GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRICAL ENGINEERING**
COURSE CODE :- **EEE304/EE310**
COURSE NAME :- **APPLIED ELECTRONICS**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **02 / 05 / 2016**

Instruction :-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) Define class – B power amplifier.

b) Draw neat circuit diagram of self biasing method of transistor.

c) Why common emitter configuration is suitable for transistor as an amplifier?

d) Write the Barkhausens criteria.

e) What is multivibrator? Write the name of multivibrator having two quasistable states.

f) Calculate the frequency of Colpitt's oscillator if L=5μH, C_1=0.01μF and C_2 = 0.001μF.

Q.2 Attempt any **FOUR** (16)

a) Explain in brief with neat circuit diagram, common collector configuration of transistor as impedance matching circuit.

b) Explain in brief AC load line analysis of CE amplifier with necessary diagrams.

c) Differentiate between RC oscillator and LC oscillator. (any four points)

d) With the neat circuit diagram explain transistor as a switch.

e) What is the condition for Schmitt trigger for deciding UTP or LTP? Which component of the circuit will alter UTP & LPT? What is hysteresis?

f) Explain in brief working of Hartley oscillator with its neat circuit diagram.

Q.3 Attempt any **TWO** (16)

a) Draw the circuit of a bistable multivibrator using P-N-P transistors and explain its operation. Also write any four applications of it.

b) What is an oscillator? Which type of feed back is necessary for an oscillator and why? With neat circuit diagram explain working of crystal oscillator.

c) Draw two stage RC coupled amplifier circuit. Also draw its frequency response and explain it in detail.

P.T.O.

Q.4 Attempt any **FOUR** (08)

a) State the importance of power electronics.

b) Draw symbol of i) LDR ii) Photo transistor.

c) Draw circuit diagram of snubber circuit.

d) List the turn-on methods of SCR.

e) Draw neat circuit diagram of PUT triggering.

f) List any two applications of photo tachometer.

Q.5 Attempt any **FOUR** (16)

a) Explain with neat circuit diagram and waveforms class A commutation.

b) Compare SCR and MOSFET (any four POINTS)

c) Draw and explain class D commutation.

d) With the neat circuit diagram explain gate protection circuit.

e) Draw and explain construction of PUT.

f) With the neat circuit diagram and waveform explain class E commutation.

Q.6 Attempt any **TWO** (16)

a) i) Compare MOSFET & IGBT (any four points)

ii) Draw and explain V-I characteristics of SCR.

b) Draw and explain construction of LASCR. Also explain its operation.

c) Draw and explain dv/dt and di/dt protection.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRICAL ENGINEERING**
COURSE CODE :- **EEE311**
COURSE NAME :- **NON CONVENTIONAL ENERGY SOURCES**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **02 / 05 / 2016**

Instruction :-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) Explain how electrical energy generated from wind energy conversion system?

b) List any four non-conventional energy sources.

c) Write the equation for power in wind.

d) Define Zenith angle.

e) State the advantages of wind energy convension system.

f) Write any four sources of energy.

Q.2 Attempt any **FOUR** (16)

a) Explain why betteries are used in wind power generation.

b) State the working of solar cell for solar power generation.
State any two materials used as solar cell.

c) Explain safety system used for wind energy conversion system.

d) Describe any one method of wind energy conversion system

e) Explain using a diagram solar cooker.

f) Explain air mass ratio is solar radiation.

Q.3 Attempt any **TWO** (16)

a) Write a note on solar radiation geornetry.

b) Explain factors to be considered while selecting site for wind energy conversion system.

c) Explain parabolic concentrator with neat diagram.

P.T.O.

Q.4 Attempt any **FOUR** (08)

a) What is meant by Anaerobic digestion and Fermentation in Biochemical conversion?

b) Brief explaination of ocean thermal electric conversion.

c) State the methods of prediction of geothermal reservoir characteristic.

d) Classify the fuel cells according to physical state of fuel.

e) State prospects of fidal energy in India.

f) What are the materials used for generation of biogas?

Q.5 Attempt any **FOUR** (16)

a) Explain Biomass conversion as thermo chemical conversion technology.

b) State and briefly explain methods of ocean thermal electric power generation.

c) Draw neat labelled diagram and explain hydrothermal energy power plant.

d) Classify and comment on Biogas plant of each type.

e) What is a single basin arrangement of Tidal power generation?

f) Draw neat labeled diagram and explain geothermal energy power plant.

Q.6 Attempt any **FOUR** (16)

a) State various advantages and disadvantages of fuel cell.

b) Explain advantages and limitations of Hydroelectric power generation scheme.

c) Explain basic principle of tidal power generation.

d) What are the site selection rrquirements of Tidal power generation plant?

e) Draw labeled diagram and explain Khadi Village Industries commission biogas plant (KVIC plant)

f) State the factors taken for consideration of selection of site for Biogas plant.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: TRIRD | PROGRAM: ELECTRICAL

COURSE CODE: EE301/R228 | COURSE NAME: HIGHER MATHS

MAX. MARKS: 80 | TIME: 3 HRS. | DATE: 02/05/2016

Instruction:-
1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
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7) Use of Mobile is strictly prohibited.

Q.1 Attempt any **FOUR** **Marks (08)**

a) Find $\frac{\Delta x^2}{Ex^2}$ *at* $h=2$

b) Prove that $\Delta(x+\cos x) = h - 2\sin\left(x+\frac{h}{2}\right).\sin\left(\frac{h}{2}\right)$

c) Find $\Delta f(x)$ *for* $f(x) = x^3 - 3x + 1$ taking h as interval of differencing.

d) A fair coin is tossed thrice. Find the probability of getting two consecutive heads.

e) Express $x^4 - 5x^3 + 3x + 4$ in factorial notation.

f) Evaluate $\int_0^\infty x^{1/4}.e^{-\sqrt{x}}\,dx$

Q.2 Attempt any **FOUR** **(16)**

a) Use Newton's forward difference formula to estimate the population of a town for the year 1895

Year	1891	1901	1911	1921	1931
Population(in thousand)	46	66	81	93	103

b) Find a positive root of $x^3 - 2x + 0.5 = 0$ by Newton Raphson method.(upto 3 iterations).

c) Find the missing term in the following table.

x	0	1	2	3	4
y	7	10	13	-	43

d) Prove that $\int_0^\pi x\sin^5 x\cos^4 x\,dx = \frac{8\pi}{315}$

e) Using Ragula-falsi method find the root of equation $xe^x - 3 = 0$ (upto 3 iterations)

f) Evaluate $\int_0^\infty \frac{x^5(1+x^4)}{(1+x)^{16}}dx$

Q.3 Attempt any **FOUR** **(16)**

a) Solve by Guass-seidal method $10x + y + z = 12,\ x + 10y + z = 12,\ x + y + 10z = 12$ (upto 3 iteration)

P.T.O

b) Using Lagrange's interpolation formula, find the polynomial which takes the values as

x	1	2	3
y	3	5	9

c) Evaluate $\int_0^1 \frac{dx}{\sqrt{x.\log\left(1/x\right)}}$

d) Evaluate f(4.5) using Newton's Backward interpolation from the following data.

x	1	2	3	4	5
f(x)	2.38	3.65	5.85	9.95	14.85

e) Evaluate $\int_0^\infty \sqrt{y}.e^{-y^2}\,dy.\ \int_0^\infty \frac{e^{-y^2}}{\sqrt{y}}\,dy$

f) An urn contains 10 red. 5 white & 5 black balls. Two balls are drawn at random. Find the probability that they are not of the same colour.

Q.4 Attempt any **FOUR** **(08)**

a) Find Fourier constant a_n *for* $f(x)=x^2$

b) Evaluate $L(\cosh 2t)$

c) Evaluate $L(3\cos^2 2t)$

d) Evaluate $L^{-1}\left[\frac{1}{s^2+4s+8}\right]$

e) If $f(t)=e^t \sinh 2t$ *find* $L[f(t)]$

f) Find $L^{-1}\left[\frac{s}{(s+2)(s+3)}\right]$

Q.5 Attempt any **FOUR** **(16)**

a) Solve $\frac{d^2y}{dt^2}+y=t$, *given that* $y'(0)=-2$ & $y(0)=1$ using L.T. method

b) Solve using Laplace transform method $\frac{d^2x}{dt^2}-\frac{2dx}{dt}+x=e^{-t},\ x=2,\ \frac{dx}{dt}=-1$ *at* $t=0$

c) Solve $\frac{dx}{dt}+x=\sin wt$ given x(0)=2 using L.T. method

d) Find L.T. of cos2t.cos3t.cos4t

e) Apply convolution theorem to evaluate $L^{-1}\left[\frac{1}{(s+2)(s+3)}\right]$

f) Find the Fourier Transform for $f(x)=1$, *for* $|x|<1$; $=0$ *for* $|x|>1$

Q.6 Attempt any **TWO** **(16)**

Find Fourier expansion of any two of the following functions.

a) $f(x)=\sin x,\ 0\le x\le\pi$; $=0\ \ \pi\le x\le 2\pi$ Hence deduce that $\frac{1}{2}=\frac{1}{1.3}+\frac{1}{3.5}+\frac{1}{5.7}+....$

b) $f(x)=0,\ -\pi\le x\le 0$; $x,\ \ 0\le x\le\pi$ Hence deduce that $\frac{\pi^2}{8}=\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+....$ & $\frac{\pi}{4}=\frac{1}{1}-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+.....$

c) $f(x)=x+\frac{\pi}{2},\ -\pi<x<0$

$=\frac{\pi}{2}-x\ \ \ 0<x<\pi$

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **THRID** PROGRAM: **CE/ME/IE/E&TC/SM/MT/IT**

COURSE CODE:

MEE313/MTE312/ME214/R228/MG228/ITE312/R228/IEE/ETE312/IX/EJ210/R228/0228

COURSE NAME: **HIGHER MATH'S**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/05/2016**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** **(08)**

a) Evaluate $\left(\frac{\Delta^2}{E}\right)x^2$ *taking* $h=1$

b) Prove that $E\Delta = \Delta E$

c) Prove that $\Delta \log f(x) = \log\left[1+\frac{\Delta f(x)}{f(x)}\right]$

d) If $z=\log(x^2+y^2)$. *find* $\frac{\partial z}{\partial x}$ & $\frac{\partial z}{\partial y}$

e) If $z=x^y$, *then find* $\frac{\partial z}{\partial x}$ & $\frac{\partial z}{\partial y}$

f) If $u=\sin(xy)$, *find* $\frac{\partial^2 u}{\partial x.\partial y}$

Q.2 Attempt any **FOUR** **(16)**

a) Estimate the missing term in the following table.

X	1	2	3	4	5
Y	2	5	7	-	32

b) Express $f(x)=2x^4+x-1$ in factorial notation & find $\Delta^3 f(x)$ *at* $x=1.5$

c) It f(x)is a polynomial of degree 2 in x If f(0)=8, f(1)=12, f(2)=18 then find f(x) using suitable interpolation formula.

d) The following table gives the premium payable for the policy of RS.1000 at age x.

Age	20	25	30	35	40
Premium	23	26	30	35	41

Find the premium, if the policy is taken at the age of 26 years.

e) Find f(1.7), if f(-2)=4, f(-1)=26, f(0)=58, f(1)=112, f(2)=446

f) Using Lagrange's formula, find f(6)

X	3	7	9	10
Y	168	120	72	63

Q.3 Attempt any **FOUR** **(16)**

a) If $z=\sin^{-1}\left(\frac{y}{x}\right)$, *verify that* $\frac{\partial^2 z}{\partial x.\partial y}=\frac{\partial^2 z}{\partial y.\partial x}$

b) If $\sin U=\frac{x^2y^2}{x+y}$ *show that* $x\frac{\partial u}{\partial x}+y.\frac{\partial u}{\partial y}=3\tan u$

P.T.O.

c) If $u = x^2.\tan^{-1}\left(\frac{y}{x}\right) - y^2.\tan^{-1}\left(\frac{x}{y}\right)$ *show that* $\frac{\partial^2 u}{\partial x.\partial y} = \frac{x^2 - y^2}{x^2 + y^2}$

d) If $x = r\cos\theta,\ y = r\sin\theta,$ *find* $\frac{\partial(x,y)}{\partial(r,\theta)}$

e) If $x = e^U.\cos V$ *and* $y = e^U.\sin V$ *prove that* $\frac{\partial(x,y)}{\partial(U,V)}\ X\ \frac{\partial(U,V)}{\partial(x,y)} = 1$

f) If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$ *then prove that* $x^2\frac{\partial^2 u}{\partial x^2} + 2xy\frac{\partial^2 u}{\partial x.\partial y} + y^2\frac{\partial^2 u}{\partial y^2} = \sin 4U - \sin 2U$

Q.4 Attempt any **FOUR** **(08)**

a) Solve $(D^2 - 5D^2 + 8D - 4)y = 0$

b) Solve $(D^4 + 8D^2 + 16)y = 0$

c) Find C-F of $(D^3 + 1)y = e^x$

d) Solve $(D^2 - 4D + 13)y = 0$

e) An unbiased coin is tossed 5 times. Find the probability of getting a head.

f) Is a random variable has a Poisson's distribution such that P(1) = P(2) find P(4)

Q.5 Attempt any **FOUR** **(16)**

a) Evaluate $(D^3 - 2D^2 - 5D + 6)y = (e^{2x} + 3)^2$

b) Evaluate $(D^4 + 8D^2 + 16)y = \sin^2 x$

c) Evaluate $(D^2 + 2D + D)y = x^2 + x$

d) If 20% of the bolts produced by a machine are defective then determine the probability that out of 4 bolts. Drawn at the most, two are defective.

e) If the probability of bad reaction from a certain injection is 0.001, determine the chance that out of 2000 individuals more than two will get a bad reaction, using Poisson distribution.

f) Maximize $z = 150x + 250y$ *subject to,* $4x + y \le 40,\quad 3x + 2y \le 60,\quad x \ge 0,\ y \ge 0$

Q.6 A) Attempt any **ONE** **(16)**

a) Solve $D^2(D^2 + 1)y = \sin x + e^{-x}$

b) Sack of sugar packed by an automatic loader have an average weight of 100kg with standard deviation 0.250kg. Assuming normal distribution, find the chance of sack yet weighing less than 99.5kg. (S.H.V. area z=0 to z=2 is 0.4772)

c) If 2% of the electric bulbs manufactured by a company are defective. Find the probability that in a sample of 100 bulbs 3 bulbs will be defective.

