GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER- 22

EXAM SEAT NO.

LEVEL : - Third PROGRAM : Mechanical Engineering

COURSE CODE :- MEG 308

COURSE NAME :- Theory of Machine

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

Instruction :-

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

QN	SQN	Question Text	R/ U/ A	CO MEG308	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Enlist the types of kinematic pairs according to the type of relative motion between the elements.	R	1	
	b)	Define the term "Inversion of mechanism".	R	1	
	c)	Draw a neat labelled sketch of Oldham's coupling.	U	1	
	d)	Define flywheel.	R	3	
	e)	Define the terms i)height of governor ii) Sleeve lift	R	3	
	f)	Write the importance of balancing.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain with neat sketch coupling rod of locomotive.	R&U	1	
	b)	Differentiate between machine and structure. (Any 4 points)	R&U	1	
	c)	The crank and connecting rod of a reciprocating engine are 200 mm and 700 mm respectively. The crank is rotating in clockwise direction at 120 rad/sec. Find with the help of Klein's construction at the instant when the crank is at 30^0 to I.D.C (Inner dead centre) i) velocity and acceleration of the piston ii) Angular velocity and angular acceleration of the connecting rod.	A	2	
	d)	Explain the method of balancing of several masses rotating in the same plane by analytical method.	R&U	3	
	e)	Explain the turning moment diagram for four stroke cycle Internal Combustion Engine.	R&U	3	
	f)	Differentiate between flywheel and Governor.	R&U		
Q.3		Attempt any **TWO:**			**16**
	a)	An engine mechanism is shown in Fig. I .The crank CB = 100mm and the connecting rod BA = 300mm with centre of Gravity G, 100mm from B. In the position shown the crankshaft has a speed of 75 rad/sec. and an angular acceleration of 1200rad/sec^2.Find i) Velocity of G and Angular velocity of AB ii) Acceleration of G and Angular acceleration of AB	A	2	

P.T.O

	b)	PQRS is a four bar chain with link PS fixed. The length of the links are PQ = 62.5mm ; and QR = 175mm ; RS = 112.5mm; PS = 200mm . The crank PQ rotates at 10rad/s clockwise. Draw the velocity and acceleration diagram when angle QPS = 60^0 and Link QR lie on the opposite side of link PS. Find the angular velocity and angular acceleration of link QR and RS	A	2	
	c)	i)Explain completely constrained motion and successfully constrained motion with suitable example. ii)With neat labelled sketch explain rotary internal combustion engine.	R&U	1	

P.T.O.

Q.3 a)

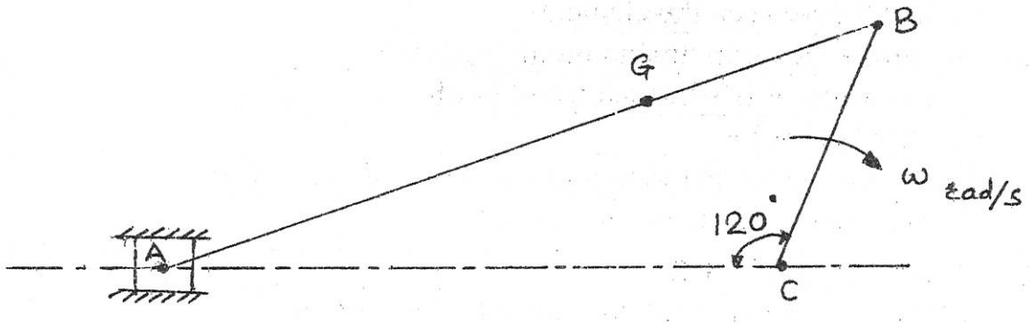

Fig. I

QN	SQN		R/U/A	CO MEG 308	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Classify the cam.	R	6	
	b)	State the function of clutch.	R	4	
	c)	List any four application of cam and follower.	R	5	
	d)	State the limitation of shoe brake.	R	6	
	e)	Define slip of the belt.	R	5	
	f)	State the limitations of knife edge follower.	A	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Write the advantages of 'V' belt drive over flat belt drive.	U	4	
	b)	Explain the working of single plate clutch with neat diagram.	U	5	
	c)	In a compound gear train the driving gears have 20 and 30 teeth respectively if the driven gears have 50and 60 teeth and driving shaft is rotating in clockwise direction at 400 rpm. Determine speed and direction of rotation of driven shaft.	U	6	
	d)	Explain with neat sketch internal expanding Brake.	A	4	
	e)	Classify follower according to surface in contact. Draw suitable sketches	A	5	
	f)	Compare open belt drive and cross Belt drive	A	6	
Q.6		Attempt any **TWO:**			**16**
	a)	Draw profile of cam operating knife edged follower from following data i) follower to move outwards through 40mm during 60^0 of cam rotation ii) follower Dwell for next 45^0. iii) follower to return to its original position during next 90^0. iv) follower to dwell for rest of rotation. The displacement of the follower is to take place with S.H.M. during both outward and return stroke. The Least radius of cam is 50 mm if the cam rotates at 300 rpm.	U	6	
	b)	Two pulleys one 450mm diameter and other 200mm diameter are on parallel shaft 1.95 M apart and are connected by cross belt drive. Find the length of the belt required and angle of contact between belt and each pulley. What power can be transmitted by belt when larger pulley rotates at 200 rpm if maximum permissible tension in the belt is 1000N , μ= 0.25	A	4	
	c)	i) A multiple clutch has three pairs of contact surface ,the outer and inner radii of contact surface are 100 mm and 50mm respectively .The maximum axial spring force is limited to 1 KN if μ= 0.35 and Assuming uniform wear. Find power transmitted by clutch at 1500 rpm. ii) Explain with neat sketch centrifugal cluth.	A	5	

