) | What are the causes of overcurrent in thyristor circuits? | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain the circuit of the harmonics reduction by transformer connection in inverters. Draw the waveform. | U | 4 | |
| | b) | Specify the causes of over-voltages and overcurrent in thyristor circuit. | R | 6 | |
| | c) | Explain circuit diagram of McMurray Half-bridge inverter. | U | 4 | |
| | d) | With the help of block diagram explain the operation of off-line interactive UPS system. | U | 5 | |
| | e) | Describe a circuit diagram of McMurray Bedford inverter, and explain them. | U | 4 | |
| | f) | Draw and explain the circuit diagram of SCR crowbar. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain a circuit diagram of McMurray Full-bridge inverter. | U | 4 | |
| | b) | Explain the principle of induction heating. | U | 6 | |
| | c) | Draw a diagram of parallel inverter. Explain the working of inverter with the help of voltage and current waveform ' | U | 4 | |
| | d) | Explain the circuit diagram of AC circuit breaker. | U | 6 | |
| | e) | List the merits and demerits of on-line UPS and off-line UPS. | A | 5 | |
| | f) | Explain the circuit diagram of Snubber circuit. | U | 6 | |
| | | | | | |

P.T.O.

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER- 23**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - V

PROGRAM : Electronics & Telecommunication

COURSE CODE :- **ETG514**

COURSE NAME :- **Introduction to Internet of Things**

MAX. MARKS : **80** TIME : **03 Hrs**

DATE :-07/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | S QN | SECTION –I | R/ U/ A | CO | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the different technologies that integrates in IoT. | U | 1 | |
| | b) | List the various features of NodeMCU ESP8266. | U | 2 | |
| | c) | State the different examples of Sensing Layer components of IoT. | U | 1 | |
| | d) | State the use of setup () and loop () function of Arduino sketch. | R | 2 | |
| | e) | State the different platforms available for the development of IoT applications. | R | 1 | |
| | f) | State Temperature-Humidity sensor modules you studied and give any two differences in between. | R | 3 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain the function of Network layer in IoT architecture and State the examples of its components. | R | 1 | |
| | b) | Explain the ESP-12E module in brief. | R | 2 | |
| | c) | State the pins of MQ2 Gas sensor module and state the function of each pin. | U | 3 | |
| | d) | Explain the following library function with proper syntax and example:<br>1.pinMode() 2.digitalRead() 3.digitalWrite()<br>4.analogRead() 5.analogWrite() 6.Serial.begin()<br>7.Serial.println() 8.Delay() | R/U | 2 | |
| | e) | Give the format of serial data received via Data pin of DHT11 and Explain. | A | 3 | |
| | f) | Write a program for NodeMCU to operate onboard LED according to status of switch connected to Node MCU pin no D5. | A | 2 | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | List any 8 technical specifications of NodeMCU ESP8266. | U | 2 | |
| | b) | List any 4 blocks in the functional block diagram of IoT and State the function of each block. | R/U | 1 | |
| | c) | Give the step wise procedure for setting Arduino IDE to program NodeMCU. | R/U | 2 | |
| | d) | State the characteristics of IoT systems and Explain each. | R/U | 1 | |
| | e) | Explain the principle of working of Touch Sensor module- TTP223. | U | 3 | |
| | f) | Give the important specifications of PIR sensor- HC-SR501. | R | 3 | |

P.T.O.

**GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.**

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER / WINTER-23**

**EXAM SEAT NO.** | | | | | | |

LEVEL: - 5th — PROGRAM: Electronics & Telecommunication

COURSE CODE: -ETG514 — COURSE NAME :- Introduction to IoT

MAX. MARKS: **80** TIME: **03 Hrs** — DATE: 7/12/2023

Instruction:-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | **SECTION –II** | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the use of comparator IC LM358 in IR sensor module. | R | 4 | |
| | b) | State any four services offered by AWS. | R | 5 | |
| | c) | Differentiate in between the terms- Local Server and Cloud Server | U | 4 | |
| | d) | Explain the formula used to find the distance to an object by ultrasonic sensor HC-SR04. | U | 5 | |
| | e) | State the purpose of LoRa Alliance. | U | 4 | |
| | f) | State the use of ESP8266WiFi.h header file. | U | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain the features of HTTP protocol. | U | 4 | |
| | b) | Describe the detection of object using IR sensor and NodeMCU with example. | U | 5 | |
| | c) | Draw the Interfacing diagram of ultrasonic sensor HC-SR04 with NodeMCU and write a program to display distance to an object on serial monitor. Assume suitable data. | A | 4 | |
| | d) | Write a program to turn ON/OFF the LED connected to D5 pin of NodeMCU.Configure NodeMCUas Local server. | A | 5 | |
| | e) | Write a program to scan all the available WiFi networks and connect to a WiFi network having maximum signal strength. | A | 5 | |
| | f) | Write a code to monitor smoke sensor data on blynk cloud server. | A | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Action of a 1000Watt AC Bulb is controlled by a Node MCU. To control the action, write a program with an interface diagram. | A | 4 | |
| | b) | Write a program to connect NodeMCU with a WiFi network with following credentials:<br>Name/id: "GPKOLHAPUR"<br>Pwd: "gpkpgpkpgpkp" | A | 5 | |
| | c) | Draw and explain the smart home automation block diagram with smoke sensor and voice alarm implementation. | A | 6 | |
| | d) | Draw a DC motor interfacing diagram with NodeMCU and write a code to control the direction of motor using switch and speed with PWM. | A | 4 | |
| | e) | Write a program to turn ON/OFF the home appliance connected to D3 pin through relay to NodeMCU by using Blynk Cloud server | A | 5 | |
| | f) | Write a code to display DHT11 sensor data on blynk cloud server. | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER- 23**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - V

PROGRAM : Electronics & Telecommunication

COURSE CODE :- **ETG514**

COURSE NAME :- **Introduction to Internet of Things**

MAX. MARKS : **80** TIME : **03 Hrs**

DATE :-07/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | S QN | SECTION –I | R/ U/ A | CO | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the different technologies that integrates in IoT. | U | 1 | |
| | b) | List the various features of NodeMCU ESP8266. | U | 2 | |
| | c) | State the different examples of Sensing Layer components of IoT. | U | 1 | |
| | d) | State the use of setup () and loop () function of Arduino sketch. | R | 2 | |
| | e) | State the different platforms available for the development of IoT applications. | R | 1 | |
| | f) | State Temperature-Humidity sensor modules you studied and give any two differences in between. | R | 3 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain the function of Network layer in IoT architecture and State the examples of its components. | R | 1 | |
| | b) | Explain the ESP-12E module in brief. | R | 2 | |
| | c) | State the pins of MQ2 Gas sensor module and state the function of each pin. | U | 3 | |
| | d) | Explain the following library function with proper syntax and example:<br>1.pinMode() 2.digitalRead() 3.digitalWrite()<br>4.analogRead() 5.analogWrite() 6.Serial.begin()<br>7.Serial.println() 8.Delay() | R/U | 2 | |
| | e) | Give the format of serial data received via Data pin of DHT11 and Explain. | A | 3 | |
| | f) | Write a program for NodeMCU to operate onboard LED according to status of switch connected to Node MCU pin no D5. | A | 2 | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | List any 8 technical specifications of NodeMCU ESP8266. | U | 2 | |
| | b) | List any 4 blocks in the functional block diagram of IoT and State the function of each block. | R/U | 1 | |
| | c) | Give the step wise procedure for setting Arduino IDE to program NodeMCU. | R/U | 2 | |
| | d) | State the characteristics of IoT systems and Explain each. | R/U | 1 | |
| | e) | Explain the principle of working of Touch Sensor module- TTP223. | U | 3 | |
| | f) | Give the important specifications of PIR sensor- HC-SR501. | R | 3 | |

P.T.O.

**GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.**

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER / WINTER-23**

**EXAM SEAT NO.** | | | | | | |

LEVEL: - 5th | PROGRAM: Electronics & Telecommunication

COURSE CODE: -ETG514 | COURSE NAME :- Introduction to IoT

MAX. MARKS: **80** TIME: **03 Hrs** | DATE: -7/12/2023

Instruction:-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION –II | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the use of comparator IC LM358 in IR sensor module. | R | 4 | |
| | b) | State any four services offered by AWS. | R | 5 | |
| | c) | Differentiate in between the terms- Local Server and Cloud Server | U | 4 | |
| | d) | Explain the formula used to find the distance to an object by ultrasonic sensor HC-SR04. | U | 5 | |
| | e) | State the purpose of LoRa Alliance. | U | 4 | |
| | f) | State the use of ESP8266WiFi.h header file. | U | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain the features of HTTP protocol. | U | 4 | |
| | b) | Describe the detection of object using IR sensor and NodeMCU with example. | U | 5 | |
| | c) | Draw the Interfacing diagram of ultrasonic sensor HC-SR04 with NodeMCU and write a program to display distance to an object on serial monitor. Assume suitable data. | A | 4 | |
| | d) | Write a program to turn ON/OFF the LED connected to D5 pin of NodeMCU.Configure NodeMCUas Local server. | A | 5 | |
| | e) | Write a program to scan all the available WiFi networks and connect to a WiFi network having maximum signal strength. | A | 5 | |
| | f) | Write a code to monitor smoke sensor data on blynk cloud server. | A | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Action of a 1000Watt AC Bulb is controlled by a Node MCU. To control the action, write a program with an interface diagram. | A | 4 | |
| | b) | Write a program to connect NodeMCU with a WiFi network with following credentials:<br>Name/id: "GPKOLHAPUR"<br>Pwd: "gpkpgpkpgpkp" | A | 5 | |
| | c) | Draw and explain the smart home automation block diagram with smoke sensor and voice alarm implementation. | A | 6 | |
| | d) | Draw a DC motor interfacing diagram with NodeMCU and write a code to control the direction of motor using switch and speed with PWM. | A | 4 | |
| | e) | Write a program to turn ON/OFF the home appliance connected to D3 pin through relay to NodeMCU by using Blynk Cloud server | A | 5 | |
| | f) | Write a code to display DHT11 sensor data on blynk cloud server. | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER / ~~SUMMER~~- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 5th PROGRAM : E&TC / IE