B) Attempt any **ONE**

a) A manufacturer produces bulbs & tubes. It takes 1 hour of work on machine M_1 & 3 hours at work on machine M_2 to produce one package of bulbs. While it takes 2 hours on machine M_1 & 4 hours on machine M_2 to produce a package of tubes .He earns a profit of Rs 13.50 per package of bulbs & Rs55 per package of tubes. How many package of each item should be produced each day so as to maximize his profit, if he operates the machine M_1 for at most 10 hours a day & machine M_2 for at most 12 hours a day? From the LPP & solve it graphically.

b) A doctor has prescribed two different kinds of foods A & B from weekly diet for a sick person. The minimum requirement of fats, carbohydrates and protein are 18, 28, 14 units respectively. One unit of food A has 4 units of fat, 14 units of carbohydrates and 7 units of protein. One unit of food B has 6 units of fat, 12 units of carbohydrates and 8 units of protein. The price of food A is Rs4.5 per unit and that of food B is 3.5 per unit. Form & solve graphically the LPP, so that the sick person's diet meets the requirements at a minimum cost.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

COURSE CODE: **CCE107/X105/E109** COURSE NAME: **ENGINEERING DRAWING-I**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **29/04/2016**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
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6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** **(08)**

a) Write Auto CAD command for the following
   i) To draw line of 40mm
   ii) To draw circle of radius 25mm

b) State the applications of parabola.

c) If point B is in the V.P. and 35mm above H.P. Draw its projection.

d) Draw conventions/ symbols for the following.
   i) Long brake line
   ii) Center line

e) A 2cm long line on a drawing represents a distance of 1 meter calculate Representative Fraction (R.F)

f) State the uses of the following drawing instrument.
   i) Set squares
   ii) French curves.

Q.2 Attempt any **FOUR** **(16)**

a) Construct parabola by rectangle method, given the base 100mm and height 70mm.

b) Draw direct (external) common tangent to two unequal circles of radius 25mm and 35mm respectively. The distance between the centers of two circles is equal to 100mm.

c) A string is unwound from a circle of 30mm radius. Draw the Involute of a circles the end of a string for unwinding the string completely. String is kept tight while being unwound.

d) The length of the top view of line parallel to VP and inclined at 45^0 to the H.P is 50mm. One end of the line is 12mm above the HP and 25mm in front of V.P. Draw the projection of the line and determine its true length.

e) Construct an ellipse by Arcs of circle method, given the major axis and minor axis 80mm and 50mm respectively.

f) The distance between end projections of a line PQ 100mm long is 80mm. The line is parallel to H.P. The end P is 15mm above H.P and 35mm in front of V.P Draw projections of line PQ and find inclination with V.P.

Q.3 Attempt any **TWO** **(16)**

a) Draw a cycloid of a circle of 50mm diameter.

b) Construct and Archemedian spiral for one convolution, given the greatest and least radii being 70mm and 15mm respectively.

P.T.O

c) A straight line AB 60mm long makes an angle of 55^0 to the H.P and 25^0 to the V.P The one end of the straight line AB is in the H.P and 20mm in front of V.P. Draw the projection of line AB.

Q.4 Attempt any **TWO** **(08)**

a) An isosceles triangle of base 30mm and attitude 50mm is having its base on H.P. plane is perpendicular to V.P and is inclined to H.P. in such a way that top view appears to be an equilateral triangle. Draw three views of plane.

b) A circular plate of diameter 60mm is resting on the V.P on a point of its circumference. The plate is inclined to V.P. in such a way that the elevation length of diameter (minor axis) passing through the point on V.P is 35mm, The plate is perpendicular to H.P. Draw its three views of the plate.

c) A pentagonal plate of 30mm side is resting on one of the side on H.P such that plate is inclined at 40^0 with H.P. and perpendicular to V.P. The center of plate is 50mm from V.P. draw its three views.

Q.5 Attempt any **TWO** **(16)**

a) A pentagonal prism having base side 30mm and axis 60mm long is resting on H.P on one of its base edge. Draw the projections of prism if the face containing that edge makes an angle of 60^0 with the H.P and its axis is parallel to V.P.

b) A cylinder having its base diameter 40mm and axis length 60mm is kept on the V.P on a point of its base circle such that its axis is inclined to V.P at 30^0 and parallel to H.P. Draw the projections of the cylinder.

c) A square pyramid side of the base 30mm and height 50mm is resting on its base with one of the sides of the base perpendicular to the V.P. It is cut by on AIP inclined at 45^0 to the H.P. in such a way that it bisects the axis. Draw F.V. sectional T.V. and true shape of section

i) F.V. (02 Marks)
ii) Sectional T.V. (02 Marks)
iii) True shape (04 Marks)

Q.6 Attempt any **TWO** **(16)**

a) A right circular cylinder of 60mm base diameter and axis 100mm long is resting on the ground on its base. It is cut by a section plane perpendicular to V.P. and inclined to H.P (or ground) in such a way that the true shape of section is an ellipse having major axis 80mm. Draw

i) Front view (02 Marks)
ii) Sectional Top view (02 Marks)
iii) True shape of section (04 Marks)

b) A cone of base diameter 40mm and axis length 50mm is kept on the H.P. on its base. It is cut by an AIP inclined at 45^0 to the H.P. and passes through a point on the axis 30mm above the base. Draw

i) Front view (02 Marks)
ii) Sectional Top view (02 Marks)
iii) True shape of section (04 Marks)

c) A cone of base diameter 40mm and axis length 60mm is kept on the V.P. on a point of its base circle such that its axis inclined to V.P. at 30^0 and parallel to H.P. Draw the projections of cone.

Stage I i) F.V (01 Marks)
ii) T.V (01 Marks)
Stage II i) F.V (03 Marks)
ii) T.V (03 Marks)

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRICAL ENGINEERING**
COURSE CODE :- **EEE303/EE211/E301/3301**
COURSE NAME :- **GENERATION AND TRANSMISSION**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **29 / 04 / 2016**

Instruction :-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
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6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) State the desirable properties of insulators.
b) Define string efficiency. State the factors on which it depends.
c) Define the terms i) Interest ii) Appreciation.
d) A generatign station has a connected load of 50MW and a maximum demand 25MW, the units generated being 72.5 $X10^6$ per annum. Calculate i) Demand factor ii) load factor.
e) State the function of super heater in thermal power station.
f) What is nuclear fission?

Q.2 Attempt any **FOUR** (16)

a) Explai the function of control rods and reflector in Nuclear Reactor.
b) Write the function of i) Reservoir ii) surge tank iii) Spill ways iv) Pen stock.
c) Explain with neat sketch gas turbine power plant.
d) At the end of power distribution system, a certain feeder supplies three distribution transformers, each one supplying a group of customers whose conected loads are as follows;

Transformer	Load	Demand Factor	Diversity fo groups
T/F no.1	10kw	0.72	1.5
T/F no.2	12kw	0.6	2.5
T/F no.3	15kw	0.8	1.5

If the diversity factor among the transformer is 1.5. Find the maximum load on feeder.

e) Write a note on load duration curve.
f) Explain with neat sketch strain insulators.

Q.3 Attempt any **FOUR** (16)

a) Define interconnected grid system. Explain its advantages.
b) Define the terms
i) Load factor ii) Demand factor iii) Diversity factor iv) Plant capacity facator.
c) Draw the schematic arrangement of thermal power station.

P.T.O.

d) State the advamtages and disadvantages of Hydroelectric power plant.

e) What are the factors to be taken into account while selecting the site for thermal power station?

f) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (near to the tower) and middle unit are 10kv & 12kv respectively. Calculate i) The ratio of capacitance between pin & earth to self capacitance
ii) String efficinecy

Q.4 Attempt any FOUR (08)

a) State any two advantages of corana.

b) Define skin effect.

c) Give the classification of transmission lines based on length and operating voltage.

d) What is the effect of lagging and leading power factor of load on regulation of transmission line?

e) Draw a neat sketch of monopolar HVDC link.

f) State any four limitations of HVDC transmission.

Q.5 Attempt any **FOUR** (16)

a) Derive the expression for sag in overhead lines when supports are at equal level.

b) What are the factors affecting corona?

c) If the maximum permissible tension in the line of spans 200m is 1450 kg. The weigth of the line is 0.684 kg/m. calculate the sag.

d) Explain the effect of resistance, inductance and capacitance of transmission line.

e) Derive the expression for voltage regulation of short transmission line.

f) Draw neat circuit diagram and phasor diagram for transmission line represented by nominal T network.

Q.6 Attempt any **FOUR** (16)

a) A single phase overhead transmission line delivers 4000KW at 11kv, 0.8 lagging power factor. If resistance and reactance per conductor are 0.15Ω and 0.02Ω respectively. Calculate percentage requlation and efficinecy of transmission line.

b) Under what conditions the voltage regulation of a short transmission line is negative and why?

c) What do you understnad by the generalized constants of a transmission line?

d) Show a diagramatic representation of a medium line in terms of its nominal Π model. Also indicate the values of series impedance and shunt admittance of the model. Draw phasor diagram.

e) Clasify the types of HVDC link. State the applications of each of these links.

f) Discuss the techanical and economical advantages of HVDC systems over AC systems.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL : **THIRD** PROGRAM: **ELECTRICAL ENGINEERING**

COURSE CODE : **EEE302/EE207/EE208/E207/3207**

COURSE NAME : **DC MACHINES & TRANSFORMERS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **28/04/2016**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** **(08)**

a) State function of commutator in a d.c. machine.
b) State any two application of d.c. shunt generator.
c) Name the material used for i) Brush ii) Yoke
d) State on which principle transformer works?
e) Define back emf.
f) List various losses occurs in a transformer.

Q.2 Attempt any **FOUR** **(16)**

a) What is the emf generated in a lap wound dc generator rotating at 400 rpm if the flux per pole in 0.05wb and the number of armature conductors is 960. All other things same, at what speed the machine should be run to get 500 volts generated emf.
b) Draw and explain phasor diagram of a transformer on No-load.
c) Derive torque equation of d.c.motor.
d) Draw and explain load characteristics of d.c. shunt generator.
e) Give the constructional differences between a core-type and a shell type transformers.
f) With help of circuit connection diagram explain speed control of d.c. shunt motor by flux control method.

Q.3 Attempt any **TWO** **(16)**

a) A 2200V/250volts single phase 50 Hz step down transformer has the maximum flux of 21.6 mwb. Find the number of turns of primary winding and secondary winding.
b) Draw and explain Torque-speed and Torque- current characteristic of
i)d.c. shunt motor ii) d.c. series motor
c) Draw a sketch which shows constructional details of d.c. machine, label the parts and state function of each part

Q.4 Attempt any **FOUR** **(08)**

a) Define Voltage Regulation of transformer.
b) What are the limitations of direct loading method test.
c) Why there is need to connect two transformers in parallel?
d) What happens when two transformers with wrong polarities are connected in parallel?
e) Which type of connection is cased for 3-phase distribution transformer? Why?
f) List any two advantages of 3-phase transformers.

P.T.O.

Q.5 Attempt any **TWO** **(16)**

a) Define an auto-transformer. (02)
Derive the expression for the saving of copper effected by using an step-down auto transformer instead of a two winding transformer. (04)
State different applications of auto-transformer. (02)

b) Describe with neat circuit diagram, direct loading method to be performed on 1-phase transformer. (08)

c) A 10 KVA, 400/230V, 50Hz, single phase transformer on test gave the following results with the instruments connected to high voltage side
O.C test : 400V, 2A, 100W
S.C test : 25V, 25A, 80W
Draw the equivalent circuit of transformer and calculate the values of different parameters. Also calculate voltage regulation at full load 0.8 p.f. (08)

Q.6 Attempt any **TWO** **(16)**

a) A 1000/200V, 20 KVA, single phase transformer absorbs 200 W at no load. The resistances of primary and secondary are 0.25 Ω and 0.012 Ω respectively. It runs for 8 hours on no load, 10 hours with load of 100 A and 6 hours with a load of 60A. p.f. being unity throughout. What will be all day efficiency of transformer.

b) i) Compare a bank of three single phase transformers with the three phase transformer.
ii) Discuss the different conditions to be satisfied for parallel operation of 3-phase transformers.

c) Two single phase transformers A and B of equal voltage ratio are running in parallel and supply a load of 1000 A at 0.8 p.f. lag. The equivalent impedances of the two transformers are (2+j3) and (2.5+j5) ohms respectively. Calculate the current supplied by each transformer and the ratio of the KW output of the two transformers.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **EE/IE/IT/E & TC**
COURSE CODE :- **CCE104/X103/X109/R105/R106**
COURSE NAME :- **ENGINEERING CHEMISTRY**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **28 / 04 / 2016**

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) Why Cr & cu shows anamolous behaviour in electronic configuration?
b) State Hund's rule of maximum multiplicity.
c) Distinguish between atoms and ions (any two points)
d) Why the galvanized containers are not used for storage of food stuffs?
e) Give the disadvantages of hard water when it is used for sugar industry.
f) Define i) Scale ii) pH of solution.

Q.2 Attempt any **FOUR** (16)

a) Describe the formation of MgO molecule with diagram & name the type of bonding.
b) Write orbital electronic configuration of following elements.
$_{12}Mg^{24}$, $_{19}k^{39}$, $_{7}N^{14}$, $_{17}Cl^{35}$
c) What are the different types of oxide films? Explain which oxide film is more protective.
d) Draw the diagram. Give two chemical reactions in regeneration of ion exchange process.
e) State and explain four causes of scale formation in boiler.
f) Define Sterilization,explain by using bleaching powder.

Q.3 Attempt any **FOUR** (16)

a) What is electroplating? Explain with suitable example.
b) Define degree of ionization. Explain the Factors affecting degree of ionization.
c) Describe the process of metal spraying for protection of metal from corrosion.
d) Distinguish between galvanising and tinning. (any four points)
e) Define pH. Draw the pH scale. What is the pH of i) Neutral Solution? ii) Extremely acidic solution? iii) Extremely basic solution.
f) Write the disadvantages of hard water in drinking and cooking use.

P.T.O.

Q.4 Attempt any **FOUR** (08)

a) What is closed circuit voltage and open circuit voltage?

b) Give the two points difference between primary cell and secondary cell.

c) Define minerals and Ores.

d) Give the important Ores of 'Cu' metal.

e) List the methods of concentration of Ores.

f) Define semiconductor. Give example.

Q.5 Attempt any **FOUR** (16)

a) Explain with diagram working of Hydrogen-Oxygen fuel cell.

b) Give the difference between calcination and Roasting.

c) How Bessemerisation of 'Cu' is carried out in Bessmer converter?

d) Define alloy. Explain the purposes of alloy formation. (any Three)

e) Give the properties and uses of Germenium as semiconductor.

f) Give the properties and uses of glass wool.

Q.6 Attempt any **FOUR** (16)

a) Write a note on Reserve Batteries and solar cell.

b) Give four physical properties and uses of 'Cu' metal.

c) How electrorefining of Blister 'Cu' is carried out?

d) Give the composition, properties and uses of Rose metal.

e) Define adhesive. Give characteristics of good adhesive.

f) Give the properties and uses of Teflon plastic.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **EE/IE/IT/E & TC**
COURSE CODE :- **CCE104/X103/X109/R105/R106**
COURSE NAME :- **ENGINEERING CHEMISTRY**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **28 / 04 / 2016**

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

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e) Give the disadvantages of hard water when it is used for sugar industry.
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e) State and explain four causes of scale formation in boiler.
f) Define Sterilization,explain by using bleaching powder.

Q.3 Attempt any **FOUR** (16)

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b) Define degree of ionization. Explain the Factors affecting degree of ionization.
c) Describe the process of metal spraying for protection of metal from corrosion.
d) Distinguish between galvanising and tinning. (any four points)
e) Define pH. Draw the pH scale. What is the pH of i) Neutral Solution? ii) Extremely acidic solution? iii) Extremely basic solution.
f) Write the disadvantages of hard water in drinking and cooking use.

P.T.O.

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f) Give the properties and uses of glass wool.

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e) Define adhesive. Give characteristics of good adhesive.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **FIFTH** PROGRAM: **ELECTRICAL**

COURSE CODE: **EEE501/EE410/E410/3408** COURSE NAME: **POWER ELECTRONICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **27/04/2016**

Instruction:-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I **Marks**

Q.1 Attempt any **FOUR** **(08)**

a) Define the controlled rectifier. Give its classification.

b) What is function of chopper? List different types of it.

c) State the function of free wheeling diode.

d) Give application and advantages of SMPS.

e) What is the need of ups?

f) Draw circuit diagram for single phase, full wave half controlled rectifier.

Q.2 Attempt any **FOUR** **(16)**

a) Draw neat circuit diagram for single phase half wave controlled rectifier with R-L load and explain its operation in positive half cycle.

b) Explain operation of 1ϕ half bridge inverter with purely resistive load.

c) With neat block diagram, explain off line ups.

d) Draw circuit diagram and waveforms for 1ϕ fully controlled bridge converter with RLE load without freewheeling diode (high L)

e) Explain different types of classification of inverter.

f) With neat circuit diagram explain operation of Jones chopper.

Q.3 Attempt any **TWO** **(16)**

a) Explain operation of 3ϕ half wave controlled rectifier with neat circuit diagram and waveforms.

b) With neat circuit diagram and waveforms explain step-up chopper.

P.T.O

c) Draw circuit diagram and waveforms for three-phase 180^0 mode bridge inverter. Also explain its operation.

Section – II

Marks

Q.4 Attempt any **FOUR** **(08)**

a) Define the need of CNC machine.

b) State the classification of cyclo-converters.

c) Define 'Regeneration & Inching of DC motor drivers.

d) Draw the circuit diagram of speed control of DC series motor.

e) State the application of cycloconverters.

f) Give the classification of NC/ CNC machine.

Q.5 Attempt any **FOUR** **(16)**

a) Draw the block diagram of DCN machine & explain its operation.

b) Draw the circuit of 3ϕ to 1ϕ cyclocoverter & explain its operation in detail.

c) Draw the block diagram of single phase SCR drive with armature current & tachogenerator feedback & explain its operation.

d) State any four differences between AC & DC drivers.

e) Define stability, plugging and explain it in detail.

f) Draw the circuit of single phase to bridge cycloconverter & explain its operation in detail.

Q.6 Attempt any **FOUR** **(16)**

a) Explain part programming? State the application CNC machines.

b) Draw the circuit of speed control of 3-ϕ induction motor by slip power recovery control & explain it in brief.

c) Explain the operation of separately excited DC motor using half controlled rectifier.

d) State the difference between three phase and single phase cycloconverter.

e) State the advantages & application of NC machine.

f) Draw the circuit diagram of speed control of three phase induction motor by stator-voltage control & explain its operation.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.
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EVEN TERM END EXAM APRIL/MAY -2016
EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **COMMON**
COURSE CODE :- **CCE110/X111/R112/0116**
COURSE NAME :- **APPLIED MECHANICS**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **26 / 04 / 2016**

Instruction :-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) Define equilibrium and state the relation between resultant force and equilibrant force.
b) State principle of Transmissibility.
c) Define Resolution of force.
d) State graphical conditions of equilibrium for parallel force system.
e) Define angle of repose.
f) If angle of repose is 30^0, calculate coefficient of friction.

Q.2 Attempt any **FOUR** (16)

a) A force of 100KN makes an angle of 135^0 with the horizontal. Find its orthogonal components.
b) Calculate the total moment about point 'A' for the force system shown in fig.
c) Find resultant force of concurrent force system graphically.
d) Find support reaction of a given beam as shown in figure by analytical method.
e) A body resting on a rough horizontal plane is on the point of moving by a pull of 22N acting 30^0 inclined to horizontal. Find the weight of body and coefficient of friction.
f) A body of weight 400N is placed on plane inclined at an angle of 18^0 with the horizontal. If $\mu = 0.27$, find the value of the force to be applied parallel to the plane just to move the body up the plane.

Q.3 Attempt any **FOUR** (16)

a) Two point loads are acting on beam as shown in fig. The self weight of beam is 2 KN/m. Using graphical method. Find support reactions.
b) A sphere of diameter 1.2m and weighing 1800N rest against two smooth planes inclined at 60^0 and 45^0 respectively. Determine reactions offered by the planes.
c) Determine analytically, the resultant of coplanar parallel forces acting vertically upwards. 40N, 20N at 30mm, 30N of 50mm and 60N at 70mm. All distances are taken from first force towards right.

PTO

d) Four forces 20N, 15N, 30N and 25N are acting at 0^0,60^0,90^0 and 150^0 from X-axis taken in order. Find resultant by analytical method.

e) Two concurrent forces of magnitude 100N have their resultant as 100N. Calculate the angle between the forces.

f) Explain Law of frictions.

Q.4 Attempt any **FOUR** (08)

a) Define centriod of plain figure.
b) State or locate the centre of semicircle and semisphere.
c) State law of conservation of momentum.
d) State Newton's 1st law of motion.
e) State equation for angular motion and given meaning of each term.
f) Define power and its S.I. unit

Q.5 Attempt any **FOUR** (16)

a) Find the centre of gravity of an equal angle section 100 X 100 X10mm and locate on figure.

b) Find the centriod of shaded area as shown figure.

c) A body falling freely under gravity passes two points 9m aparts vertically in 0.2sec. Find from what height above the upper point did it start to fall?

d) A bullet weighing 3N leaves the barrel of a rifle with a muzzle velocity of 750m/s. If the length of parallel is 100cm. Find the impulse and impulsive force.

e) A particle is rotating at 300 RPM. If the radius of rotation is 1.5m calculate i) angular Velocity ii) Linear velocity.

f) The shaft of an electric motor rotates at 1500 rpm at a particular instant. In 8 second the speed uniformly decreases to 500 rpm. Find the angular retardation.

Q.6 Attempt any **FOUR** (16)

a) How many litres of water can be raised in 10 minutes to a height of 30m by means of pump of 2.5KW power and efficiency 80%?

b) Water having volume of 1500 liters is lifted to a height of 6m and is delivered at velocity of 4m/sec. What is the energy possessed by water?

c) A machine having following observation. Find the law of machine.

Load (N)	100	200	300	400	500	600
Effort (N)	10	18	25	28	33	39

d) For a lifting M/C UR=50.6. An effort of 90N lifts load of 1800N and an effort of 135N requires a load of 3150N. Determine law of M/C and Maximum efficiency of machine.

e) Define i) Mechanical Advantages ii) Velocity Ratio
iii) Efficiency iv) Reversible machine.

f) Draw the nature of graphs for a lifting machine.
i) Load Vs effort ii) Load Vs idea effort. iii) Load Vs Mechanical Advantage
iv) Load Vs effort lost in friction.

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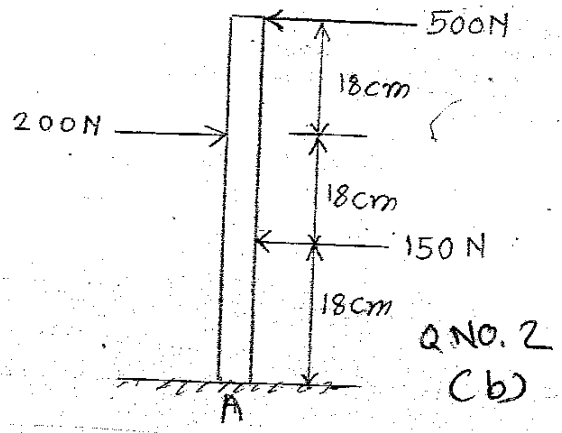

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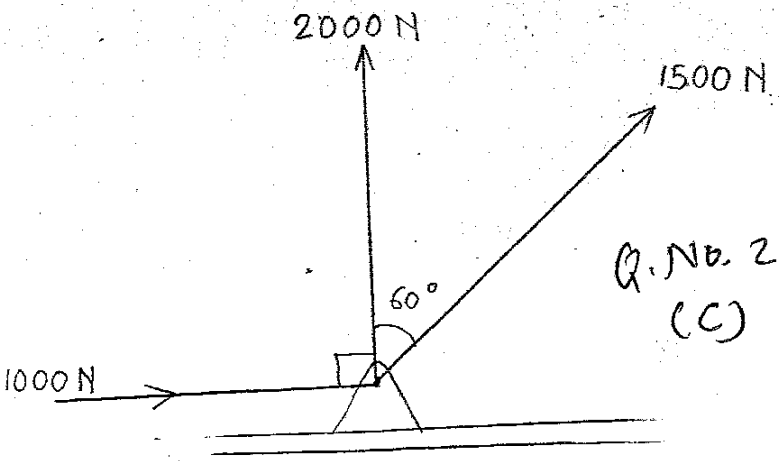
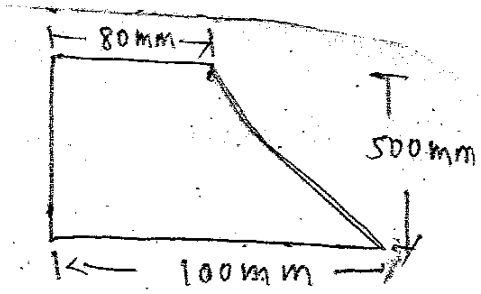
(b)



Q. No. 2
(c)



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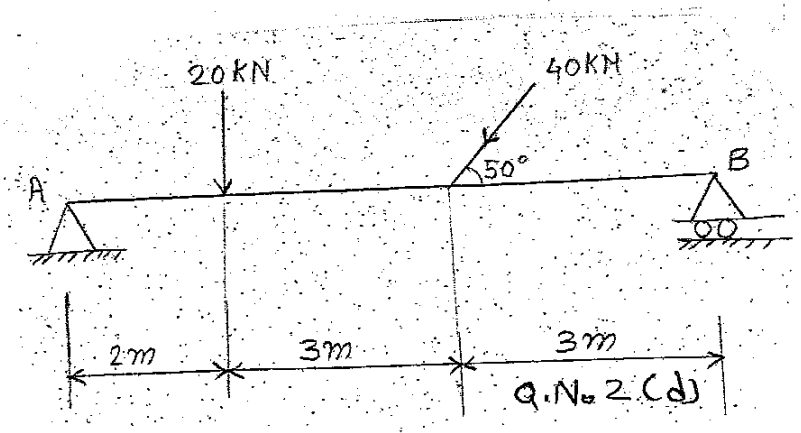
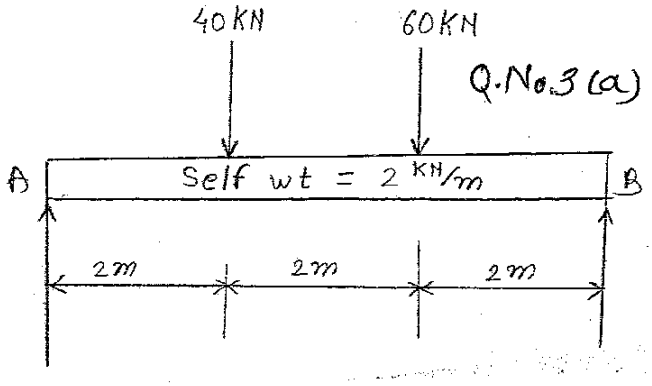


Q.No. 2 (d)



Q.No. 3 (a)

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **SECOND** PROGRAM : **ELECTRICAL ENGINEERING**
COURSE CODE :- **EEE201/EE206/E206/3206**
COURSE NAME :- **FUNDAMENTALS OF ELECTRONICS**
MAX. MARKS : **40** TIME : **2 HRS.** DATE :- **26 / 04 / 2016**

Instruction :-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) List any two applications of P-N junction diode.

b) Define Rectifier. Give classification of rectifier.

c) Draw symbol and truth table of AND & NOT gate.

d) State the function of following IC i) IC 7486 ii) IC 7432.

e) Draw common emitter configuration of transistor.

f) List any two advantages of shunt capacitor filter.