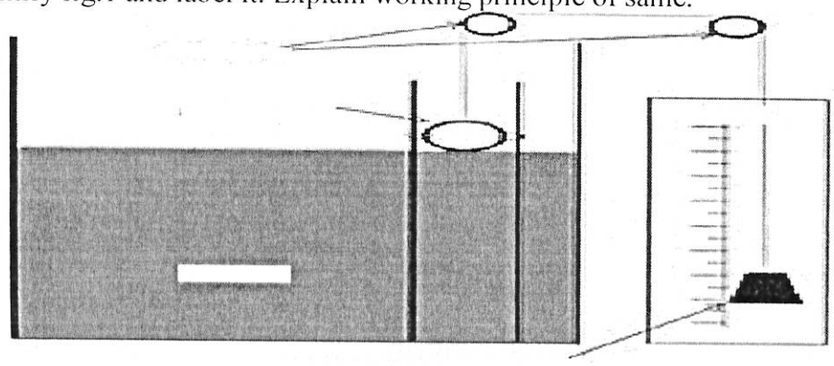
COURSE CODE :-EIG508

COURSE NAME :- Instrumentation

MAX. MARKS : **80** TIME : **03 Hrs** DATE :07/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | Co EIG 508 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define Digital transducers with one example. | R | 1 | |
| | b) | Define sensor with two examples. | R | 1 | |
| | c) | List two applications of PT100 resistance thermometer. | R | 2 | |
| | d) | Define Peltier effect in temperature measurement. | R | 2 | |
| | e) | Define Level in level Measurement. | R | 3 | |
| | f) | State the importance of level measurement in industries. | R | 3 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain the operating principle for unbounded strain gauge. | U | 1 | |
| | b) | Explain following selection criteria for transducer<br>i) Sensitivity ii) Accuracy iii) Operating range iv) Errors | U | 1 | |
| | c) | Convert the temperature of scalding water ,$54^0$ C, into degrees Fahrenheit and Kelvin. | A | 2 | |
| | d) | Explain operating principle of PTC with mathematical equation and waveforms. | U | 2 | |
| | e) | Identify fig.1 and label it. Explain working principle of same.<br>  | A | 3 | |
| | f) | Explain indirect method of electrical type capacitance level detector (Contact Type) | U | 3 | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Compare between bounded type and unbounded type strain gauge.(any 4 points) | U | 1 | |
| | b) | Explain with neat diagram transducers using variation in area of plates in capacitive transducer. | U | 1 | |
| | c) | The label on a pressurized can of spray disinfectant warns against heating the can above $130^0$ .Write the corresponding temperature on the Celsius and Kelvin temperature scales? | A | 2 | |
| | d) | Explain the construction and working principle of Radiation pyrometers. | U | 2 | |
| | e) | Explain the construction and working principle of Thermistors. | U | 2 | |
| | f) | Explain Ultrasonic Level measurement(Non-Contact Type) | U | 3 | |

PTO

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER**

**EXAM SEAT NO.** | | | | | | |

LEVEL : -5th PROGRAM : IE & E & TC

COURSE CODE :- EIG508

COURSE NAME :-INSTRUMENTATION

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-07/12/2023

| QN | SQN | SECTION –II | R/U/A | Co EIG 508 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define the terms Pressure with its unit. | R | 4 | |
| | b) | Compare between Laminar and Turbulent Flow.(any 2 points) | U | 4 | |
| | c) | State the methods of data transmission. | R | 5 | |
| | d) | State necessity of the microwave channels in radio transmission | R | 5 | |
| | e) | State the need of wireless sensors. | R | 6 | |
| | f) | State the function of data acquisition system. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain construction of Helical Tube. | U | 4 | |
| | b) | Explain Power line carrier in telemetering systems. | U | 5 | |
| | c) | Describe Transmission channels & media with designing parameter. | A | 5 | |
| | d) | Draw and Explain block diagram of D.C.Signal conditioning. | U | 6 | |
| | e) | Describe Block diagram of Single channel Data acquisition system. | U | 6 | |
| | f) | Draw and Explain working of Ultrasonic flow meter. | U | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Describe working of Metallic diaphragm gauge with the help of diagram. | A | 4 | |
| | b) | Explain Radio channels in telemetry systems. | U | 5 | |
| | c) | Explain block diagram of General telemetering systems. | U | 5 | |
| | d) | Design Chopped & modulated amplifier with the help of circuit diagram. | A | 6 | |
| | e) | Explain Multichannel Data acquisition system with the help of block diagram. | U | 6 | |
| | f) | Construct labeled Orifice plate meter for flow measurement. | A | 4 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **ELECTRONICS & TELECOMMUNICATION**

COURSE CODE :- **ETF506**

COURSE NAME **AUDIO & VIDEO ENGINEERING**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- **07/ 12 / 2023**

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | **SECTION -I** | R/U/A | Co ETF 506 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw the block diagram of stereo amplifier and list transducers used in it. | U | 1 | |
| | b) | Give the frequency range for audio frequency and draw frequency response for same. | U | 1 | |
| | c) | Give any four advantages of data compression. | U | 2 | |
| | d) | Define the terms i) Image continuity ii) Pedestal Height. | R | 3 | |
| | e) | State the effect on picture if blanking pulses are not added in composite video signal. | A | 3 | |
| | f) | State the Grassman's Law. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw composite video signal diagram. | U | 3 | |
| | b) | Differentiate between Woofer, mid-range speaker and tweeter ( any four points) | U | 1 | |
| | c) | Draw and explain format of AVI file. | U | 2 | |
| | d) | Give following CCIR B standards i) No. of lines ii) Video Bandwidth iii) Horizontal line period iv) Field frequency | U | 3 | |
| | e) | Draw and explain interlaced scanning. | U | 3 | |
| | f) | State need of compression and explain JPEG file format. | U | 2 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Define resolution & explain with diagram its types. | R | 3 | |
| | b) | Draw vestigial side band and answer the following<br>i) Function of colour sub carrier.<br>ii) Calculate total BW required in VSB transmission. | U | 3 | |
| | c) | Compare between MPEG2 & MPEG4 ( any four points) | U | 2 | |
| | d) | Draw and explain 2 way cross over network. | U | 1 | |
| | e) | Draw and explain 5 points graphic equalizer. | U | 1 | |
| | f) | With example explain additive colour mixing theory. | U | 3 | |

P.T.O.

| QN | SQN | SECTION –II | R/U/A | Co ETF 506 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define Positive Modulation with waveform. | R | 4 | |
| | b) | List merits and demerits of Negative modulation. | R | 4 | |
| | c) | Explain the function of RF tuner in TV receiver system. | U | 5 | |
| | d) | Define TV signal and state modulation technique used for audio and video signal for PAL system. | R | 5 | |
| | e) | Explain function of alternator in cable TV system. | U | 6 | |
| | f) | List applications of MATV. | A | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain working principle of delta gun picture tube. | U | 4 | |
| | b) | Identify the type of modulation in the following diagram and indicate; Black level, Peak white level, Synchronous pulse, Noise pulse, Percent amplitude level. Refer Figure ( a) | A | 4 | |
| | c) | Explain Chroma signal amplifier circuit used in TV receiver with diagram. | U | 5 | |
| | d) | Compare between NTSC and PAL system ( four points) | U | 5 | |
| | e) | State specifications of Attenuator and explain its working principle. | R | 6 | |
| | f) | Explain with block diagram LNBC. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the block diagram of colour TV transmitter and give the function of colour matrix block in TV transmitter. | R | 4 | |
| | b) | Explain EHT generation in television. | U | 5 | |
| | c) | State functions of following block in colour TV receiver i) AGC ii) Delay line iii) Synch-seperator and deflection circuit iv) RF tuner. | R | 5 | |
| | d) | Explain with block diagram operation of PAL-D system in receiver. | U | 5 | |
| | e) | Explain with diagram CCTV. | U | 6 | |
| | f) | Explain design concept of cable TV. | U | 6 | |

Q.5 b

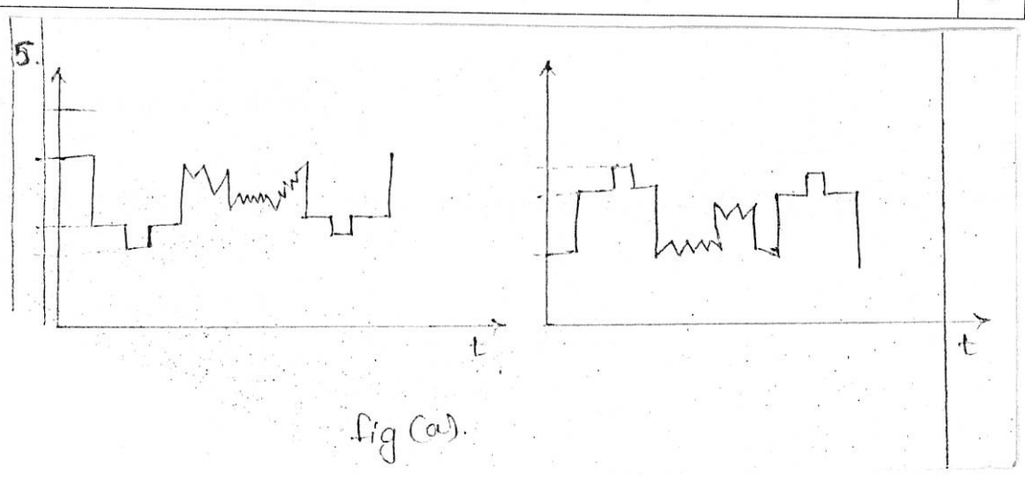



fig (a).