Q.2 Attempt any **FOUR** (16)

a) Explain with neat circuit diagram transistor shunt voltage regulator.

b) Explain operating principle of Zener diode.

c) Compare P-N junction and Zener diode (any four POINTS)

d) Explain any four specification of transistor.

e) Draw and explain emitter bias method.

f) Draw construction of NPN transistor and explain operating principle of it.

Q.3 Attempt any **FOUR** (16)

a) State and explain De-Morgan's first and second theorm.

b) Draw logic diagram for following expression

F(A,B,C,D) = $ABD + A\overline{B}\,\overline{D} + BCD + \overline{A}\;\overline{B}\;D + A\,\overline{C}\,\overline{D}$

c) Compare Half wave Rectifier and Full ware Rectifier (any four POINTS)

d) Explain formation of P-type material and N-type material.

e) List any four applications of P-N junction diode.

f) Draw and explain output characteristics of CE configuration.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **COMMON**

COURSE CODE: **CCE105/X104/R107/0107** COURSE NAME: **BASIC MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **30/04/2016**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
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Marks

Q.1 Attempt any **FOUR** **(08)**

a) Resolve into partial fractions: $\frac{x+1}{(x+3)(x-2)}$

b) Resolve into partial fractions: $\frac{x}{x^2-1}$

c) Find X if $\begin{bmatrix} 4 & 5 \\ -3 & 6 \end{bmatrix} + x = \begin{bmatrix} 10 & -1 \\ 0 & -5 \end{bmatrix}$

d) Find x & y if $\begin{bmatrix} 3x^2 & 4 \\ 1 & y-3 \end{bmatrix} = \begin{bmatrix} 12 & 4 \\ 1 & 8 \end{bmatrix}$

e) If $A = \begin{bmatrix} 2 & 3 \\ 4 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ 4 & 6 \end{bmatrix}$ find 2A+3B-4I

f) Find the middle term in the expansion of $(x+5)^8$

Q.2 Attempt any **FOUR** **(16)**

a) Solve using determinants: $x+y+z=1;\quad 2x+3y+z=4;\quad 4x+9y+z=16$

b) Prove using properties that $\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix} = abc(a-b)(b-c)(c-a)$

c) Resolve into partial fractions: $\frac{x^2+2x}{(x-3)(x^2+1)}$

d) Express the matrix 'A' as the sum of symmetric and skew-symmetric matrices $A = \begin{bmatrix} -1 & 7 & 1 \\ 2 & 3 & 4 \\ 5 & 0 & 5 \end{bmatrix}$

e) If $A = \begin{bmatrix} -1 & 3 & 5 \\ 0 & 6 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -5 \\ 7 & 8 \\ 1 & -1 \end{bmatrix}$, $C = \begin{bmatrix} 4 & -5 \\ 1 & 1 \end{bmatrix}$, *verify that* $(AB)C = A(BC)$

f) Find A^{-1} by adjoint method if $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$

P.T.O

Q.3 Attempt any **FOUR** **(16)**

a) Solve the following equation $\begin{vmatrix} x+10 & x+2 & x+3 \\ x+4 & x+5 & x+6 \\ 2x+7 & x+8 & 0 \end{vmatrix} = 0$

b) Resolve into partial fractions: $\frac{x^2+x+1}{(x+1)^2(x+2)}$

c) Resolve into partial fractions: $\frac{2x^4+x^2+4}{(x^2+1)(2x^2+3)(x^2-2)}$

d) Solve the following simulations equations by matrix method: 2x+y=3; 2y+3z=4; 2z+2x=8

e) Using Binomial theorem prove that $\left(\sqrt{2}+1\right)^5-\left(\sqrt{2}+1\right)^5=82$

f) The term independent of x in the expansion of $\left(x^3+\frac{m}{x^8}\right)^{11}$ is 1320 find m.

Q.4 Attempt any **FOUR** **(08)**

a) Prove that as $\cos(\pi+\theta)=-\cos\theta$

b) If A=30^0 verify that $\sin 3A = 3\sin A - 4\sin^3 A$

c) Express as product and evaluate $\sin 99^0 - \sin 81^0$

d) Prove that a=b cos c + C cosB

e) Find principal value of $\cos^{-1}\left(-\frac{1}{2}\right)-\sin^{-1}\left(\frac{1}{2}\right)$

f) In ΔABC if a=125cm, b=123cm, c=62cm find $\sin\frac{A}{2}$

Q.5 Attempt any **FOUR** **(16)**

a) If $\tan(x+y)=\frac{3}{4}$, $\tan(x-y)=\frac{8}{15}$ *them show that* $\tan 2x=\frac{77}{36}$

b) Prove that $\frac{\sec 8A-1}{\sec 4A-1}=\frac{\tan 8A}{\tan 2A}$

c) Prove that $\frac{\sin 4A+\sin 5A+\sin 6A}{\cos 4A+\cos 5A+\cos 6A}=\tan 5A$

d) Prove that $\tan^{-1}\left(\frac{1}{7}\right)+\tan^{-1}\left(\frac{1}{13}\right)=\cot^{-1}\left(\frac{9}{2}\right)$

e) Prove that $(b^2-c^2)\sin^2 A+(c^2-a^2)\sin^2 B+(a^2-b^2)\sin^2 c=0$

f) Solve ΔABC *if* $b=1,\ c=\sqrt{3}-1$ & $A=60^0$

Q.6 Attempt any **FOUR** **(16)**

a) If α and β both are obtuse angles and $\sin\alpha=\frac{5}{13}$, $\cos\beta=\frac{-4}{5}$ *evaluate* $\cos(\alpha+\beta)$

b) Prove that $4\sin A\sin(60^0-A)\sin(60^0+A)=\sin 3A$

c) Show that $\cos^{-1}\left(\frac{4}{5}\right)+\tan^{-1}\left(\frac{3}{5}\right)=\tan^{-1}\left(\frac{27}{11}\right)$

d) In ΔABC *show that* $\tan A+\tan B+\tan C=\tan A\tan B\tan C$

e) Solve ΔABC in which the sides are a=52.8, b=39.3, c=72.1

f) In any ΔABC, prove that $a\cos\left(\frac{B-C}{2}\right)=(b+c)\sin\frac{A}{2}$

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEE510/EE406/E406/3404**

COURSE NAME :- **INDUSTRIAL ORGANIZATION & MANAGEMENT**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **25 / 04 / 2016**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) Define an industrial organization.

b) Define management.

c) Define trade.

d) Define marketing.

e) Define advertising.

f) Write a brief overview of the different aspects of business.

Q.2 Attempt any **TWO** (16)

a) i) Define and elaborate the importance of Forecasting and planning in industries. (04)
ii) State the importance of effective co-ordination and supervision. (04)

b) i) Name the types of advertising used and state their coverage. (04)
ii) State the importance of marketing research. (04)

c) i) State the importance of proper communication and directing in industrial organizations. (04)
ii) Name the different leadership qualities explaining each in brief. (04)

Q.3 Attempt any **TWO** (16)

a) Compare the individual proprietorship firm and the partnership firm on any six points.

b) Describe how the management of industries is made effective by having different levels of management in the administrative setup.

c) Name the different types of leaders and state their characteristics in short

P.T.O.

	Section – II	Marks
Q.4	Attempt any **FOUR**	(08)

a) What is 'capital'?

b) Define the term 'Inventory'.

c) What you mean by 'Unit load'?

d) Define the term 'Accident'.

e) Define i) Node ii) Activity with respect to network.

f) ESI Act is related with which sector?

Q.5 Attempt any **FOUR** (16)

a) Differentiate between shares and debentures.

b) Differentiate between fixed capital and working capital.

c) What is under and over capitalization? What measures will you adopt to avoid them?

d) Describe the role of institutions towards raising finance.

e) What is ERP? Describe.

f) Describe EOQ with a neat sketch.

Q.6 Attempt any **FOUR** (16)

a) Enlist causes of accidents.

b) Discuss the importance of safety training progress.

c) Differentiate between CPM and PERT.

d) List various time estimates used in PERT. Which you will prefer amongst them?

e) Show break even analysis graphically and describe various terms connected with it.

f) Enlist the contents of electricity act.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRICAL ENGINEERING**
COURSE CODE :- **EEE308**
COURSE NAME :- **MATERIALS WIRING & ILLUMINATION**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **07 / 05 / 2016**

Instruction :-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) Define resitivity?

b) Define conducting material.

c) Classify magnetic materials and give examples of each.

d) Define insulating materials.

e) Name the different types of insulated wires.

f) State the types of ceiling roses.

Q.2 Attempt any **FOUR** (16)

a) Differentiate between conductors and wires.

b) List different conducting materials and write their applications.

c) State the thermal and electrical properties of conducting material.

d) How will you identify the following insulating materials

i) PVC ii) Polyethylene iii) Bakelite.

e) What is the difference between natural resin and synthetic resin?

f) Explain the following i) CRGO Silicon Steel ii) HRGO Silicon Steel.

Q.3 Attempt any **FOUR** (16)

a) State and explain any two types of wiring indetail.

b) Write short note and specifications for the following

i) Switch ii) Holder iii) Plug iv) Fuse

c) What is MCB and ELCB? Explain its use in detail.

d) State the thermal and Mechanical Properties of magentic material.

e) State any four applications of Magentic material.

f) Explain the following. Breakdown in insulating Material

P.T.O.

Q.4 Attempt any **FOUR** (08)

a) Define 'lumens' related to illumination.

b) State the power assumed per socket of 5A in lighting circuit design.

c) Define maintenance factor and state its significance in illumination calculations.

d) State the function of the fuse in electric installation.

e) State how fans are decided for occupancies.

f) State the importance of mounting height in illumination calculations.

Q.5 Attempt any **TWO** (16)

a) A one room kitchen flat is built in an area of 240 square feet of which the kitchen is 100square feet, and the room is 140square feet. The sanitary block has an area of 40square feet. Draw the plan as per your perception and design the electrical installation system suitable for it. Prepare the material estimate assumign suitable positions for lights, fans and power points.

b) State the general rules to decide the arrangement and distribution of loads, selection of components in electrical installations of residence.

c) Estimate the quantity of materials and find cost for conduit wiring system used in a house having single phase 230V, 50Hz, supply. The following electric points are to be provided.

Occupancy	Light points (60W)	Fans (60W)	Plug point (100W)
(3m X4m) Room 1	02	01	02
(3m X4m) Room 2	02	01	01

Roof height in 3.75m from floor.

Q.6 Attempt any **FOUR** (16)

a) State illumination levels for
i) Corridors ii) Drawing Halls iii) Operation Theators iv) Saree Shop.

b) State the Laws of illuminations giving mathematical expressions and meaning of terms involved.

c) Classify lighting arrangements by light reaching working plane.

d) State the significance of CRI while selecting light sources for various purposes.

e) Describe the importance of waste light factor and beam factor in illumination design.

f) A workshop (20m X 18m) is to be illuminated by twin tube fittings (each fitting has power of 72W and 5500 humen output). The illumination required on the working plane is 280 line. Determine the number of filttings, required assuming suitable values for the factors involved in the calculation show the disposition of the fittings in the plan.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEE502/EE401/E401**

COURSE NAME :- **MICROPROCESSOR AND MICROCONTROLLERS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **04 / 05 / 2016**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) Write various buses generated by microprocessor and state function of each bus.

b) Write the function of following pins of 8085 processor i) ALE ii) HOLD.

c) Define i) Machine cycle ii) Instruction cycle.

d) Describe DAA instruction with example.

e) Define i) Stack ii) subroutine.

f) Draw the format of SIM instruction and describe each bit.

Q.2 Attempt any **FOUR** (16)

a) Draw the diagram of overall interrupt structure of 8085 processor and lable it.

b) Describe PUSH and POP instruction with the help of simple diagram.

c) Draw a labelled diagram of instruction cycle of 'MVI A , 04' instruction.

d) Write assembly language program to add 24H and 42H and store the result of addition in L register.

e) Draw the diagram of bidirectional buffer and write its function as an interfacing device.

f) Define addressing mode. Write various addressing modes of 8085 processor. Describe any one addressing mode with example.

Q.3 Attempt any **TWO** (16)

a) Draw a labelled diagram of internal architecture of 8085 processor and describe accumulator.

b) Write assembly langulage program to transfer a block of ten data bytes stored at 4000H memory location to 5000H memory locations. Also draw flowchart.

c) Describe followign instruction i) CALL ii) RET iii) SI & DI iv) RIM

P.T.O.

Section – II	Marks

Q.4 Attempt any **FOUR** (08)

a) State the function of following pins of 8255 programmable peripheral interfer

i) A_0, A_1 ii) $\overline{CS}$.

b) If 8085 microprocessor system has two memory chips of 1k X 4 and two memory chips of 2k X 8 then what will be the total memory size in the system?

c) State the use of Accumulator (A) register.

d) Draw the format of TMOD register of 8051.

e) Define baud rate in UART 8051.

f) State the type of interrupts provided in 8051.

Q.5 Attempt any **FOUR** (16)

a) A 2k X 8 ROM is to be interfaced to 8085 with address of its first location to be 0000H. Draw interfacing circuit and show address mapping.

b) Compare memory mapped I/O with I/O mapped I/O (any four points)

c) Write the architectural features of 8051 microcontroller (any eight points)

d) Draw the format of PSW register of 8051 and describe it.

e) Write an ALP for 8051 microcontroller to generate a square wave of 1KHz at Pin P1.5 of 8051. Assume crystal frequency = 12KHz.

f) Enlist ay four arithmetic instructions of 8051. Explain them in detail with example.

Q.6 Attempt any **FOUR** (16)

a) Explain the IN instruction with proper timing diagram.

b) Draw and explain the block diagram of 8255 programmable peripheral interface.

c) Draw the architecture of 8051 microcontroller.

d) Explain alternative functions of port three pins of microcontroller8051

e) State and explain any four addressing modes of 8051 microcontroller with proper example.

f) Write an assembly language program to find largest number among five numbers stored at location starting from 2000H. Store the result at 2005H.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEE508**

COURSE NAME :- **ELECTRIC TRACTION**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **06 / 05 / 2016**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) State any four disadvantages of an electric traction.
b) What are criteria for selection of diesel-electric or electric traction?
c) State various design aspects used for OHE design.
d) Why insulated overlapping is used in OHE supply system?
e) State current collecting methods and their voltage specifications.
f) State various methods of raising and lowering of pantograph.