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER / ~~SUMMER~~- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 5th PROGRAM : E&TC / IE

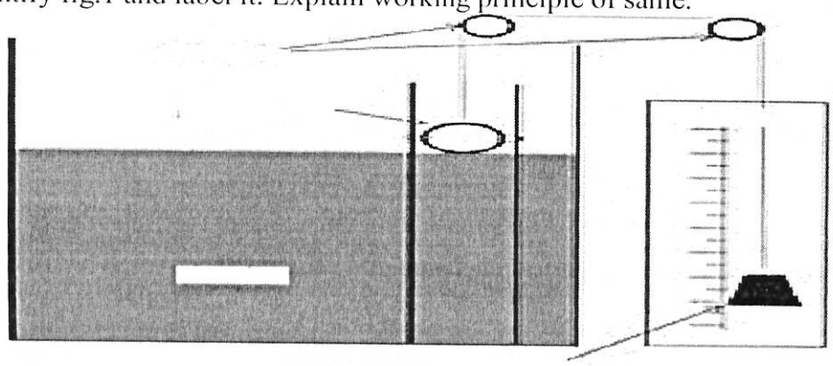
COURSE CODE :-EIG508

COURSE NAME :- Instrumentation

MAX. MARKS : **80** TIME : **03 Hrs** DATE :07/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | **SECTION -I** | R/U/A | Co **EIG 508** | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define Digital transducers with one example. | R | 1 | |
| | b) | Define sensor with two examples. | R | 1 | |
| | c) | List two applications of PT100 resistance thermometer. | R | 2 | |
| | d) | Define Peltier effect in temperature measurement. | R | 2 | |
| | e) | Define Level in level Measurement. | R | 3 | |
| | f) | State the importance of level measurement in industries. | R | 3 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain the operating principle for unbounded strain gauge. | U | 1 | |
| | b) | Explain following selection criteria for transducer<br>i) Sensitivity ii) Accuracy iii) Operating range iv) Errors | U | 1 | |
| | c) | Convert the temperature of scalding water ,$54^0$ C, into degrees Fahrenheit and Kelvin. | A | 2 | |
| | d) | Explain operating principle of PTC with mathematical equation and waveforms. | U | 2 | |
| | e) | Identify fig.1 and label it. Explain working principle of same.<br>  | A | 3 | |
| | f) | Explain indirect method of electrical type capacitance level detector (Contact Type) | U | 3 | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Compare between bounded type and unbounded type strain gauge.(any 4 points) | U | 1 | |
| | b) | Explain with neat diagram transducers using variation in area of plates in capacitive transducer. | U | 1 | |
| | c) | The label on a pressurized can of spray disinfectant warns against heating the can above $130^0$ .Write the corresponding temperature on the Celsius and Kelvin temperature scales? | A | 2 | |
| | d) | Explain the construction and working principle of Radiation pyrometers. | U | 2 | |
| | e) | Explain the construction and working principle of Thermistors. | U | 2 | |
| | f) | Explain Ultrasonic Level measurement(Non-Contact Type) | U | 3 | |

PTO

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER**

**EXAM SEAT NO.** | | | | | | |

LEVEL : -5th PROGRAM : IE & E & TC

COURSE CODE :- EIG508

COURSE NAME :-INSTRUMENTATION

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-07/12/2023

| QN | SQN | SECTION –II | R/U/A | Co EIG 508 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define the terms Pressure with its unit. | R | 4 | |
| | b) | Compare between Laminar and Turbulent Flow.(any 2 points) | U | 4 | |
| | c) | State the methods of data transmission. | R | 5 | |
| | d) | State necessity of the microwave channels in radio transmission | R | 5 | |
| | e) | State the need of wireless sensors. | R | 6 | |
| | f) | State the function of data acquisition system. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain construction of Helical Tube. | U | 4 | |
| | b) | Explain Power line carrier in telemetering systems. | U | 5 | |
| | c) | Describe Transmission channels & media with designing parameter. | A | 5 | |
| | d) | Draw and Explain block diagram of D.C.Signal conditioning. | U | 6 | |
| | e) | Describe Block diagram of Single channel Data acquisition system. | U | 6 | |
| | f) | Draw and Explain working of Ultrasonic flow meter. | U | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Describe working of Metallic diaphragm gauge with the help of diagram. | A | 4 | |
| | b) | Explain Radio channels in telemetry systems. | U | 5 | |
| | c) | Explain block diagram of General telemetering systems. | U | 5 | |
| | d) | Design Chopped & modulated amplifier with the help of circuit diagram. | A | 6 | |
| | e) | Explain Multichannel Data acquisition system with the help of block diagram. | U | 6 | |
| | f) | Construct labeled Orifice plate meter for flow measurement. | A | 4 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER / ~~SUMMER~~- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 5th PROGRAM : E&TC / IE

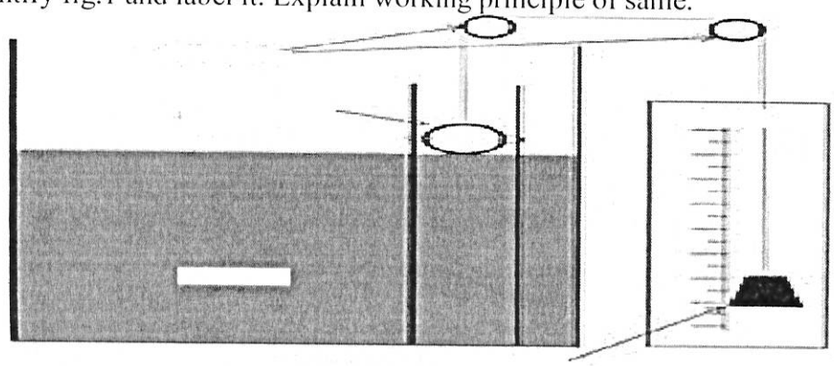
COURSE CODE :-EIG508

COURSE NAME :- Instrumentation

MAX. MARKS : **80** TIME : **03 Hrs** DATE :07/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | Co EIG 508 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define Digital transducers with one example. | R | 1 | |
| | b) | Define sensor with two examples. | R | 1 | |
| | c) | List two applications of PT100 resistance thermometer. | R | 2 | |
| | d) | Define Peltier effect in temperature measurement. | R | 2 | |
| | e) | Define Level in level Measurement. | R | 3 | |
| | f) | State the importance of level measurement in industries. | R | 3 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain the operating principle for unbounded strain gauge. | U | 1 | |
| | b) | Explain following selection criteria for transducer<br>i) Sensitivity ii) Accuracy iii) Operating range iv) Errors | U | 1 | |
| | c) | Convert the temperature of scalding water ,$54^0$ C, into degrees Fahrenheit and Kelvin. | A | 2 | |
| | d) | Explain operating principle of PTC with mathematical equation and waveforms. | U | 2 | |
| | e) | Identify fig.1 and label it. Explain working principle of same.<br>  | A | 3 | |
| | f) | Explain indirect method of electrical type capacitance level detector (Contact Type) | U | 3 | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Compare between bounded type and unbounded type strain gauge.(any 4 points) | U | 1 | |
| | b) | Explain with neat diagram transducers using variation in area of plates in capacitive transducer. | U | 1 | |
| | c) | The label on a pressurized can of spray disinfectant warns against heating the can above $130^0$ .Write the corresponding temperature on the Celsius and Kelvin temperature scales? | A | 2 | |
| | d) | Explain the construction and working principle of Radiation pyrometers. | U | 2 | |
| | e) | Explain the construction and working principle of Thermistors. | U | 2 | |
| | f) | Explain Ultrasonic Level measurement(Non-Contact Type) | U | 3 | |

PTO

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER**

**EXAM SEAT NO.** | | | | | | |

LEVEL : -5th PROGRAM : IE & E & TC

COURSE CODE :- EIG508

COURSE NAME :-INSTRUMENTATION

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-07/12/2023

| QN | SQN | SECTION –II | R/U/A | Co EIG 508 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define the terms Pressure with its unit. | R | 4 | |
| | b) | Compare between Laminar and Turbulent Flow.(any 2 points) | U | 4 | |
| | c) | State the methods of data transmission. | R | 5 | |
| | d) | State necessity of the microwave channels in radio transmission | R | 5 | |
| | e) | State the need of wireless sensors. | R | 6 | |
| | f) | State the function of data acquisition system. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain construction of Helical Tube. | U | 4 | |
| | b) | Explain Power line carrier in telemetering systems. | U | 5 | |
| | c) | Describe Transmission channels & media with designing parameter. | A | 5 | |
| | d) | Draw and Explain block diagram of D.C.Signal conditioning. | U | 6 | |
| | e) | Describe Block diagram of Single channel Data acquisition system. | U | 6 | |
| | f) | Draw and Explain working of Ultrasonic flow meter. | U | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Describe working of Metallic diaphragm gauge with the help of diagram. | A | 4 | |
| | b) | Explain Radio channels in telemetry systems. | U | 5 | |
| | c) | Explain block diagram of General telemetering systems. | U | 5 | |
| | d) | Design Chopped & modulated amplifier with the help of circuit diagram. | A | 6 | |
| | e) | Explain Multichannel Data acquisition system with the help of block diagram. | U | 6 | |
| | f) | Construct labeled Orifice plate meter for flow measurement. | A | 4 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRONICS & TELECOMMUNICATION**

COURSE CODE :- **ETG311**

COURSE NAME **BASIC OF POWER ELECTRONICS**

MAX. MARKS : **40** TIME : **02Hrs.** DATE :- **08/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co ETG 311 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw the circuit diagram of class C commutation. | R | 3 | |
| | b) | Draw the circuit diagram of single phase centre tapped full wave controlled rectifier with R load. | R | 5 | |
| | c) | Draw the symbol of i) SCR ii) DIAC | R | 1 | |
| | d) | State the use of freewheeling diode in controlled rectifiers. | R | 5 | |
| | e) | List different Turn-ON methods of SCR. | R | 2 | |
| | f) | State the problems in SCR series connection. | R | 4 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain Mode-I and Mode-II of TRIAC with diagram. | U | 1 | |
| | b) | Explain the necessity of parallel connection of SCR. | U | 4 | |
| | c) | Compare controlled and uncontrolled rectifiers ( any four points) | U | 5 | |
| | d) | Draw and explain the V-I characteristic of SCR. | U | 1 | |
| | e) | Describe any one of the forced commutation method of turn-off SCR with circuit diagram. | U | 3 | |
| | f) | Explain the advantages and disadvantages of Gate triggering of SCR. | U | 2 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw input and output waveforms for single phase half wave controlled rectifier with inductive load. | R | 5 | |
| | b) | Explain pulse triggering of a SCR, with a neat circuit diagram and necessary waveforms. | U | 2 | |
| | c) | Draw and explain single phase bridge rectifier with R load. | U | 5 | |
| | d) | Draw and explain VI characteristics of TRIAC. | U | 1 | |
| | e) | Describe the need of series and parallel connection of SCR. | U | 4 | |
| | f) | Explain class A commutation with load parallel to C with circuit diagram and waveform. | 3 | 2 | |
| | | | | | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRONICS & TELECOMMUNICATION**

COURSE CODE :- **ETG311**

COURSE NAME **BASIC OF POWER ELECTRONICS**

MAX. MARKS : **40** TIME : **02Hrs.** DATE :- **08/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co ETG 311 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw the circuit diagram of class C commutation. | R | 3 | |
| | b) | Draw the circuit diagram of single phase centre tapped full wave controlled rectifier with R load. | R | 5 | |
| | c) | Draw the symbol of i) SCR ii) DIAC | R | 1 | |
| | d) | State the use of freewheeling diode in controlled rectifiers. | R | 5 | |
| | e) | List different Turn-ON methods of SCR. | R | 2 | |
| | f) | State the problems in SCR series connection. | R | 4 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain Mode-I and Mode-II of TRIAC with diagram. | U | 1 | |
| | b) | Explain the necessity of parallel connection of SCR. | U | 4 | |
| | c) | Compare controlled and uncontrolled rectifiers ( any four points) | U | 5 | |
| | d) | Draw and explain the V-I characteristic of SCR. | U | 1 | |
| | e) | Describe any one of the forced commutation method of turn-off SCR with circuit diagram. | U | 3 | |
| | f) | Explain the advantages and disadvantages of Gate triggering of SCR. | U | 2 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw input and output waveforms for single phase half wave controlled rectifier with inductive load. | R | 5 | |
| | b) | Explain pulse triggering of a SCR, with a neat circuit diagram and necessary waveforms. | U | 2 | |
| | c) | Draw and explain single phase bridge rectifier with R load. | U | 5 | |
| | d) | Draw and explain VI characteristics of TRIAC. | U | 1 | |
| | e) | Describe the need of series and parallel connection of SCR. | U | 4 | |
| | f) | Explain class A commutation with load parallel to C with circuit diagram and waveform. | 3 | 2 | |
| | | | | | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 3rd PROGRAM : E & TC.

COURSE CODE :- EIG303/EIF303

COURSE NAME :- ELECTRONIC MEASUREMENT AND INSTRUMENTS

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-08/12/2023

| QN | SQN | | R/U/A | Co EIG 303 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | List any two functions of DSO. | R | 4 | |
| | b) | Draw the diagram of passive voltage probe. | R | 4 | |
| | c) | State the need of signal generator. | R | 5 | |
| | d) | Define Pulse generator. | R | 5 | |
| | e) | State the function of event marker in strip chart recorder | R | 6 | |
| | f) | List the types of recorders. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Compare between time domain and frequency domain on the basis of following points,<br>i)Definition ii)Waveform iii)Example iv)Cost | U | 5 | |
| | b) | State the procedure for frequency measurement using CRO with diagram. | A | 4 | |
| | c) | Draw and explain block diagram of X-Y recorder. | U | 6 | |
| | d) | Draw the constructional diagram of CRT. state two materials used for display in CRT screen. | U | 4 | |
| | e) | State the specifications of function generator (Any 4) | U | 5 | |
| | f) | Compare between active and passive voltage probe on the basis of<br>i) Block diagram ii)definition iii) components used<br>iv) Application | U | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain vertical deflection system with neat diagram. | U | 4 | |
| | b) | Explain in detail spectrum analyzer. | U | 5 | |
| | c) | Draw and explain type of CRO probe used to measure current in the circuit. | A | 4 | |
| | d) | State the applications of strip chart recorder(Any 4) | | | |
| | e) | Draw neat block diagram of DSO. | U | 4 | |
| | f) | Draw the neat labelled block diagram of function generator and explain how sine wave generated. | U | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 202**

**EXAM SEAT NO.** | | | | | | |

LEVEL : -**THIRD** PROGRAM : **IE/E&TC**

COURSE CODE :- **EIG303** / EIF303

COURSE NAME :- **ELECTRONICS MEASUING INSTRUMENTS**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-08/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | | R/U/A | Co EIG303 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the units of any 2 fundamental quantities. | R | 1 | |
| | b) | Give the classification of standards. | R | 1 | |
| | c) | Draw the diagram of whetstone's bridge. | R | 2 | |
| | d) | List any two applications of maxwell's bridge. | R | 2 | |
| | e) | Define average value. | R | 3 | |
| | f) | Draw the diagram of digital frequency meter. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain any 2 dynamic characteristics of instruments. | U | 1 | |
| | b) | Draw & explain bridge balance condition for capacitance comparison bridge. | U | 2 | |
| | c) | Explain kelvin's bridge with neat diagram. | U | 2 | |
| | d) | Classify bridges. Write the parameters which can be measured using bridge. | A | 2 | |
| | e) | Compare analog & digital instruments (any four points) | U | 3 | |
| | f) | Explain operation of LCR meter with suitable diagram. | U | 3 | |
| | | | | | |
| Q.3 | | | | | **16** |
| | a) | Explain the types of errors. | U | 1 | |
| | b) | Explain how unknown frequency can be measured using wien's bridge. | A | 2 | |
| | c) | Discuss hay's bridge with neat diagram. | U | 2 | |
| | d) | Explain the construction of RTD with suitable diagram. | U | 3 | |
| | e) | Write classification of transducers with examples. | U | 3 | |
| | f) | Explain the PMMC instrument with neat labeled diagram. | U | 3 | |
| | | | | | |

P.T.O.

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 3rd PROGRAM : E & TC.

COURSE CODE :- EIG303/EIF303

COURSE NAME :- ELECTRONIC MEASUREMENT AND INSTRUMENTS

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-08/12/2023

| QN | SQN | | R/U/A | Co EIG 303 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | List any two functions of DSO. | R | 4 | |
| | b) | Draw the diagram of passive voltage probe. | R | 4 | |
| | c) | State the need of signal generator. | R | 5 | |
| | d) | Define Pulse generator. | R | 5 | |
| | e) | State the function of event marker in strip chart recorder | R | 6 | |
| | f) | List the types of recorders. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Compare between time domain and frequency domain on the basis of following points,<br>i)Definition ii)Waveform iii)Example iv)Cost | U | 5 | |
| | b) | State the procedure for frequency measurement using CRO with diagram. | A | 4 | |
| | c) | Draw and explain block diagram of X-Y recorder. | U | 6 | |
| | d) | Draw the constructional diagram of CRT. state two materials used for display in CRT screen. | U | 4 | |
| | e) | State the specifications of function generator (Any 4) | U | 5 | |
| | f) | Compare between active and passive voltage probe on the basis of<br>i) Block diagram ii)definition iii) components used<br>iv) Application | U | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain vertical deflection system with neat diagram. | U | 4 | |
| | b) | Explain in detail spectrum analyzer. | U | 5 | |
| | c) | Draw and explain type of CRO probe used to measure current in the circuit. | A | 4 | |
| | d) | State the applications of strip chart recorder(Any 4) | | | |
| | e) | Draw neat block diagram of DSO. | U | 4 | |
| | f) | Draw the neat labelled block diagram of function generator and explain how sine wave generated. | U | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/SUMMER- 202**

**EXAM SEAT NO.** | | | | | | |

LEVEL : **-THIRD** PROGRAM : **IE/E&TC**

COURSE CODE :- **EIG303 / EIF303**

COURSE NAME :- **ELECTRONICS MEASUING INSTRUMENTS**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-08/12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | | R/U/A | Co EIG303 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the units of any 2 fundamental quantities. | R | 1 | |
| | b) | Give the classification of standards. | R | 1 | |
| | c) | Draw the diagram of whetstone's bridge. | R | 2 | |
| | d) | List any two applications of maxwell's bridge. | R | 2 | |
| | e) | Define average value. | R | 3 | |
| | f) | Draw the diagram of digital frequency meter. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain any 2 dynamic characteristics of instruments. | U | 1 | |
| | b) | Draw & explain bridge balance condition for capacitance comparison bridge. | U | 2 | |
| | c) | Explain kelvin's bridge with neat diagram. | U | 2 | |
| | d) | Classify bridges. Write the parameters which can be measured using bridge. | A | 2 | |
| | e) | Compare analog & digital instruments (any four points) | U | 3 | |
| | f) | Explain operation of LCR meter with suitable diagram. | U | 3 | |
| | | | | | |
| Q.3 | | | | | **16** |
| | a) | Explain the types of errors. | U | 1 | |
| | b) | Explain how unknown frequency can be measured using wien's bridge. | A | 2 | |
| | c) | Discuss hay's bridge with neat diagram. | U | 2 | |
| | d) | Explain the construction of RTD with suitable diagram. | U | 3 | |
| | e) | Write classification of transducers with examples. | U | 3 | |
| | f) | Explain the PMMC instrument with neat labeled diagram. | U | 3 | |
| | | | | | |

P.T.O.

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **THIRD** PROGRAM : **IE & E & TC**

COURSE CODE :- **EIG307/EIF307**

COURSE NAME **LINEAR INTEGRATED CIRCUITS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **11/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co EIG 307 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Why OP-Amp is called operational amplifier? | U | 1 | |
| | b) | List the different types of differential amplifier. | R | 1 | |
| | c) | Differential between open loop and closed loop configuration of OPAMP. | R | 2 | |
| | d) | State the virtual ground concept in OP-AMP. | 2 | 1 | |
| | e) | Sketch the transfer characteristics of inverting comparator. | A | 3 | |
| | f) | List the applications of Schmitt trigger. ( any four) | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Sketch the circuit for an ideal OPAMP and describe it. | A | 1 | |
| | b) | With neat circuit diagram describe the working of DIBO ( Dual Input Balanced Output) differential amplifier. | U | 1 | |
| | c) | Derive the output expression for averaging amplifies using OP-amp. | A | 2 | |
| | d) | Describe with neat circuit diagram working of Integrator circuit using OP-amp. | A | 2 | |
| | e) | Compare Inverting ad non-inverting comparator. ( any four points) | U | 3 | |
| | f) | Describe working of window comparator with neat circuit diagram. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Sketch the Block diagram of operational amplifier. State function of each block. | A | 1 | |
| | b) | Define i) CMRR ii) Slew Rate iii) SVRR iv) Bandwidth With respect to operational amplifier. | R | 1 | |
| | c) | For a non-inverting summing amplifier having inputs Va, Vb, Vc such that Va = 2v, Vb = 3V, Vc = 7V. If $R_F$=100kΩ, & $R_1$=10kΩ. Find the output voltage. Also draw the circuit diagram. | A | 2 | |
| | d) | Differentiate between the differentiator and Integrator circuit. | U | 2 | |
| | e) | Draw the circuit of V to I converter with grounded load and describe it's working. | U | 3 | |
| | f) | Draw the circuit diagram of instrumentation amplifier using three OP-amps and explain its operation. | U | 3 | |
| | | | | | |