Q.2 Attempt any **FOUR** (16)

a) What are the constructional feature of Faiveley's pantograph?
b) Explain design and durability term of Pan-strips of pantograph.
c) What is a purpose of Mast? State their spare parts used in construction along with their functions.
d) State and give short explainations of various design aspects as a composition of OHE supply system.
e) Compare diesel electric and electric traction systems.
f) Draw neat labeled diagram and explain 'Substation' for electric traction.

Q.3 Attempt any **FOUR** (16)

a) Explain design aspect of encumbrances and span length as composition of OHE system.
b) Explain with neat sketch various type of catenaly system used according to speed designed for electric traction.
c) Describe the factors taken into consideration for location and spacing of traction substation.
d) State and explain various miscelleneous equipments used at control post or switching stations.
e) State and explain various test carried out on the electrical parts of pantog saph.
f) Write short notes on preventive maintenance testing methods of typical traction equipments.

P.T.O.

Section – II	Marks

Q.4 Attempt any **FOUR** (08)

a) Write any two special requirements of train lighting.

b) List any two relays used in electric locomotive.

c) State the use of head light and flasher light.

d) State the two types of air conditioning installations in railway coaches.

e) Draw any two rectifiers connections used in electric locomotive.

f) State the purpose of maintenance. Give its classification.

Q.5 Attempt any **FOUR** (16)

a) With neat sketch explain method of obtaining uindirectional polarity.

b) List limitations of arno converter. (any four)

c) Write any four means to improve reliability of locomotive.

d) Write any four differences between low voltage tap changing and high voltage tap changing method.

e) Draw a neat sketch of single battery system used in train lighting.

f) State the necessity of locomotive maintenance.

Q.6 Attempt any **FOUR** (16)

a) List four advantages of end on generation.

b) State any four causes of electrical faults in electric locomotive.

c) Draw a neat labelled power circuit of a locomotive.

d) State classification of locomotives indicating various letters/numbers used.

e) Write various steps in testing procedure.

f) For a smooting reactor on electric locomotive give

i) Location ii) Function iii) Material used iv) Advantage.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **SECOND** PROGRAM : **COMMON**
COURSE CODE :- **CCE202/0101/0102**
COURSE NAME :- **COMMUNICATION SKILL**
MAX. MARKS : **40** TIME : **2 HRS.** DATE :- **06 / 05 / 2016**

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (Answer the following questions in 3-5 sentences) (08)

a) Draw a well labelled diagam illustrating the process of communication.

b) Enlist any four examples in which written communication is used.

c) Enlist four advantages of oral communication.

d) Explain two principles of effective written communication.

e) Define Haptics.

f) Enlist any four advantages of OHP.

Q.2 Attempt any **FOUR** (Answer the following question in 12-14 sentences) (16)

a) State i) Mechanical Barrier ii) Organizational Barriers.

b) Explain with sutiable example i)Upward communication.ii)Horizontal communication.

c) Enlist four tips for prepared speech.

d) State any four precautions one should take when making a presentation.

e) State and explain any four interview techniques.

f) State the guidelines on preparing presentation i) Thinking about audience ii) Good slide show design.

Q.3 Attempt any **TWO** (16)

a) Explain types of communication. i) Verbal- Non-verbal ii) Oral – Written.

b) Following is the opinion of 100 parents about the new pattern of board exam of students X. In this problem the data is given in %.

i) In favour of new pattern – 60 ii) Against new pattern – 30 iii) No comments -10

Prepare a pie-chart.

c) Write an application along with your resume to Modern Automobile Factory, Pune-8 for the post of Junior Engineer.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL :- **FIFTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEE503/EE305**

COURSE NAME :- **ELECTRICAL MACHINE CONTROL AND AUTOMATION**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **07 / 05 / 2016**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) What is the use of rack and pinion arrangement?

b) Define primary control devices and pilot devices.

c) Name the common alloys used as a contact materials of contactor.

d) What is meant by voltage relay?

e) Which are two parts of push button switches?

f) Draw symbol's of chasis and junction.

Q.2 Attempt any **FOUR** (16)

a) State any four advantages of magnetic control.

b) Draw neat diagram of HRC fuse and explain its characteristic.

c) Explain clapper type contactor.

d) Explain Bimettalic Thermal over load relay, with neat diagram.

e) Draw neat diagram of knob type limit switch and explain its working.

f) Draw control diagram of DOL starter and explain it.

Q.3 Attempt any **FOUR** (16)

a) What is D.C. series current relay? State the meaning of pull in current, drop out curretn and differential current with respect to D.C. series current relay.

b) Draw connection scheme for phase failure relay and explain.

c) Draw circuit diagram of simple electronic timer and explain its working.

d) How zero speed switch is represented in a control circuit? Explain.

e) Explain pressure transducer using strain gauge with neat sketch.

f) What is control transformer? Explain with neat diagram.

P.T.O.

Section – II	Marks

Q.4 Attempt any **FOUR** (08)

a) Draw the connection diagram for starting of slip ring induction motor.

b) What is meant by leadder diagram?

c) What is the need of phase reversal protection?

d) State any two causes of over temperature in motor.

e) Define plugging of motor.

f) State two applications of PLC.

Q.5 Attempt any **FOUR** (16)

a) Explain DOL starter with Random Reversing Control.

b) Explain Dynamic Breaking.

c) Explain operation of startor for two speeds, one winding motor.

d) Draw under voltage protection for an induction motor.

e) What are the steps involved in current limit acceleration scheme of wound rotor induction motor.

f) Discuss the working of definite time limit starter.

Q.6 Attempt any **FOUR** (16)

a) Discuss the working of secondary frequency acceleration starter.

b) How will you match fuse characters with starting current characters of motor? Explain with diagram.

c) Explain the working of PLC with the help of block diagram.

d) State the advantages of PLC.

e) State the advantages and disadvantages of part winding motors.

f) Explain star-delta starter with power and control diagram.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRS** PROGRAM: **ELECTRICAL**

COURSE CODE: **EEE102** COURSE NAME: **FUNDAMENTALS OF ELECTRICAL ENGINEERING**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **09/05/2016**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** **(08)**

a) Define electric current and state it unit.
b) State Kirchhoff's current law.
c) Define active network and passive network.
d) What is the meaning of linear circuits?
e) Write down any two applications of heating effect of electric current.
f) Define capacitor and state its unit.

Q.2 Attempt any **FOUR** **(16)**

a) A metal coil has a resistance of 2.732 at 0^0C. Find its resistance at 100^0C. Take α_0=0.00379 per ^{0}C.
b) What are the different types of resistors? Explain any one type in detail.
c) Find resistance between terminals A & B of the circuit shown in fig. 1

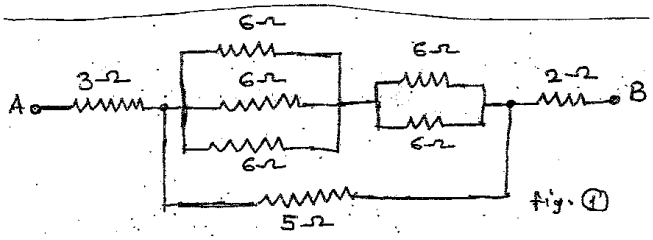

fig. (1)

d) Explain duality between series and parallel circuits.
e) Derive the relation for capacitance of parallel plate capacitor having composite medium.
f) Explain charging of capacitor and write down equations for voltage across capacitor and current through capacitor during charging.

Q.3 Attempt any **FOUR** **(16)**

a) Explain how current source can be converted into equivalent voltage source with neat example.
b) Find current through each branch using Kirchhoff's laws for the circuit shown in fig. 2

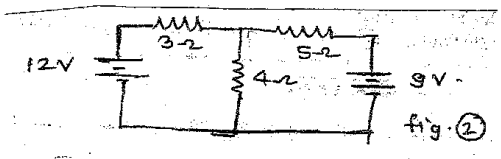

fig. (2)

P.T.O.

c) Find current through each branch of the circuit shown in fig.3

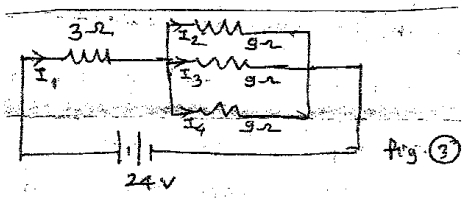

fig (3)

d) Explain how total voltage is divided in series connection in D.C circuits.
e) State different types of capacitors. Explain any one detail.
f) Find equivalent capacitance of the following combination shown in fig.4

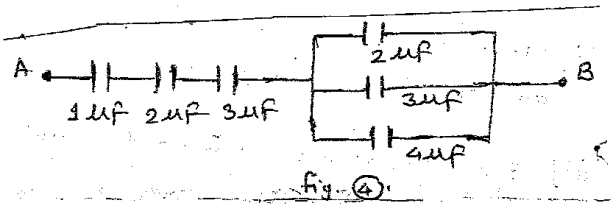

fig. (4)

Q.4 Attempt any **FOUR** **(08)**

a) Define MMF. State its unit.
b) Define reluctance and state its unit.
c) State Fleming's right hand rule.
d) Write any two applications of mutual induction.
e) State Lenz law.
f) State any two applications of LED lamp.

Q.5 Attempt any **FOUR** **(16)**

a) Compare electrical circuit and magnetic circuit (any four points).
b) State & explain Faradays first law and second law of electromagnetic induction.
c) Define terms.
   i) Magnetic field strength
   ii) Flux density
d) Derive expression for coefficient of coupling.
e) Explain construction & working of sodium vapour lamp.
f) Compare CFL and LED lamp on any four points.

Q.6 Attempt any **FOUR** **(16)**

a) Explain construction and working of mercury vapour lamp.
b) Explain working principle of electric arc lamps.
c) The field winding of dc electromagnet is wound with 960 turns and has resistance of 50Ω when the excitation voltage is 230V, the magnetic flux linking the coil is 0.005 wb. Calculate self inductance of the coil and the energy stored in the magnetic field.
d) Explain mutually induced EMF.
e) Explain about permanent magnet. State any two applications of it.
f) Draw B-H curve & explain in short.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEE504**

COURSE NAME :- **ILLUMINATION ENGINEERING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **10 / 05 / 2016**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) Define Luminous Intensity and state its unit.
b) Define Luminous flux and state its unit.
c) Define Illuminance and state its unit.
d) Define mounting height and space (use diagram). State their importance in illumination scheme design.
e) State the range of illumination levels needed for classrooms, corridors, drawing halls and an architect's office.
f) Define a Luminaire.

Q.2 Attempt any **TWO** (16)

a) Name and describe the different types of lighting schemes using relevant labeled diagrams.
b) i) State the laws of illumination and how they are applicable to different situations (two examples)
ii) Describe the effect of the wall colors and clean liness of light sources on the illumination of working planes.
c) List in detail the steps in design of an illumination scheme.

Q.3 Attempt any **FOUR** (16)

a) State the important features to be incorporated in design of illumination scheme for a factory or workshop where there are many motional devices as motors etc.
b) Justify the need for lighting control schemes.
c) Describe with simple schematic diagram or otherwise the Electronic Dimmer used in illumination control systems.
d) An illumination of 60 lux is to be produced on a working plane in a room of size 10m X 8m. The number of lamps required are 36 while only hall of the light emerging from each lamp reaches the working plane. Determine the power of the lamp in candela.
e) Describe the use of transformers in light control circuits using proper diagram and example.
f) Describe using proper schematic diagram or block diagram the ON/OFF control of lighting circuits. State two stations where it is applied?

P.T.O.

Section – II

Marks

Q.4 Attempt any **FOUR** (08)

a) State which two types of lamps are used in lighting for advertisement/ hoardings.

b) State any two precautions to be taken while designing factory lighting scheme.

c) Which are the lamps used in photography?

d) Name the locations in hospitals where:

i) Highest illumination is required ii) Lowest illumination is required.

e) State any two features of illumination scheme of residential installation.

f) State any two standards in the interior illuminationof industrial unit.

Q.5 Attempt any **FOUR** (16)

a) Explain any two salient features of illumination scheme of commercial installation.

b) Explain any two design considerations for illumination of industrial premises.

c) Explain any two design consideratiosn for illumination of interior locations of commercial installation.

d) State any four factors considered in the design of illumination scheme for residential interior locations.

e) Explain the features of lighting of shipyards.

f) Explain any four features of hospital lighting.

Q.6 Attempt any **FOUR** (16)

a) Write short note on 'Lighting for Agriculture'.

b) State any four essential requirements of stage lighting.

c) Write short note on 'Sports lighting'.

d) Explain the latest technology used in street lighting.

e) State any four features of illumination of outdoor railway lighting.

f) Explain salient features of 'Flood lighting'

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **ELECTRICAL**

COURSE CODE: **EEE310/EE205/E205/3205**

COURSE NAME: **ELECTRICAL INSTRUMENTATION**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **10/05/2016**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** **(08)**

a) Define i) precision ii) Repeatability

b) Define i) linearity ii) Resolution

c) What is meant by standards?

d) Name any two instruments used for resistance measurement.

e) Name the instrument used for earth resistance measurement.

f) Define insulation resistance.

Q.2 Attempt any **FOUR** **(16)**

a) Calssify different types of errors occur in measuring instruments.

b) What is the difference between accuracy and precision?

c) Explain how errors can be limited.

d) Explain what is voltage standard?

e) Explain what is current standards?

f) Explain measurement of inductance by Anderson bridge.

Q.3 Attempt any **FOUR** **(16)**

a) Distinguish between repeatability and reproducibility in the instrumentation field.

b) Write a short note on frequency standards.

c) Explain measurements of resistance by Kelvin double bridge method.

P.T.O

d) Explain measurement of insulation resistance.

e) Draw and explain earth tester.

f) Write a note on digital LCR meter.

Q.4 Attempt any **FOUR** **(08)**

a) Write down any two applications of CRO.

b) Define transducers.

c) What is meant by active transducers?

d) What is RTD? Where it is used?

e) State any four quantities that can be measured with the help of multimeters? Also write their units.

f) What is the use of function generator?