**P.T.O**

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 3rd PROGRAM :
COURSE CODE :- EIG307 / EIF307
COURSE NAME :- LINEAR INTEGRATED CIRCUITS
MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 11 /12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co EIG 307 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Give classification of filter. | R | 5 | |
| | b) | Draw the pin diagram of IC 566 | U | 4 | |
| | c) | State any four specifications of IC555 | R | 6 | |
| | d) | List any two applications of astable multivibrator | R | 4 | |
| | e) | Draw the pin diagram of IC 555 | R | 6 | |
| | f) | Draw the circuit diagram of wide -band pass filter. | U | 5 | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain first order butterworth high pass filter using opamp. | U | 5 | |
| | b) | State the operating principle of Wien bridge oscillator using IC741 Give the expression of frequency of oscillations. | A | 4 | |
| | c) | Draw and explain with neat diagram Bistable multivibrator using IC555. | U | 6 | |
| | d) | State the advantages and disadvantages of RC phase shift oscillator. | R | 4 | |
| | e) | Define following term w.r.t filter<br>i) Roll of rate ii) Q-factor<br>ii) Bandwidth iv) cut –off frequency | U | 5 | |
| | f) | Draw and explain triangular waveform generator circuit. | R | 4 | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain with neat diagram astable multivibrator using IC555. | U | 6 | |
| | b) | For second order LPF ,calculate the $f_c$ ,If $R_2$,R3 =33KΩ & $C_1$, $C_2$=0.002μf | A | 5 | |
| | c) | Describe with neat circuit diagram working of Quadrature oscillator. | U | 4 | |
| | d) | Draw and explain working of wide band reject filter. | U | 5 | |
| | e) | Draw and explain working of Schmitt trigger using IC555. | U | 6 | |
| | f) | Design second order butterworth high pass filter of cut off frequency $f_c$=10KHZ, Draw the designed circuit and frequency response curve. | A | 5 | |

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **IE & E& TC**

COURSE CODE :- **ETG103**

COURSE NAME **BASIC ELECTRONICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **15/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co EIG 103 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | State values of cut in voltages for Si & Ge diodes. | R | 1 | |
| | b) | Define i) Ripple factor ii) Rectifier efficiency | R | 2 | |
| | c) | Define intrinsic semiconductor. Give two examples. | R | 1 | |
| | d) | Draw the symbol of P-N junction diode and zener diode. | R | 1 | |
| | e) | State the types of transistor and draw symbol of any one of it. | R | 3 | |
| | f) | State any two applications of P-N junction diode. | R | 1 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain input characteristics of NPN transistor in CE configuration. | U | 3 | |
| | b) | Explain the formation of P-N junction diode. | U | 1 | |
| | c) | Explain working of half wave rectifier. Draw related input output waveforms. | U | 2 | |
| | d) | Draw the V-I characteristics of zener diode and explain it. | R | 1 | |
| | e) | What is the need of filter? Explain any one filter circuit. | U | 2 | |
| | f) | With diagram explain operating principle of NPN transistor. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain how transistor acts as a switch. | U | 3 | |
| | b) | Draw and explain forward and reverse I-V characteristics of PN junction diode. | A | 1 | |
| | c) | Explain operation of full wave Bridge rectifier with neat diagram. | U | 2 | |
| | d) | Explain the relation between $\alpha$ and $\beta$ in transistor. | A | 3 | |
| | e) | Explain the working of LC filter circuit. | U | 2 | |
| | f) | State types of configuration of transistors. State applications of transistor. | U | 3 | |
| | | | | | |

**P.T.O**

| QN | SQN | Question Text | R/U/A | Co EIG 103 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the need of Biasing of BJT. | U | 4 | |
| | b) | Give the different types of amplifier coupling. | R | 4 | |
| | c) | List different types of FET's. | R | 5 | |
| | d) | State applications of FET. ( any four ) | R | 5 | |
| | e) | Define line and load regulation. | R | 6 | |
| | f) | State need of regulated power supply. | U | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain fixed bias method of transistor biasing. | U | 4 | |
| | b) | Explain the concept of DC load line and operating point. | U | 4 | |
| | c) | Explain working principle of N-channel depletion type MOSFET with construction diagram. | U | 5 | |
| | d) | Draw and explain V-I characteristics of FET. | U | 5 | |
| | e) | Draw block diagram of DC regulated power supply and explain function of each block. | U | 6 | |
| | f) | Draw circuit of zener diode as a voltage regulator and explain its working. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Sketch and explain frequency response curve of two stage RC coupled amplifier. | U | 4 | |
| | b) | Explain the need of cascading of amplifier. Sketch RC coupled cascaded amplifier ( 2 –stage) | A | 4 | |
| | c) | Define $\mu$, $g_m$ and $r_d$ and derive relation between $\mu$, $g_m$ and $r_d$ with respect to FET. | A | 5 | |
| | d) | Compare E-MOSFET and D-MOSFET. | A | 5 | |
| | e) | Sketch functional block diagram of IC 723 and explain in short. | A | 6 | |
| | f) | Select regulator IC for 12V regulated output voltage and sketch the regulated power supply using this IC. | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **IE & E& TC**

COURSE CODE :- **ETG103**

COURSE NAME **BASIC ELECTRONICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **15/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/ U/ A | Co EIG 103 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | State values of cut in voltages for Si & Ge diodes. | R | 1 | |
| | b) | Define i) Ripple factor ii) Rectifier efficiency | R | 2 | |
| | c) | Define intrinsic semiconductor. Give two examples. | R | 1 | |
| | d) | Draw the symbol of P-N junction diode and zener diode. | R | 1 | |
| | e) | State the types of transistor and draw symbol of any one of it. | R | 3 | |
| | f) | State any two applications of P-N junction diode. | R | 1 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain input characteristics of NPN transistor in CE configuration. | U | 3 | |
| | b) | Explain the formation of P-N junction diode. | U | 1 | |
| | c) | Explain working of half wave rectifier. Draw related input output waveforms. | U | 2 | |
| | d) | Draw the V-I characteristics of zener diode and explain it. | R | 1 | |
| | e) | What is the need of filter? Explain any one filter circuit. | U | 2 | |
| | f) | With diagram explain operating principle of NPN transistor. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain how transistor acts as a switch. | U | 3 | |
| | b) | Draw and explain forward and reverse I-V characteristics of PN junction diode. | A | 1 | |
| | c) | Explain operation of full wave Bridge rectifier with neat diagram. | U | 2 | |
| | d) | Explain the relation between $\alpha$ and $\beta$ in transistor. | A | 3 | |
| | e) | Explain the working of LC filter circuit. | U | 2 | |
| | f) | State types of configuration of transistors. State applications of transistor. | U | 3 | |
| | | | | | |

**P.T.O**

| QN | SQN | Question Text | R/U/A | Co EIG 103 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State the need of Biasing of BJT. | U | 4 | |
| | b) | Give the different types of amplifier coupling. | R | 4 | |
| | c) | List different types of FET's. | R | 5 | |
| | d) | State applications of FET. ( any four ) | R | 5 | |
| | e) | Define line and load regulation. | R | 6 | |
| | f) | State need of regulated power supply. | U | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain fixed bias method of transistor biasing. | U | 4 | |
| | b) | Explain the concept of DC load line and operating point. | U | 4 | |
| | c) | Explain working principle of N-channel depletion type MOSFET with construction diagram. | U | 5 | |
| | d) | Draw and explain V-I characteristics of FET. | U | 5 | |
| | e) | Draw block diagram of DC regulated power supply and explain function of each block. | U | 6 | |
| | f) | Draw circuit of zener diode as a voltage regulator and explain its working. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Sketch and explain frequency response curve of two stage RC coupled amplifier. | U | 4 | |
| | b) | Explain the need of cascading of amplifier. Sketch RC coupled cascaded amplifier ( 2 –stage) | A | 4 | |
| | c) | Define $\mu$, $g_m$ and $r_d$ and derive relation between $\mu$, $g_m$ and $r_d$ with respect to FET. | A | 5 | |
| | d) | Compare E-MOSFET and D-MOSFET. | A | 5 | |
| | e) | Sketch functional block diagram of IC 723 and explain in short. | A | 6 | |
| | f) | Select regulator IC for 12V regulated output voltage and sketch the regulated power supply using this IC. | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **IE & E & TC**

COURSE CODE :- **EIG101**

COURSE NAME **ELECTRONICS COMPONENTS AND APPLICATIONS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **18/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co EIG 101 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define Active and Passive components with one example. | R | 1 | |
| | b) | Enlist different types of dielectric materials used for capacitors ( any four) | R | 2 | |
| | c) | Draw equivalent circuit of capacitor. | R | 2 | |
| | d) | Give classification of capacitors. | R | 2 | |
| | e) | State mutual Inductance. | R | 3 | |
| | f) | State functions and any one application of an inductor. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Identify the colour code for following resistor values. i) $3k\ \Omega \pm$ 10% ii) $56k\ \Omega \pm$ 10% iii) $8.2k\ \Omega \pm$ 5% iv) $1M\Omega \pm$ 10% | A | 1 | |
| | b) | Draw the constructional diagram for carbon film resistor and state its two applications. | U | 1 | |
| | c) | Explain Disc Ceramic Capacitor with diagram. | U | 2 | |
| | d) | Draw and explain cross sectional diagram of trimmer capacitor. | U | 2 | |
| | e) | Compare Air-Core and Ferrite- Core Inductor ( any four points) | U | 3 | |
| | f) | Explain Toroidal Inductor with diagram. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Identify the value of resistors using colour codes. i) Green, Blue, Yellow, Red. ii) Red, Orange, Yellow, Red. | A | 1 | |
| | b) | Identify the colour code for given resistors i) 100Ω, 10% ii) 47K, 5% | A | 1 | |
| | c) | Compare Linear and logarithmic potentiometer ( any four points) | U | 1 | |
| | d) | Explain PVC gang capacitor with diagram. | U | 2 | |
| | e) | Calculate value of capacitor using colour codes. i) Orange, Orange, Blue ii) Yellow, Voilet, Yellow iii) Orange, Yellow, White iv) Yellow, Voilet, Orange | A | 2 | |
| | f) | Explain slug tuned Inductor using diagram. | U | 3 | |
| | | | | | |

**P.T.O**

| QN | SQN | Question Text | R/U/A | Co EIG 101 | **Marks** |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State any two applications of : i) LCD ii) LED | A | 5 | |
| | b) | State different types of PCB. | U | 6 | |
| | c) | State the advantages of LCD. | R | 5 | |
| | d) | State any two applications of<br>i) FRC connector ii) Video connector. | A | 4 | |
| | e) | Draw symbol of i) Push to ON switch ii) Push to OFF switch. | R | 5 | |
| | f) | Draw a neat sketch of RJ 45 connector. | U | 4 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw constructional diagram and two applications of phone plug and jacks connector. | A | 4 | |
| | b) | Draw neat sketch of thumb wheel switch and state two applications. | A | 5 | |
| | c) | Define and explain mechanical and electrical life of switches. | U | 5 | |
| | d) | State the advantages of SMD over IC ( any four) | U | 6 | |
| | e) | Draw the construction diagram of co-axial cable and state its two applications. | A | 4 | |
| | f) | State any four general rules to be followed while preparing artwork of PCB. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the construction diagram of Mercury Wetted Reed relay and state its two applications. | A | 5 | |
| | b) | Classify the Integrated circuits ( IC's) | A | 6 | |
| | c) | Describe the working principle of Dry reed Relay. | U | 5 | |
| | d) | State the properties and applications of Video connector. | A | 4 | |
| | e) | Describe the working principle of Electromagnetic relay with the help of neat diagram. | U | 5 | |
| | f) | Describe the working of Toggle switch with neat diagram. | U | 4 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **IE & E & TC**

COURSE CODE :- **EIG101**

COURSE NAME **ELECTRONICS COMPONENTS AND APPLICATIONS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **18/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co EIG 101 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define Active and Passive components with one example. | R | 1 | |
| | b) | Enlist different types of dielectric materials used for capacitors ( any four) | R | 2 | |
| | c) | Draw equivalent circuit of capacitor. | R | 2 | |
| | d) | Give classification of capacitors. | R | 2 | |
| | e) | State mutual Inductance. | R | 3 | |
| | f) | State functions and any one application of an inductor. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Identify the colour code for following resistor values. i) 3$k\,\Omega \pm$ 10% ii) 56$k\,\Omega \pm$ 10% iii) 8.2$k\,\Omega \pm$ 5% iv) 1M$\Omega \pm$ 10% | A | 1 | |
| | b) | Draw the constructional diagram for carbon film resistor and state its two applications. | U | 1 | |
| | c) | Explain Disc Ceramic Capacitor with diagram. | U | 2 | |
| | d) | Draw and explain cross sectional diagram of trimmer capacitor. | U | 2 | |
| | e) | Compare Air-Core and Ferrite- Core Inductor ( any four points) | U | 3 | |
| | f) | Explain Toroidal Inductor with diagram. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Identify the value of resistors using colour codes. i) Green, Blue, Yellow, Red. ii) Red, Orange, Yellow, Red. | A | 1 | |
| | b) | Identify the colour code for given resistors i) 100Ω, 10% ii) 47K, 5% | A | 1 | |
| | c) | Compare Linear and logarithmic potentiometer ( any four points) | U | 1 | |
| | d) | Explain PVC gang capacitor with diagram. | U | 2 | |
| | e) | Calculate value of capacitor using colour codes. i) Orange, Orange, Blue ii) Yellow, Voilet, Yellow iii) Orange, Yellow, White iv) Yellow, Voilet, Orange | A | 2 | |
| | f) | Explain slug tuned Inductor using diagram. | U | 3 | |
| | | | | | |

**P.T.O**

| QN | SQN | Question Text | R/U/A | Co EIG 101 | **Marks** |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State any two applications of : i) LCD ii) LED | A | 5 | |
| | b) | State different types of PCB. | U | 6 | |
| | c) | State the advantages of LCD. | R | 5 | |
| | d) | State any two applications of<br>i) FRC connector ii) Video connector. | A | 4 | |
| | e) | Draw symbol of i) Push to ON switch ii) Push to OFF switch. | R | 5 | |
| | f) | Draw a neat sketch of RJ 45 connector. | U | 4 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw constructional diagram and two applications of phone plug and jacks connector. | A | 4 | |
| | b) | Draw neat sketch of thumb wheel switch and state two applications. | A | 5 | |
| | c) | Define and explain mechanical and electrical life of switches. | U | 5 | |
| | d) | State the advantages of SMD over IC ( any four) | U | 6 | |
| | e) | Draw the construction diagram of co-axial cable and state its two applications. | A | 4 | |
| | f) | State any four general rules to be followed while preparing artwork of PCB. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw the construction diagram of Mercury Wetted Reed relay and state its two applications. | A | 5 | |
| | b) | Classify the Integrated circuits ( IC's) | A | 6 | |
| | c) | Describe the working principle of Dry reed Relay. | U | 5 | |
| | d) | State the properties and applications of Video connector. | A | 4 | |
| | e) | Describe the working principle of Electromagnetic relay with the help of neat diagram. | U | 5 | |
| | f) | Describe the working of Toggle switch with neat diagram. | U | 4 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **IE & E&TC**

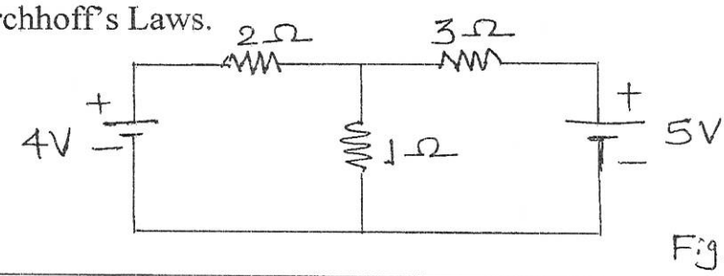
COURSE CODE :- **EIG107**

COURSE NAME **BASIC ELECTRICAL ENGINEERING**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **19/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co EIG 107 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define i) Electrical Power ii) Electrical Energy | R | 1 | |
| | b) | Define conductance and state its unit. | R | 1 | |
| | c) | Define permeability. What is the value of permeability of free space? | R | 2 | |
| | d) | State the properties of hard magnetic material. | R | 2 | |
| | e) | State Faraday's laws of electro-magnetic induction. | R | 3 | |
| | f) | State Lenz's Law. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between direct current and alternating current ( any four points) | U | 1 | |
| | b) | The rating of electric geyser is 250V, 3 KW. How much current does it take and what is its hot resistance? Also calculate energy consumed by it in one hour. | A | 1 | |
| | c) | Explain in brief permanent magnet and electromagnet. | A | 2 | |
| | d) | Explain B-H curve in detail. | R | 2 | |
| | e) | Compare electric and magnetic circuit on any four points. | U | 2 | |
| | f) | Explain how Fleming's right hand rule helps to deciding direction of induced emf. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | 16 |
| | a) | Derive the expression for equivalent resistance when two resistances are connected in series. | U | 1 | |
| | b) | Find current through 1Ω resistance of Figure No. 1 using Kirchhoff's Laws.   Fig. No 1 | A | 1 | |
| | c) | Explain with neat diagram useful flux and leakage flux. | U | 2 | |

**P.T.O**

| | | | | | |
|---|---|---|---|---|---|
| | d) | An iron ring of mean circumference 100cm is uniformly wound with 500 turns of wire and current of 1.1A passed through it with area of cross section is $2m^2$. Calculate i) mmf ii) Reluctance Assume $\mu_r = 100$, $\mu_o = 4\pi * 10^{-7} H/M$ | A | 2 | |
| | e) | Distinguish between statically induced emf and dynamically induced emf. | U | 3 | |
| | f) | A conductor of length one meter moves at right angle to a uniform magnetic field of flux density 1.5 tesla with a velocity of 80m/s. Calculate the induced emf in a conductor. What will be the value of induced emf, if conductor moves at an angle of $30^0$ with the direction of the field? | A | 3 | |
| | | | | | |
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define following terms regarding AC: i) Frequency ii) Peak value | R | 4 | |
| | b) | Converts following phasors into polar form i) 2 + j3 ii) 5 + j4 | U | 4 | |
| | c) | Perform subtraction of $V_1$ and $V_2$. $V_1 = 10 < 21^0$ $V_2 = 6 + j\,8$. | U | 4 | |
| | d) | Calculate active power in capacitive circuit having power factor of 0.8, current flowing through circuit is 1.2A when applied voltage is 230V. | A | 5 | |
| | e) | Define reactance and impedance and state their units. | R | 5 | |
| | f) | Draw impedance triangle for inductive circuit. ( Resistance and capacitance in series) | R | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Perform multiplication and addition of phasors $I_1$ and $I_2$. $I_1 = 12 + j\,15$; $I_2 = 16 + j7$. | A | 4 | |
| | b) | Calculate angular velocity, RMS value and frequency of 260 sin (500t). | A | 4 | |
| | c) | Define following terms regarding AC voltage i) Peak factor ii) Form factor iii) Cycle iv) Time period | R | 4 | |
| | d) | Perform addition and subtraction of $V_1$ and $V_2$ $V_1 = 20 \sin(wt + 12)$; $V_2 = 6 \sin(wt + 17)$ | A | 4 | |
| | e) | Draw star and delta connections of resistive load. Also write relation between line voltages and phase voltages. | U | 5 | |
| | f) | Explain purely capacitive Ac circuit and purely inductive AC circuit. | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain AC circuit having resistance and capacitance in series. | U | 5 | |
| | b) | Consider a 200Ω resistance is connected in series with inductor. Series circuit is drawing current of 1.3A for 220 V AC supply. Calculate active, reactive and apparent power in circuit. | A | 5 | |
| | c) | Explain AC circuit having resistor, inductor and capacitor in series. | U | 5 | |
| | d) | Explain construction of single phase transformer. | U | 6 | |
| | e) | Explain principle of working of DC motor. | A | 6 | |
| | f) | Describe the necessity of earthing in electric circuit. Draw the construction diagram pipe earthing. | U | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **IE & E&TC**