Q.5 Attempt any **FOUR** **(16)**

a) Explain different type of CRO's

b) How transducers can be classified?

c) Explain any four factors on which selection of transducer for any specific application depends.

d) Explain how LVDT can be used for measurements of displacement?

e) Draw block diagram of multimeter.

f) Explain X-Y recorder with neat diagram.

Q.6 Attempt any **FOUR** **(16)**

a) State the importance and use of Lissajous figures.

b) How specifications of CRO's can be given.

c) What are the different types of strain gauges? Explain any one.

d) How temperature can be measured with the help of transducers? Explain

e) Write down specifications of LVDT.

f) Explain construction and working of sensentitive DC voltmeter.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEE404**

COURSE NAME :- **ENERGY CONSERVATION & AUDIT**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **10 / 05 / 2016**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) State the importance of energy conservation.

b) State the need of energy Audit.

c) Classify energy sources.

d) State applications of tariff system to reduce energy bill.

e) State energy cost and recent MSEDCL traiff.

f) What is co-generation?

Q.2 Attempt any **FOUR** (16)

a) Classify Renewable and Non-renewable energy.

b) State the objectives of tariff.

c) State characteristics of tariff.

d) State the need of co-generation.

e) State and explain type of tariff.

f) State the advantages of co-generation.

Q.3 Attempt any **FOUR** (16)

a) Classify commercial and non-commerical energy.

b) Explain energy production and needs of growing economy.

c) A consumer has a maximum demand of 200kw at 40% load factor. If the tariff is Rs.100 per KW of maximum demand plus 10 paise per kwh, find the overall cost per kwh.

d) Calculate annual bill of a consumer whose maximum demand is 100kw, p.f. =0.8 lagging and load factor = 60%. The tariff used is Rs.75 per KVA of maximum demand plus 15 paise per kwh consumed.

e) Explain steam turbine co-generation system.

f) State the Evaporation, condensation, humidity, heat transfer.

P.T.O.

Section – II	Marks

Q.4 Attempt any **FOUR** (08)

a) State briefly the need to carry out the financial analysis while formulating an energy efficinecy management system.
b) Define energy conseservation with respect to its consercation.
c) Who is an energy management?
d) State the function of the ozone layer around the earth.
e) Define energy audit.
f) Define global warming.

Q.5 Attempt any **TWO** (16)

a) i) State the objectives of energy management. (04)

ii) Name the factors that adversely affect the global environment. Describe any two of them. (04)

b) i) State the measures to counter the ozone layer depletion. (04)

ii) State the principles of energy managemetn. (04)

c) i) State any four energy management strategies to have effective energy conservation. Describe each one. (04)

ii) State how the green house gases are related to global warming. Describe the steps to control and reduce the green house gases. (04)

Q.6 Attempt any **TWO** (16)

a) Describe the various steps in the Walk through energy audit.

b) Name any twelve instruments used in energy audit. State the function of each.

c) i) Name the various types of data collected in energy audit exercises. List and describe the steps involved. (04)

ii) State the importance of data analysis in energy audit. Describe in short two types of data analysis. (04)

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B-4 CR-17 (82)

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEE403/EE212/EE303/E303**

COURSE NAME :- **DISTRIBUTION AND UTILIZATION**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **11 / 05 / 2016**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) What is resistance welding?

b) State any two arc welding equipement.

c) What is Reactive power?

d) Define power factor.

e) Which is the reliable distribution system used prefferably?

f) List the types of D.C. Distributors.

Q.2 Attempt any **FOUR** (16)

a) Discuss the objectives of Tariff.

b) Explain the causes of low power factor of supply system.

c) What are the various methods for power factor improvement? Explain one of them.

d) Explain the term feeder, distributor and service main.

e) Explain the following systems of distribution. i) Radial system ii) Ring Main system.

f) Compare between AC & DC welding.

Q.3 Attempt any **FOUR** (16)

a) Compare between metal Arc welding and carbon Arc welding.

b) A 3 phase, 5KW induction motor has a p.f. of 0.75 lagging a bank of capacitors is connected in delta across the supply terminals and p.f. is raised to 0.9 lagging. Determine the KVAR rating of the capacitors connected in each phase.

c) What is the importance of load power factors in a.c. distribution?

d) Describe some of the important types of tariff commonly used.

e) Describe the types of A.C. distribution systems.

f) Draw a single diagram showing a typical distribution system.

P.T.O.

Section – II	Marks

Q.4 Attempt any **FOUR** (08)

a) State the advantages of electric drive any four.

b) State the factors governing selection of electric motor drive any four.

c) Classify the electric drive system in practice.

d) State various drives used for traction system.

e) State the braking methods used for electrci traction.

f) Why electric heating preffered give two reasons?

Q.5 Attempt any **FOUR** (16)

a) Draw and explain speed torque characteristics matching for load and motor in the drive system.

b) Explain duty cycle of motor draw suitable sketch.

c) Classify electric traction along with comparative poins e.g. characteristics, efficiency explainations.

d) Give advantages and disadvantages of electric traction.

e) What are the requirements of good heating for furnace?

f) Explain any one type of electric oven with heat labeled diagram.

Q.6 Attempt any **FOUR** (16)

a) State and explain methods of strating and speed control for DC series motor used for traction.

b) State advantages for kando system over dc supply system for traction.

c) State various methods and spare parts used for current collection gear Catenary system in electric traction.

d) State type of substation used for traction. Give their advantages and disadvantages.

e) Explain various causes of failure of heating element.

f) Classify electric heating method. Explain any one application using above heating method.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **ME/EE/SM**

COURSE CODE: **CCE108/X107/R110** COURSE NAME: **ENGINEERING DRAWING-II**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **12/05/2016**

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Draw any **two** proportionate free hand sketches of the following. **(08)**

a) Lewis foundation bolt

b) Single riveted lap joint

c) Sellers thread & buttress thread

Q.2 Attempt any **TWO** **(16)**

a) Fig.2.1 is an isometric view of an object. Draw the following views by using first angle method of orthographic projection.

i) Front view in the direction of arrow 'X' (04 Marks)

ii) Top view (04 Marks)

b) Refer Fig.No.2.2 and draw following views by using first angle method of orthographic projection.

i) Front view in the direction 'X' (04 Marks)

ii) Side view looking from left (04 Marks)

c) Fig.2.3 show pictorial view of an object. Draw the following views by using first angle method.

i) Front view in the direction 'X' (04 Marks)

ii) Top view (04 Marks)

Q.3 Attempt any **ONE** **(16)**

a) Draw the following views from the pictorial view shown fig.3.1

i) Sectional front view – section along A-A (06 Marks)

ii) Top view (05 Marks)

iii) Side view looking from left (05 Marks)

Use First angle method.

P.T.O

b) Fig.3.2 show pictorial view of an object. Draw the following views by using first angle method.

i) Front view in the direction 'X' (05 Marks)

ii) Top view (05 Marks)

iii) Sectional side view –section along A-A (06 Marks)

Q.4 Attempt the **Following** **(08)**

a) Fig.4.1 shows two views of an object. Draw its missing top view.

Q.5 Draw any one of the following **(16)**

A) i) Fig. 5.1 shows F.V & T.V. of an object. Draw isometric view. (14 Marks)

ii) Draw isometric scale for 100mm (02 Marks)

B) i) Fig.5.2 shows F.V & S.V of an object. Draw isometric view. (14 Marks)

ii) Draw isometric scale for 75mm (02 Marks)

Q.6 Attempt any **TWO** **(16)**

a) The elevation of a steel chimney 600mm in a diameter fitted to an inclined root is shown in fig.6.1. The axis of cylindrical chimney is 150mm from the ridge develop the lateral surface of the chimney (Use suitable scale) (08 Marks)

b) A hexagonal pyramid, base 30mm side & axis 75mm long is resting on H.P with side of base parallel to V.P it is cut by a section plane, perpendicular to the V.P & inclined at 45^0 to the H.P & bisecting the axis. Draw development of lateral surface. (08 Marks)

c) Draw the development of lateral surface of a pentagonal prism with edge of base 40mm & height 90mm, kept on the H.P on its base with an edge of base parallel to V.P when it is cut by AIP inclined at 30^0 to H.P & bisecting the axis of the prism. (08 Marks)

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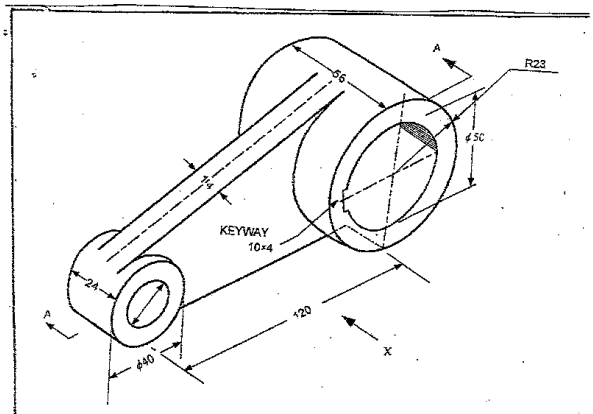

FIG. NO. 2·1

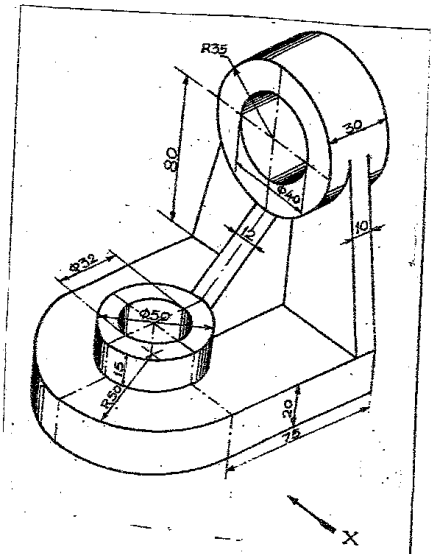

FIG. NO. 2·2

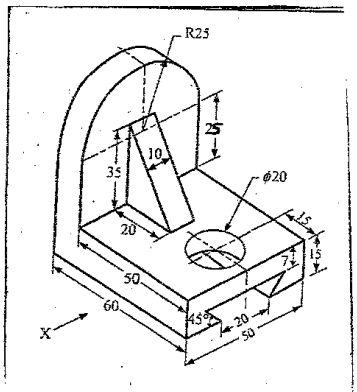

FIG. NO. 2·3

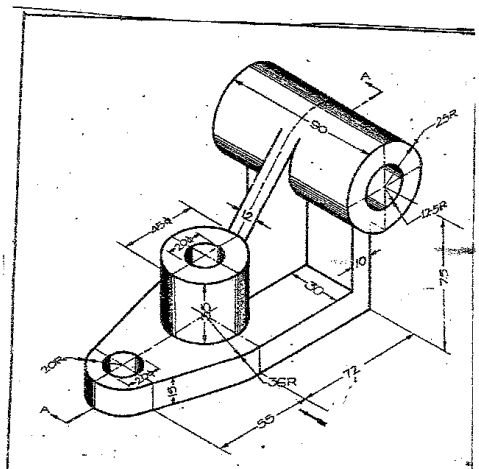

FIG. NO. 3·1

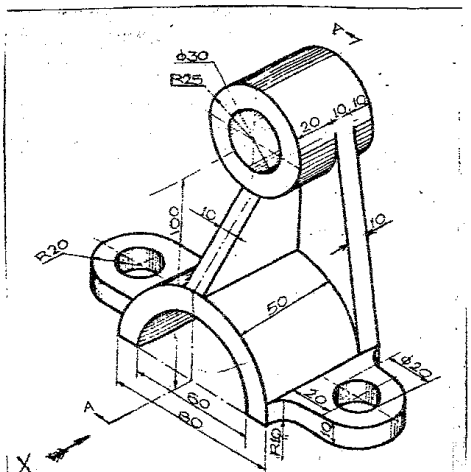

FIG. NO. 3·2

P.T.O.

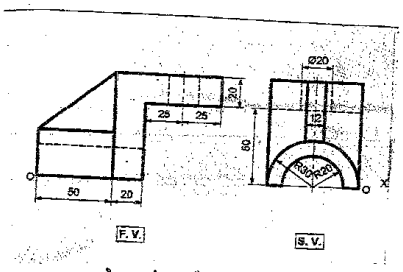

Fig. 4.1

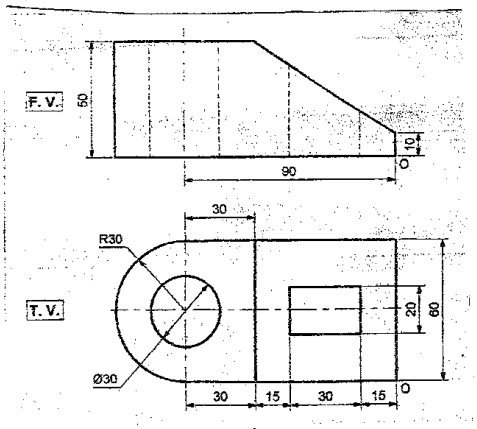

Fig. 5.1

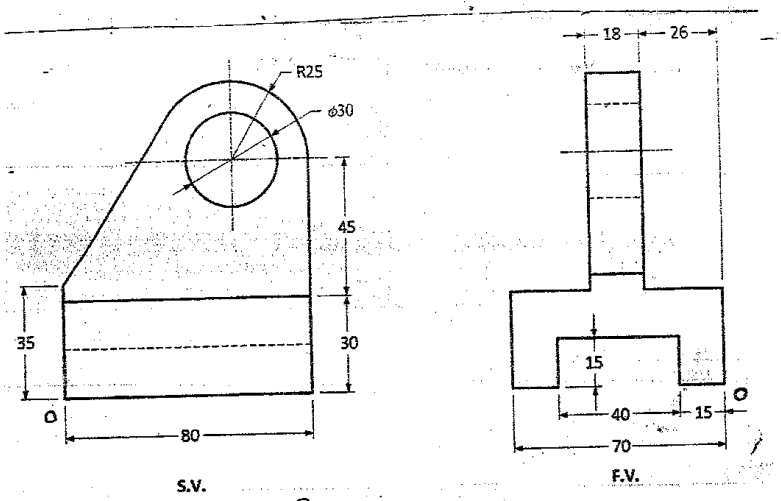

Fig. 5.2

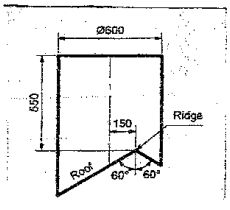

Fig. 6.1

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **ELECTRICAL ENGINEERING**
COURSE CODE :- **EEE101**
COURSE NAME :- **BASIC MECHANICAL ENGINEERING**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **16 / 04 / 2016**

Instruction :-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) What is I.C. Engine?

b) List down any four parts of I.C. Engine.

c) What is the function of boiler?

d) Classify the boilers according to,
i) Relative position of water and hot gases ii) Position of furnace.

e) Write the functions of condenser.

f) Define Dalton's law of partial pressure.