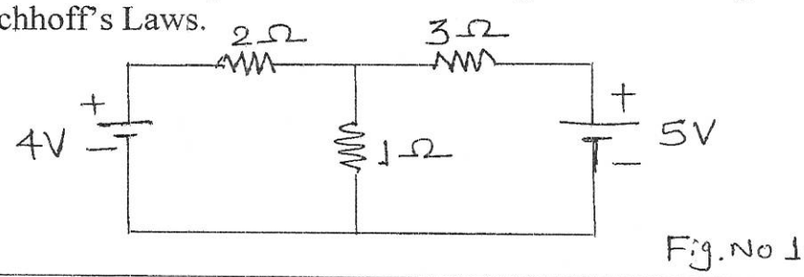
COURSE CODE :- **EIG107**

COURSE NAME **BASIC ELECTRICAL ENGINEERING**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **19/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co EIG 107 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define i) Electrical Power ii) Electrical Energy | R | 1 | |
| | b) | Define conductance and state its unit. | R | 1 | |
| | c) | Define permeability. What is the value of permeability of free space? | R | 2 | |
| | d) | State the properties of hard magnetic material. | R | 2 | |
| | e) | State Faraday's laws of electro-magnetic induction. | R | 3 | |
| | f) | State Lenz's Law. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between direct current and alternating current ( any four points) | U | 1 | |
| | b) | The rating of electric geyser is 250V, 3 KW. How much current does it take and what is its hot resistance? Also calculate energy consumed by it in one hour. | A | 1 | |
| | c) | Explain in brief permanent magnet and electromagnet. | A | 2 | |
| | d) | Explain B-H curve in detail. | R | 2 | |
| | e) | Compare electric and magnetic circuit on any four points. | U | 2 | |
| | f) | Explain how Fleming's right hand rule helps to deciding direction of induced emf. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Derive the expression for equivalent resistance when two resistances are connected in series. | U | 1 | |
| | b) | Find current through 1Ω resistance of Figure No. 1 using Kirchhoff's Laws.   Fig. No 1 | A | 1 | |
| | c) | Explain with neat diagram useful flux and leakage flux. | U | 2 | |

**P.T.O**

| | | | | | |
|---|---|---|---|---|---|
| | d) | An iron ring of mean circumference 100cm is uniformly wound with 500 turns of wire and current of 1.1A passed through it with area of cross section is $2m^2$. Calculate i) mmf ii) Reluctance Assume $\mu_r = 100$, $\mu_o = 4\pi * 10^{-7} H/M$ | A | 2 | |
| | e) | Distinguish between statically induced emf and dynamically induced emf. | U | 3 | |
| | f) | A conductor of length one meter moves at right angle to a uniform magnetic field of flux density 1.5 tesla with a velocity of 80m/s. Calculate the induced emf in a conductor. What will be the value of induced emf, if conductor moves at an angle of $30^0$ with the direction of the field? | A | 3 | |
| | | | | | |
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define following terms regarding AC: i) Frequency ii) Peak value | R | 4 | |
| | b) | Converts following phasors into polar form i) 2 + j3 ii) 5 + j4 | U | 4 | |
| | c) | Perform subtraction of $V_1$ and $V_2$. $V_1 = 10 < 21^0$ $V_2 = 6 + j\,8$. | U | 4 | |
| | d) | Calculate active power in capacitive circuit having power factor of 0.8, current flowing through circuit is 1.2A when applied voltage is 230V. | A | 5 | |
| | e) | Define reactance and impedance and state their units. | R | 5 | |
| | f) | Draw impedance triangle for inductive circuit. ( Resistance and capacitance in series) | R | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Perform multiplication and addition of phasors $I_1$ and $I_2$. $I_1 = 12 + j\,15$; $I_2 = 16 + j7$. | A | 4 | |
| | b) | Calculate angular velocity, RMS value and frequency of 260 sin (500t). | A | 4 | |
| | c) | Define following terms regarding AC voltage i) Peak factor ii) Form factor iii) Cycle iv) Time period | R | 4 | |
| | d) | Perform addition and subtraction of $V_1$ and $V_2$ $V_1 = 20 \sin(wt + 12)$; $V_2 = 6 \sin(wt + 17)$ | A | 4 | |
| | e) | Draw star and delta connections of resistive load. Also write relation between line voltages and phase voltages. | U | 5 | |
| | f) | Explain purely capacitive Ac circuit and purely inductive AC circuit. | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain AC circuit having resistance and capacitance in series. | U | 5 | |
| | b) | Consider a 200Ω resistance is connected in series with inductor. Series circuit is drawing current of 1.3A for 220 V AC supply. Calculate active, reactive and apparent power in circuit. | A | 5 | |
| | c) | Explain AC circuit having resistor, inductor and capacitor in series. | U | 5 | |
| | d) | Explain construction of single phase transformer. | U | 6 | |
| | e) | Explain principle of working of DC motor. | A | 6 | |
| | f) | Describe the necessity of earthing in electric circuit. Draw the construction diagram pipe earthing. | U | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER -23**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : Electronics and Telecommunication

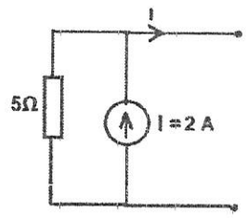
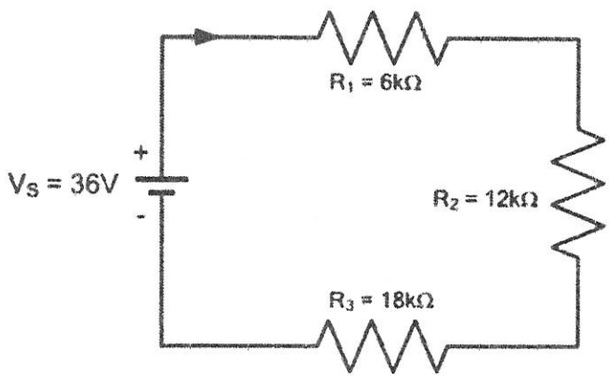
COURSE CODE :- ETH101

COURSE NAME :- Basic Electronics

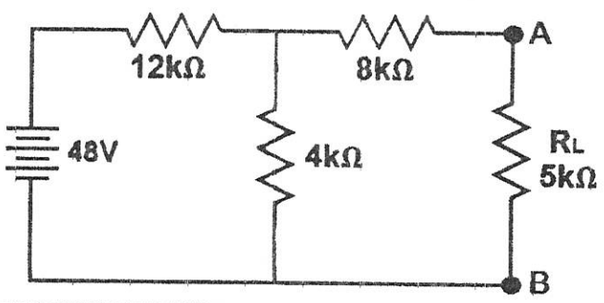
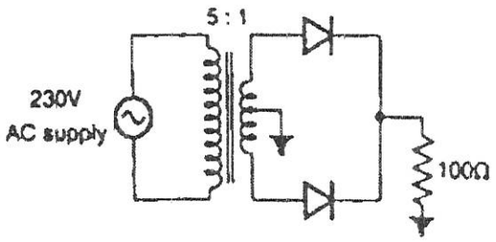
MAX. MARKS : 70 TIME : 03 Hrs DATE :-19 /12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **THREE: (2 X 3)** | | | **06** |
| | a) | State Kirchoff's Current Law | R | 1 | 2 |
| | b) | Define Ideal Voltage Source. Draw the symbol of it. | R | 1 | 2 |
| | c) | Define a) Instantaneous value b) Peak Value of sine wave. | R | 2 | 2 |
| | d) | Obtain an equivalent voltage source to current source for the given circuit:   | A | 2 | 2 |
| | e) | State transformation ratio of a transformer. | U | 3 | 2 |
| | | | | | |
| Q.2 | | Attempt any **FOUR: (4 X 4)** | | | **16** |
| | a) | Define the Practical Current Source. Draw the symbol and Ideal and Practical Characteristics of it | U | 1 | 4 |
| | b) | Calculate the voltage across the R1, R2 and R3 using voltage divider rule and calculate the current flowing through the circuit.   | A | 1 | 4 |
| | c) | Explain the Current divider rule with suitable example. | R | 1 | 4 |
| | d) | An alternating current given by equation i = 142.14 sin 628 t. find - (i) Peak value (ii) Time period (iii) RMS value (iv) Average value . | U | 2 | 4 |
| | e) | Compare current transformer and auto transformer. (Any four points) | U | 3 | 4 |
| | f) | State Faraday's Laws of Electromagnetic Induction. | R | 3 | 4 |

P.T.O.

| | | | | | |
|---|---|---|---|---|---|
| Q.3 | | Attempt any **TWO: (6 X 2)** | | | **12** |
| | a) | Calculate the current flowing through 4Ω resistor using KCL   | A | 1 | 6 |
| | b) | Explain Phase relationship between voltage and current through a resistor with neat circuit diagram and waveform | U | 2 | 6 |
| | c) | A transformer with 1000 primary turns and 400 secondary turns is supplied from a 220 V AC supply. Calculate the secondary voltage and the volts per turn. | A | 3 | 6 |
| Q.4 | | Attempt any **FOUR: (2 X 4)** | | | **08** |
| | a) | Draw the symbol of LED and varactor diode. | R | 4 | |
| | b) | Draw constructional diagram of PN junction diode and label it properly. | R | 4 | |
| | c) | State the two advantages and two disadvantages of Half wave rectifier | A | 5 | |
| | d) | Define Peak Inverse Voltage. State PIV value for HWR | U | 5 | |
| | e) | Enlist any two applications of Differentiator circuit | A | 6 | |
| | f) | State the need of Wave Shaping Circuit. | U | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR: (4 X 4)** | | | **16** |
| | a) | Explain with neat diagram working of P-N junction diode in forward bias. Also draw its V-I characteristics. | U | 4 | |
| | b) | Describe the working of photodiode. Draw its characteristics curve. | A | 4 | |
| | c) | In full wave bridge rectifier Vm=10V, RL=10KΩ. find (1) VDC (2) IDC (3) Ripple factor (4) PIV | A | 5 | |
| | d) | Explain working of the Full Wave Bridge Rectifier with help of Circuit diagram and Waveforms. | U | 5 | |
| | e) | Explain Series Positive clipper with neat circuit diagram and waveforms. | U | 6 | |
| | f) | Explain RC Differentiator circuit with neat circuit diagram. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **TWO: (6 X 2)** | | | **12** |
| | a) | Explain: (i) Avalanche breakdown in PN junction diode (3M) and (ii) Zener breakdown in Zener diode (3M) | U | 4 | |
| | b) | Figure shows a center tapped full wave rectifier circuit as shown below.   Assuming both the diodes to be ideal, Determine (1) DC output voltage(2) PIV of Diode | A | 5 | |
| | c) | i) What is the output of 3 V peak to peak sine wave at 1 kHz is applied at the input of positive clipper circuit. Draw input and output waveforms.<br>(ii) Design a diode clamper to limit the -ve peak output to +8V when input is 20 $V_{peak}$ square wave varying above zero. | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER -23**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : Electronics and Telecommunication

COURSE CODE :- ETH101

COURSE NAME :- Basic Electronics

MAX. MARKS : 70 TIME : 03 Hrs DATE :-19 /12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
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7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | | R/U/A | Co | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **THREE: (2 X 3)** | | | **06** |
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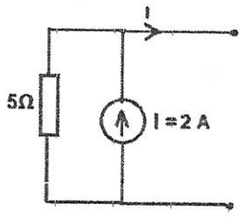
| | b) | Define Ideal Voltage Source. Draw the symbol of it. | R | 1 | 2 |
| | c) | Define a) Instantaneous value b) Peak Value of sine wave. | R | 2 | 2 |
| | d) | Obtain an equivalent voltage source to current source for the given circuit:   | A | 2 | 2 |
| | e) | State transformation ratio of a transformer. | U | 3 | 2 |
| | | | | | |
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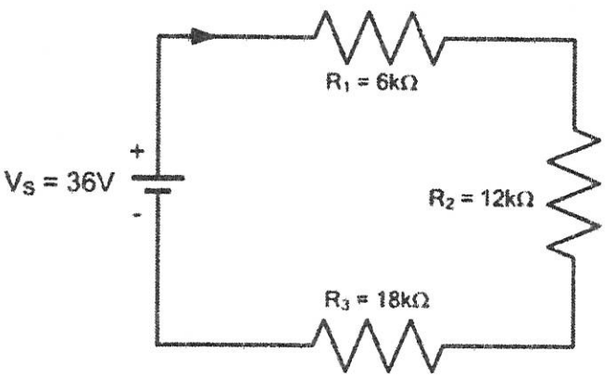
| | a) | Define the Practical Current Source. Draw the symbol and Ideal and Practical Characteristics of it | U | 1 | **4** |
| | b) | Calculate the voltage across the R1, R2 and R3 using voltage divider rule and calculate the current flowing through the circuit.   | A | 1 | 4 |
| | c) | Explain the Current divider rule with suitable example. | R | 1 | 4 |
| | d) | An alternating current given by equation i = 142.14 sin 628 t. find - (i) Peak value (ii) Time period (iii) RMS value (iv) Average value . | U | 2 | 4 |
| | e) | Compare current transformer and auto transformer. (Any four points) | U | 3 | 4 |
| | f) | State Faraday's Laws of Electromagnetic Induction. | R | 3 | 4 |

P.T.O.

| | | | | | |
|---|---|---|---|---|---|
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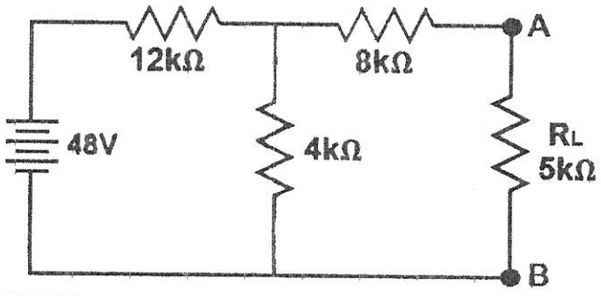
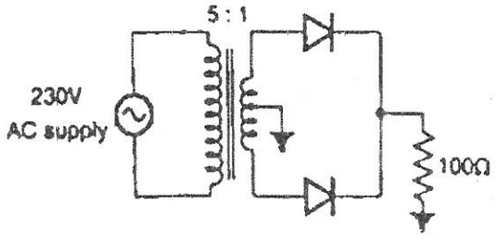
| | a) | Calculate the current flowing through 4Ω resistor using KCL   | A | 1 | 6 |
| | b) | Explain Phase relationship between voltage and current through a resistor with neat circuit diagram and waveform | U | 2 | 6 |
| | c) | A transformer with 1000 primary turns and 400 secondary turns is supplied from a 220 V AC supply. Calculate the secondary voltage and the volts per turn. | A | 3 | 6 |
| Q.4 | | Attempt any **FOUR: (2 X 4)** | | | **08** |
| | a) | Draw the symbol of LED and varactor diode. | R | 4 | |
| | b) | Draw constructional diagram of PN junction diode and label it properly. | R | 4 | |
| | c) | State the two advantages and two disadvantages of Half wave rectifier | A | 5 | |
| | d) | Define Peak Inverse Voltage. State PIV value for HWR | U | 5 | |
| | e) | Enlist any two applications of Differentiator circuit | A | 6 | |
| | f) | State the need of Wave Shaping Circuit. | U | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR: (4 X 4)** | | | **16** |
| | a) | Explain with neat diagram working of P-N junction diode in forward bias. Also draw its V-I characteristics. | U | 4 | |
| | b) | Describe the working of photodiode. Draw its characteristics curve. | A | 4 | |
| | c) | In full wave bridge rectifier Vm=10V, RL=10KΩ. find (1) VDC (2) IDC (3) Ripple factor (4) PIV | A | 5 | |
| | d) | Explain working of the Full Wave Bridge Rectifier with help of Circuit diagram and Waveforms. | U | 5 | |
| | e) | Explain Series Positive clipper with neat circuit diagram and waveforms. | U | 6 | |
| | f) | Explain RC Differentiator circuit with neat circuit diagram. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **TWO: (6 X 2)** | | | **12** |
| | a) | Explain: (i) Avalanche breakdown in PN junction diode (3M) and (ii) Zener breakdown in Zener diode (3M) | U | 4 | |
| | b) | Figure shows a center tapped full wave rectifier circuit as shown below.   Assuming both the diodes to be ideal, Determine (1) DC output voltage(2) PIV of Diode | A | 5 | |
| | c) | i) What is the output of 3 V peak to peak sine wave at 1 kHz is applied at the input of positive clipper circuit. Draw input and output waveforms.<br>(ii) Design a diode clamper to limit the -ve peak output to +8V when input is 20 $V_{peak}$ square wave varying above zero. | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **THIRD** PROGRAM : **IE & E & TC**

COURSE CODE :- **EIG307/EIF307**

COURSE NAME **LINEAR INTEGRATED CIRCUITS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **11/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.( and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co EIG 307 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Why OP-Amp is called operational amplifier? | U | 1 | |
| | b) | List the different types of differential amplifier. | R | 1 | |
| | c) | Differential between open loop and closed loop configuration of OPAMP. | R | 2 | |
| | d) | State the virtual ground concept in OP-AMP. | 2 | 1 | |
| | e) | Sketch the transfer characteristics of inverting comparator. | A | 3 | |
| | f) | List the applications of Schmitt trigger. ( any four) | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Sketch the circuit for an ideal OPAMP and describe it. | A | 1 | |
| | b) | With neat circuit diagram describe the working of DIBO ( Dual Input Balanced Output) differential amplifier. | U | 1 | |
| | c) | Derive the output expression for averaging amplifies using OP-amp. | A | 2 | |
| | d) | Describe with neat circuit diagram working of Integrator circuit using OP-amp. | A | 2 | |
| | e) | Compare Inverting ad non-inverting comparator. ( any four points) | U | 3 | |
| | f) | Describe working of window comparator with neat circuit diagram. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Sketch the Block diagram of operational amplifier. State function of each block. | A | 1 | |
| | b) | Define i) CMRR ii) Slew Rate iii) SVRR iv) Bandwidth With respect to operational amplifier. | R | 1 | |
| | c) | For a non-inverting summing amplifier having inputs Va, Vb, Vc such that Va = 2v, Vb = 3V, Vc = 7V. If $R_F$=100kΩ, & $R_1$=10kΩ. Find the output voltage. Also draw the circuit diagram. | A | 2 | |
| | d) | Differentiate between the differentiator and Integrator circuit. | U | 2 | |
| | e) | Draw the circuit of V to I converter with grounded load and describe it's working. | U | 3 | |
| | f) | Draw the circuit diagram of instrumentation amplifier using three OP-amps and explain its operation. | U | 3 | |
| | | | | | |

**P.T.O**

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**SUMMER/WINTER**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - 3rd PROGRAM :
COURSE CODE :- EIG307 / EIF307
COURSE NAME :- LINEAR INTEGRATED CIRCUITS
MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 11 /12/2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | Question Text | R/U/A | Co EIG 307 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Give classification of filter. | R | 5 | |
| | b) | Draw the pin diagram of IC 566 | U | 4 | |
| | c) | State any four specifications of IC555 | R | 6 | |
| | d) | List any two applications of astable multivibrator | R | 4 | |
| | e) | Draw the pin diagram of IC 555 | R | 6 | |
| | f) | Draw the circuit diagram of wide -band pass filter. | U | 5 | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Draw and explain first order butterworth high pass filter using opamp. | U | 5 | |
| | b) | State the operating principle of Wien bridge oscillator using IC741 Give the expression of frequency of oscillations. | A | 4 | |
| | c) | Draw and explain with neat diagram Bistable multivibrator using IC555. | U | 6 | |
| | d) | State the advantages and disadvantages of RC phase shift oscillator. | R | 4 | |
| | e) | Define following term w.r.t filter<br>i) Roll of rate ii) Q-factor<br>ii) Bandwidth iv) cut –off frequency | U | 5 | |
| | f) | Draw and explain triangular waveform generator circuit. | R | 4 | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain with neat diagram astable multivibrator using IC555. | U | 6 | |
| | b) | For second order LPF ,calculate the $f_c$ ,If $R_2$,R3 =33KΩ & $C_1$, $C_2$=0.002μf | A | 5 | |
| | c) | Describe with neat circuit diagram working of Quadrature oscillator. | U | 4 | |
| | d) | Draw and explain working of wide band reject filter. | U | 5 | |
| | e) | Draw and explain working of Schmitt trigger using IC555. | U | 6 | |
| | f) | Design second order butterworth high pass filter of cut off frequency $f_c$=10KHZ, Draw the designed circuit and frequency response curve. | A | 5 | |