Q.2 Attempt any **FOUR** (16)

a) Differentiate between Petrol engine and Diesel engine.

b) What are the various systems of I.C. Engine? Explain any one in brief.

c) Explain the working of four stroke petrol engine with neat sketches.

d) Draw a labeled diagram of Babcock and Wilcox boiler. Show the path of water, steam and air flue gas.

e) What do you mean by boiler mountings? Explain any one with neat sketch.

f) Differentiate between Jet condenser and surface condenser.

Q.3 Attempt any **FOUR** (16)

a) Draw a neat labeled diagram of I.C. Engine showing all main components.

b) Describe the working of Two stroke diesel engine.

c) Give any four differentiating points between Fire tube boiler and water tube boiler.

d) Explain the working of Loeffler boiler with neat sketch.

e) What is boiler draught? Explain in short natural boiler draught.

f) Explain the construction and working of induced draught cooling tower with neat sketch.

P.T.O.

Q.4 Attempt any **FOUR** (08)

a) What is air conditioning?

b) List common refrigerants used in practice.

c) State the function of a turbine.

d) Classify compressors.

e) State two advantages of a hydraulic system.

f) What are actuators?

Q.5 Attempt any **FOUR** (16)

a) Describe vapour absorption refrigeration system.

b) Define psychrometric terms.

c) Sketch a pelton turbine and label it.

d) Differentiate between a reaction and an impulse steam turbine.

e) Describe the working of a reciprocating compressor.

f) Sketch a centrifugal pump. State its advantages.

Q.6 Attempt any **FOUR** (16)

a) Describe the working of an impulse turbine.

b) Sketch a meter out circuit and describe it.

c) List sensors. Sketch any one.

d) What you know about FRL unit?

e) List control elements for flow. Sketch any one.

f) Differentiate between hydraulic system and a pneumatic system.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEE402/EE411/E411/3409**

COURSE NAME :- **ELECTRICAL ESTIMATION & COSTING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **18 / 04 / 2016**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) State any two general safety precautions related to service lines and Apparatus on consumer's premises as per I.E. Rule no 30.

b) State IE Rule no. 31 regarding which line should be protected by a cut-out.

c) State the percentage variation of frequency permitted by IE Rule no.55.

d) State the ground clearance of the lowest conductor of overhead line erected across a street as per IE Rule no. 77 for i) low and medium voltage lines ii) high voltage lines.

e) State the clearance from buildings for high-voltage lines upto and including 33kv as per IE Rule no. 80.

f) What is "costing" of electrical installation?

Q.2 Attempt any **TWO** (16)

a) i) Explain various types of service connections. (04)
ii) Prepare an estimate of over head service connection . (04)

b) With neat diagram, explain "plate earthing". (04)
Prepare an estimate of plate earthing. (04)

c) i) Write short note on "Necessity of earthing". (04)
ii) State any four guidelines for wiring of residential installation. (04)

Q.3 Attempt any **TWO** (16)

a) Explain in detail various components used in residential installation and their positioning.

b) Explain detail, the procedures for designing the circuit and determination of rating of main components in the electrical installation.

c) i) Explain how the provision is made for the earthing of residential installation (04)
ii) Explain the important things to be considered in preparation of estimate of electrical installation . (04)

P.T.O.

Section – II

Marks

Q.4 Attempt any **FOUR** (08)

a) Justify the need for testing the wiring of a new electrical installation system.
b) Briefly state difference between residential and commercial electrical installation systems.
c) Name the earthing used for commercial electrical installation systems and state the value of (range) the same.
d) State the main differences (any two) between commercial and industrial electrical supply installation systems.
e) State the formulas for motor current calculation (ac motors) (single phase and three phase)
f) State the function of the busbars. Where is it located in commercial complex electrical installations?

Q.5 Attempt any **FOUR** (16)

a) State the fundamental consideration to plan the electrical installation system for a multi-stored commercial complex.

b) State the procedure to measure the earth resistance with respect to an earthing electrode. Draw the graph to illustrate its variation with respect to the distance from the electrode.

c) State how motor current calculation procedure is used to select main switch and fuse for the motor.

d) State the procedure to decide the size of incoming cables and busbars for commercial buildings.

e) A single stored commercial complex has 7 shops in each of its three wings. Each shop has a sanctioned load of 1 phase 230V, 3-kw. The common lighting/fan load (corridors etc) is 1KW. Determine the common mains supply cable capacity main switch and busbar specifications. Draw a schematic distribution diagram for any one wing.

f) State the general rules to be followed in preparing and installing electric supply systems for a very large multi-stored building having commerce functional blocks.

Q.6 Attempt any **FOUR** (16)

a) Justify the need to earth all the machines in a factory. State how the length of the earth wire is decided in such installations. State value of resistance expected.

b) State the requirements/ characteristics of a valid contract.

c) State the tests to be carried out on a new domestic (residential) electrical installation. Illustrate them using proper circuits and relevant information.

d) A 5kW, 400V, 3 phase squirrel cage induction motor is to be provided with suitable electrical installation. State the components required for the same and their technical specifications.

e) State the criteria to be considered while awarding a work order to a contractor.

f) Differentiate Administrative approval and Technical sanction of a certain work

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: FIRST PROGRAM: EE/IE/IT/E&TC

COURSE CODE: CCE102/X102/X108/R103/R104

COURSE NAME: ENGINEERING PHYSICS

MAX. MARKS: 80 TIME: 3 HRS. DATE: 18/04/2016

Instruction:-

1) Answers must be written in the main answer book provided. (and supplements if required)
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) State and explain Snell's law of refraction.

b) Draw a neat ray diagram of refraction of light through glass prism.

c) Define stress and state its types.

d) State and explain Newton's law of viscosity.

e) Define capillary action. Give its one example.

f) Derive the relation $V=n\lambda$.

Q.2 Attempt any **FOUR** (16)

a) Define dispersion and dispersive power. Write relation between refractive index and dispersive power with meaning of symbols used.

b) Define elastic limit. State Hooke's law of elasticity. Hence define modules of elasticity and state its SI unit.

c) A wire of length 1 meter extends by 2mm when stretched by a load of 2kg. Find area of cross-section of wire if $Y=1.96\times10^{11}N/m^2$.

d) A metal plate of area 100 sq.cm rests on a layer of paraffin oil 2mm thick. If the horizontal force required to move the plate with velocity 3cm/s is 0.24N, find the coefficient of viscosity of oil.

e) With the help of a neat diagram, explain molecular theory of surface tension.

f) State the characteristics of linear SHM.

Q.3 Attempt any **FOUR** (16)

a) Calculate angle of minimum deviation for an equilateral prism of refractive index 1.732.

b) State four application of elasticity.

c) Drive expression for coefficient of viscosity by stoke's method.

d) A liquid rises up by a height of 5.2cm in a capillary tube of diameter 0.82mm. How high will it rise in another tube of radius 0.025cm?

e) Differentiate between transverse wave and longitudinal wave (any four point)

f) Define resonance. State its three applications.

Q.4 Attempt any **FOUR** **(08)**

a) State & explain Ohm's law.

b) Draw a circuit diagram of meter bridge.

c) Write Plank-Einstein's photo electric equation. Write meaning of each symbol used.

d) Define i) Work function ii) Threshold frequency

e) Draw structure of optical fiber.

f) Define i) Critical angle ii) Total internal reflection

Q.5 Attempt any **FOUR** **(16)**

a) The energy of photon is 5.28×10^{-19}J. Calculate frequency and wavelength. ($C = 3 \times 10^{8}$m/s $h = 6.63 \times 10^{-34}$Js)

b) Obtain balancing conditions for Wheatstone network. Draw necessary diagram.

c) Explain the properties of laser.

d) What id X- ray? Write its three properties.

e) What are the advantages of optical fiber over ordinary cable communication?(any four)

f) What is nanotechnology? Write three applications of nanotechnology in electronics.

Q.6 Attempt any **FOUR** **(16)**

a) Explain with neat sketch Coolidge X ray tube for production of X-rays.

b) What is optical pumping? Explain Population inversion with necessary diagrams.

c) Enlist four applications of optical fiber.

d) What is photoelectric effect? State any three characteristics of photoelectric effect.

e) What is nanostructured material? Give three example of nanostructured material.

f) Given three resistances 30 Ohm each. How can they be connected to give the resultant resistance of 10 Ohm and 45 Ohm? Draw circuit diagram.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRICAL ENGINEERING**
COURSE CODE :- **EEE307/EE202//EE203/E202/E203/3202/3203**
COURSE NAME :- **DC & AC CIRCUIT**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **20 / 04 / 2016**

Instruction :-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) State maximum power transfer theorem.
b) State Thevenin's theorem
c) Explain the term 'Elementary alternator'.
d) Define 'Peak factor'. What is its value for sinusoidal current?
e) Two phasors are $\overline{V_1} = 7 + j9$, $\overline{V_2} = 3 - j5$ *find* $\overline{V_1} \cdot \overline{V_2}$.
f) What is power factor? Give its value for pure capacitive.

Q.2 Attempt any **FOUR** (16)

a) A star connection contains three resistances R_1, R_2 & R_3. Find the resistances of the equivalent delta connection.
b) Explain generation of alternating quantities by Elementary Alternator.
c) Instantaneous voltage and current are given by

$V = 141.4 \sin 314t$, $i = 28.28 \sin\left(314t + \frac{\Pi}{3}\right)$

Determine i) Voltmeter and Ammeter reading ii) Frequency of current.
iii) Power factor iv) Power consumed

d) Calculate the resistance and inductance or capacitance of following impedances, if frequency is 50 Hz. i) $Z_1 = (10 - j10)\ \Omega$ ii) $Z_2 = 10 \angle -60^0\ \Omega$.
e) Determine the current I_{AB} by Nodal analysis.
f) Determine equivalent resistance between nodes B and C of network fig. 2 (f)

Q.3 Attempt any **TWO** (16)

a) i) Calculate the value of R so that power transferred to load resistance R will be maximum in circuit shown in Fig. 3 (a) i.
ii) Determine I_{AB} by applying superposition theorem. Refer Fig. 3 (a) ii.

b) An ac series circuit containing R= 10Ω, L= 0.1H and C= 100μF is connected across a 230V, 50Hz supply. Find
i) Inductive reactance ii) Capacitive reactance iii) Current iv) Power factor
v) Power vi) voltage across capacitor. vii) Frequency when Z=10Ω viii) Reactive power

P.T.O.

c) i) State the meaning of term lag and lead in relation to alternating quantity with necessary waveform.
ii) Derive the relation between RMS value and maximum value of alternating current.

Q.4 Attempt any **FOUR** (08)

a) Define Q-factor of a parallel circuit.

b) Define balanced load.

c) When R-L-C circuit is in resonance. What will be the value of reactance of the circuit?

d) Write the formula for resonant frequency.

e) State any two advantages of three phase system over single phase system.

f) Define resonance frequency.

Q.5 Attempt any **TWO** (16)

a) A resistance of 10 ohms and an inductance 0.1 Henry are connected in series across a 230V, 50Hz supply find
i) Circuit impedance ii) Admittance
iii) Current iv) Phase angle of the current related to the applied voltage.

b) Show that the expression for the total power consumed in a balanced 3-phase a.c. circuit is the same for both the star and the delta connection. Draw phasor diagram & in both cases.

c) A coil having an inductance of 50 mH and resistance 10Ω is connected in series with a 25 μf capacitor across a 200V ac supply. Calculate
i) Resonance frequency of the circuit ii) Current flowing at resonance and
iii) Value of Q_0 by using different data.

Q.6 Attempt any **TWO** (16)

a) A balanced star-connected load of (8 + j6) ohm per phase is connected to a balanced 3-phase 400V supply. Find the line current, power factor, power and total volt-amperes.

b) Draw and explain i) Three phase three wire system ii) Three phase four wire system.

c) If two impedances $Z_1 = (4 + j8)$ ohm and $Z_2 = (3 - j6)$ ohm are connected in parallel with each other and a voltage source of 230V is applied across the parallel combination then obtain the following
i) Draw the circuit diagram ii) Current through each branch and p.f. of each branch.
iii) Total current. iv) Power consumed by each impedance.

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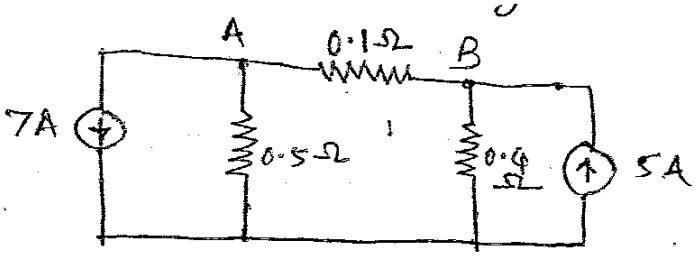
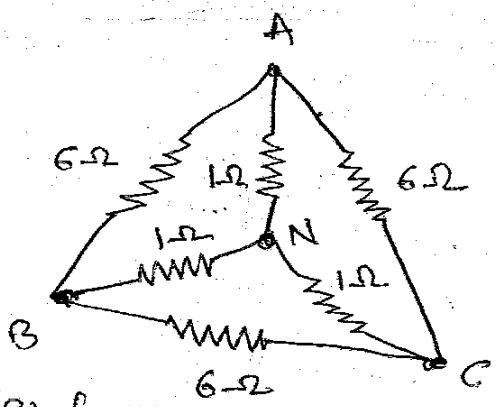
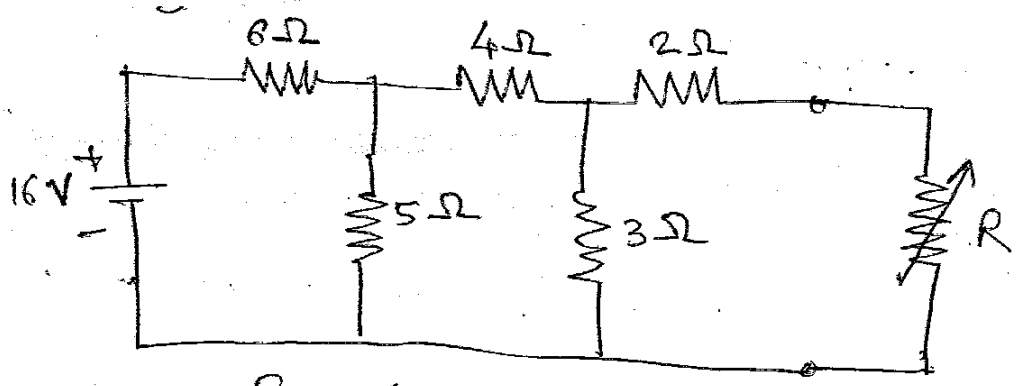


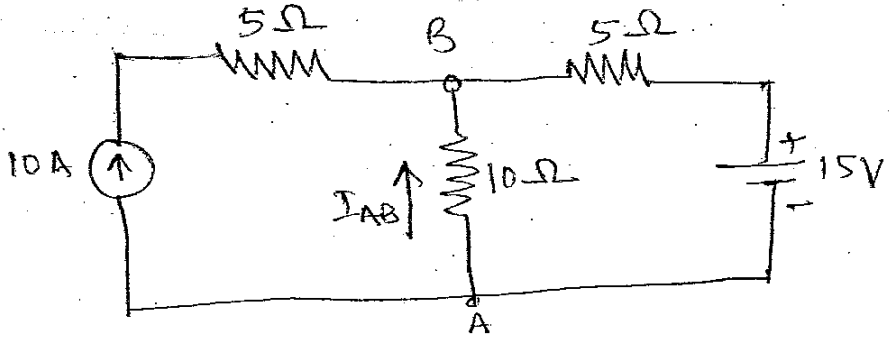
Q. 2(e) fig. 2(e)



Q. 2(f) fig 2(f)



Q. 3 (a) fig 3 (a) I.



Q. 3. a. (II) fig 3 (a) II.

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EVEN TERM END EXAM APRIL/MAY. -2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRICAL ENGINEERING**
COURSE CODE :- **EEE306/EE204**
COURSE NAME :- **ELECTRICAL MEASUREMENT**
MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **21 / 04 / 2016**

Instruction :-
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Marks

Q.1 Attempt any **FOUR** (08)

a) Why damping torque is necessary in measuring instruments?
b) State how the wattmeters are classified according to construction.
c) Define secondary instrument.
d) Why the terminals of CT are shorted when it is not in use?
e) What are the methods of measuring the power in single phase inductive circuit without the use of wattmeter?
f) Why does MI instruments have non-linear scale.

Q.2 Attempt any **FOUR** (16)

a) Draw a neat circuit diagram and explain the working principle of moving iron attraction type instrument.
b) Explain the effect of error, caused due to pressure coil inductance of electrodynamometer type wattmeter.
c) Explain various effects of p.f. on wattmeter readings in measurement of power.
d) The i/p power to a 3 phase motor was measured by two wattmeter method. The readings were10.4kw and -3.4kw and the voltage was 400volt. Calculate i) Power factor ii) Line current.
e) Draw a neat sketch and label the parts of PMMC.
f) Explain the working of induction type wattmeter with neat diagram.

Q.3 Attempt any **FOUR** (16)

a) Explain with diagram the measurement of power by two wattmeter method.
b) Draw the circuit diagram and phasor diagram for measurement of reactive power in 3 phase balanced, star connected load by one wattmeter.
c) List the desirable qualities of measuring instrument and explain any three.
d) Compare analogue ammeter and voltmeter on the basis of i) Connection in the circuit ii) Resistance iii) circuit symbol iv) Power consumption.
e) Describe working of electrostatic voltmeter.
f) Show by suitable connection diagram a C.T. and P.T. used in circuit to measure power by wattmeter in a single phase high voltage circuit.

(P.T.O.)

Q.4 Attempt any **FOUR** (08)

a) State the advantages of prepaid energy meter.

b) State any four differences between analog and digital energymeter.

c) State the advantages of 3 phase dynamometer power factor meter.

d) State the purpose of synchroscope.

e) State the need for voltage multipliers.

f) State the necessity of extending the range of meter.

Q.5 Attempt any **FOUR** (16)

a) Describe using proper diagram the testing of energy meter.

b) Explain Tri-vector meter.

c) With neat sketch explain moving iron power factor meter.

d) With ~~neat~~ sketch Weston frequency meter.

e) Draw the constructional details of maximum demand indicator.

f) With neat sketch explain ammeter shunt.

Q.6 Attempt any **TWO** (16)

a) Explain any four errors, effect and compensation techniques in energy meters.

b) With neat sketch explain multimeter. State its applications.

c) I) Explain extension of range of voltmeter.

II) Explain use of instrument transformers for range extension

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2016

EXAM SEAT NO. | | | | | | |

LEVEL: **FOURTH** PROGRAM: **ELECTRICAL**

COURSE CODE: **EEE401/EE209/E209/3208** COURSE NAME: **A.C.MACHINES**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **21/04/2016**

Instruction:-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicates marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I **Marks**

Q.1 Attempt any **FOUR** **(08)**

a) How can the direction of rotation of three phase induction motor be reversed.

b) Name the material used for i) slipring & ii) brushes for 3-phase induction motor.

c) A 3-phase induction motor is wound for 6-poles supplied with 50Hz AC calculate synchronous speed.

d) List the methods for speed control of 3-phase induction motor from starter side.

e) Define 'slip' in induction motor.

f) Which factor decides diameter of the circle diagram of 3-phase induction motor.

Q.2 Attempt any **FOUR** **(16)**

a) Explain the principle of working of three phase induction motor.

b) Describe the difference in construction between a slip-ring type induction motor and squirrel-cage induction motor.

c) A37.3 KW, 3-phase 440volts 50Hz induction motor has a speed of 950rpm of full-load. The machine has 6-poles calculate i) slip ii) how many alterations will the rotor voltage make per unit.

d) Draw and name the parts of Auto-transformer starter.

e) Explain methods of speed control from rotor side of three phase induction motor.

f) What tests are to be performed on an induction motor to be able to draw its circle diagram? What information one can get about the performance of the motor from the circle diagram?

P.T.O

Q.3 Attempt any **TWO** **(16)**

a) State the necessity of the starters in three phase induction motor also explain importance of soft starters.

b) Draw and explain Torque-slip curves for three phase induction motor.

c) A 3-pahse, 400V induction motor gave the following test reading.

No load Test : 400V,1250W,9A
Short circuit Test : 150V, 4KW, 38A

If the normal rating is 14.9KW draw the circle diagram & find the full load of value of voltage & current, p.f & slip.

Section – II **Marks**

Q.4 Attempt any **FOUR** **(08)**

a) How would you reverse the direction of rotation of capacitor start capacitor Run motor?

b) What are the disadvantage of shaded pole 1 phase I.M?

c) Define hunting of synchronous motor.

d) State two applications of synchronous motor.

e) Define short pitch factor.

f) Name the factors that affect the regulation of the alternator.

Q.5 Attempt any **FOUR** **(16)**

a) Derive the relationship between synchronous speed (Ns) and frequency (f) of alternator.

b) Compare salient pole and cylindrical rotor alternator.

c) A 3-phase star connected alternator is rated at 1500KWA, 13.5KV. The armature resistance and synch reactance are 1.4Ω and 25Ω respectively per phase. Calculate percentage voltage regulation for a load 1200KW at 0.8 leading p.f.

d) Explain why single phase induction motors are not self starting.

e) Compare synchronous motor and induction motor.

f) Explain 'V'curve of a synchronous motor.

Q.6 Attempt any **TWO** **(16)**

a) Determine the voltage regulation of 2000volt, single phase alternator supplying current of 100amps at i) unity p.f ii) 0.8 leading p.f. from the following results full load current of 100 amps is produced by field excitation of 2.5amp. during short circuit and the excitation produced emf of 500 volts during open circuit. The armature resistance is 0.8Ω.

b) i) Explain the working of synchronous motor.

ii) What is the use of damper winding in a synchronous motor?

c) i) Explain working of shaded pole induction motor with suitable sketches.

ii) Explain with diagram the working of universal motor

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEE406/EE307/EE409**

COURSE NAME :- **SWITCHGEAR PROTECTION**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **22 / 04 / 2016**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available o request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) What is the necessity of protection in power system?

b) Define fuse. Write any two materials which can be used as a fuse.

c) Define are voltage and Restriking voltage with respect to circuit breakers.

d) State the importance of natural earthing.

e) State any four causes of over voltages in power system.

f) List any four equipments used in substations.

Q.2 Attempt any **FOUR** (16)

a) Explain different types of faults and their causes.

b) Draw neat diagram of HRC fuse and explain its working.

c) Explain the arc formation process in circuit breaker.

d) What are the different types of groundings?

e) Explain horn gap lightening arrestor with neat diagram

f) Compare "indoor substations with outdoor substations.

Q.3 Attempt any **FOUR** (16)

a) What is the use of current limiting reactors in power system? Explain any one arrangement with neat diagram.

b) Draw neat diagram of MOCB.

c) Explain SF_6 circuit breaker with suitable diagram.

d) What is auto reclosing? Why it is necessary? What are the different types of auto reclosing?

e) Differentiate between equipment earthing and neutral earthing.

f) i) What is surge absorber? Where it is used?
ii) Draw symbols of C.T. & P.T. used in substations.

P.T.O.

	Section – II	Marks
Q.4	Attempt any **FOUR**	(08)

a) Define i) actuating Quantity ii) Pick-up current of relay.

b) State any two modern advanced relays.

c) What is differential relay?

d) Classify relays on the basis of relay timing.

e) State any two faults in transformer and also mention atleast one cause of each.

f) What is current setting of relay?

Q.5 Attempt any **TWO** (16)

a) i) Explain any four essential qualities of protection. (04)

ii) With neat diagram, explain time-graded over current protection of feeders. (04)

b) i) With neat diagram, explain the Distance Protection of transmission line. (04)

ii) With neat diagram, explain the Differential protection scheme of busbar. (04)

c) i) Explain various abnormalities and faults in alternators. (04)

ii) With neat diagram, explain how the protection against unbalanced loading is provided for alternator. (04)

Q.6 Attempt any **TWO** (16)

a) i) Write short note on "Reverse Power protection" of alternator. (04)

ii) State the different types of comparators used in static relays. (02)

State any two protecting devices used alongwith power transformer and their purpose. (02)

b) i) With neat diagram, explain the operation of Directional Relay. (04)

ii) With neat diagram, explain the operation of Translay Relay. (04)

c) With neat diagram, explain the differential protection scheme for Δ –Y power transformer.

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM APRIL / MAY 2016

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEE405/EE413**

COURSE NAME :- **TESTING & MAINTENANCE OF ELECTRICAL EQUIPMENT**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **23 / 04 / 2016**

Instruction :-

1) Answer to two sections must be written in separate section answer book provided.
2) Figure to the right indicate marks.
3) Illustrate your answers with sketches wherever necessary.
4) Use of non-programmable pocket calculator is permissible.
5) Mathematical and other tables shall be made available on request.
6) Assume additional suitable data necessary.
7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR** (08)

a) Distinguish clearly between Routine Test and Type Tests.

b) State any two causes of fire due to electrical reasons.

c) State any two objectives of testing.

d) Define an electric shock.

e) Define an electrical accident.

f) Define Maintenance.

Q.2 Attempt any **FOUR** (16)

a) Explain any four precautions to be taken to avoid fire due to electrical reasons.

b) Distinguish clearly between direct and indirect testing.

c) Explain any four advantages of preventive maintenance.

d) Write short note on 'Total productive Maintenance'.

e) Explain various type tests conducted on 3-phase induction motor as per IS.

f) Explain routine maintenance of 1 phase induction motor.

Q.3 Attempt any **TWO** (16)

a) i) State the operation of fire extinguishers. (02)
ii) Explain preventive maintenance of 3 phase induction motor as per IS 9001:1992. (06)

b) i) What is Regenerative method of testing? (02)
ii) With neat circuit diagram, explain the need and conditions to be satisfied for parallel operation of alternators. (06)

c) Write maintenance schedule of synchronous motor as per IS 4884:1968. (08)

P.T.O.

Section – II	Marks

Q.4 Attempt any **FOUR** (08)

a) List any two special tests on transformers.

b) What are the different classes of insulation and their permissible temperature ranges?

c) List the agents which contaminates the insulating oil.

d) State any four electrical faults in machines.

e) Name any two lifting machines for heavy equipments.

f) State the necessity of leveling and alignment of two machines.

Q.5 Attempt any **FOUR** (16)

a) Explain impulse voltage with stand test on transformer.

b) Explain different methods of determining temperature rise in transformer windings.

c) How insulation resistance of a machine can be measured? Explain.

d) List the common troubles in Electrical installations.

e) Give trouble shooting chart of 3 phase transformer.

f) What are the requirements of different dimensions of foundations for rotating machines?

Q.6 Attempt any **FOUR** (16)

a) Explain the conditions to be satisfied for connecting 3 phase transformer in parallel.

b) How correction factor for temperature is applied when machine is hot?

c) Explain flash point test on oil.

d) What are the internal and external causes of failure of equipments?

e) State the use of i) Earth tester ii) Growler iii) bearing puller iv) Multimeter.

f) Two 6600/440volt, 3 phase transformer A of 250kVA and B of 500 kVA have following particulars perphase

$R_A = 0.008\ \Omega$, $X_A = 0.035\ \Omega$

$R_B = 0.003\ \Omega$ & $X_B = 0.019\ \Omega$

How will the load of 650kvA at p.f. of 0.8 lag be shared by the transformers when they will operate in parallel

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