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(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : ME

COURSE CODE :- MEG 418 / MEF503

COURSE NAME :- QUALITY MANAGEMENT

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

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
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QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Name two categories of product	R	MEG 418-1	
	b)	Give any two purpose of Quality audit	U	MEG 418-1	
	c)	Define Quality Assurance	R	MEG 418-1	
	d)	What is Quality of Design?	U	MEG 418-2	
	e)	What is Quality of Conformance?	R	MEG 418-2	
	f)	Name four Categories of Internal failure cost.	R	MEG 418-2	
Q.2		Attempt any **FOUR:**			**16**
	a)	List the product features of Service industry	R	MEG 418-1	
	b)	Discuss Availability for a product	R	MEG 418-1	
	c)	Describe maintainability measures for maintainability	U	MEG 418-1	
	d)	Describe the way that management need to support quality circle activities.	U	MEG 418-2	
	e)	Explain the concept of Quality circle in manufacturing industry	A	MEG 418-2	
	f)	Discuss the categories of appraisal cost	R	MEG 418-2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain tasks involved in inspection function.	U	MEG 418-1	
	b)	Describe the role of upper management	U	MEG 418-1	
	c)	List Fundamental topics to be included in Quality Policy	A	MEG 418-2	
	d)	Describe the approach for complex products, to divide content of Quality audit.	R	MEG 418-2	
	e)	Give the responsibilities of quality assurance	U	MEG 418-2	
	f)	Discuss the categories of prevention cost.	U	MEG 418-2	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - PROGRAM : ME

COURSE CODE :- MEG418 / MEF503

COURSE NAME :- TOTAL QUALITY MANAGEMENT

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

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State benefits of S.Q.C.	R	MEG 418.3	02
	b)	Classify control charts.	R	MEG 418.3	02
	c)	List Characteristics of successful teams,	R	MEG 418.4	02
	d)	Define Vision and Mission.	R	MEG 418.4	02
	e)	State purpose of Benchmarking.	R	MEG 418.5	02
	f)	Enlist various QC tools.	R	MEG 418.5	02
			12		
Q.5		Attempt any **FOUR:**			**16**
	a)	State the characteristics and application of Normal distribution curve.	U	MEG 418.3	04
	b)	Compute the arithmetic mean, median, range, standard deviation of following data. 2,3,4,5,2,3,4,5,4,5.	U	MEG 418.3	04
	c)	Explain with neat sketch concept of PDSA cycle.	U	MEG 418.4	04
	d)	Explain functions of Quality Council.	U	MEG 418.4	04
	e)	Explain concept of 5 'S' in detail.	U	MEG 418.5	04
	f)	Explain ISO 14000.	U	MEG 418.5	04
Q.6		Attempt any **FOUR:**			**16**
	a)	Determine the control limits for X and R charts if $\Sigma X = 357.50$, $\Sigma R = 9.90$, Number of subgroups = 20. Given A2 = 0.18, D3 = 0.41, D4 = 1.59 and d2 = 3.725. Also find the process capability	A	MEG 418.3	04
	b)	Draw the X –R control chart and explain the following terms on it (i) Extreme variations (ii) Shift (iii) Indication of trend (iv) Erratic Fluctuations	A	MEG 418.3	04
	c)	Explain Juran's steps for quality improvements.	A	MEG 418.4	04
	d)	Explain characteristics of Quality Leaders.	A	MEG 418.4	04
	e)	Explain methodology of system improvement using Six sigma.	A	MEG 418.5	04
	f)	Explain any two tools of TQM with neat sketch.	A	MEG 418.5	04

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SUMMER/WINTER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : ME

COURSE CODE :- MEG 418 / MEF503

COURSE NAME :- QUALITY MANAGEMENT

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

Instruction :-

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	d)	What is Quality of Design?	U	MEG 418-2	
	e)	What is Quality of Conformance?	R	MEG 418-2	
	f)	Name four Categories of Internal failure cost.	R	MEG 418-2	
Q.2		Attempt any **FOUR:**			**16**
	a)	List the product features of Service industry	R	MEG 418-1	
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	b)	Describe the role of upper management	U	MEG 418-1	
	c)	List Fundamental topics to be included in Quality Policy	A	MEG 418-2	
	d)	Describe the approach for complex products, to divide content of Quality audit.	R	MEG 418-2	
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WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - PROGRAM : ME

COURSE CODE :- MEG418 / MEF503

COURSE NAME :- TOTAL QUALITY MANAGEMENT

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

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	c)	List Characteristics of successful teams,	R	MEG 418.4	02
	d)	Define Vision and Mission.	R	MEG 418.4	02
	e)	State purpose of Benchmarking.	R	MEG 418.5	02
	f)	Enlist various QC tools.	R	MEG 418.5	02
			12		
Q.5		Attempt any **FOUR:**			**16**
	a)	State the characteristics and application of Normal distribution curve.	U	MEG 418.3	04
	b)	Compute the arithmetic mean, median, range, standard deviation of following data. 2,3,4,5,2,3,4,5,4,5.	U	MEG 418.3	04
	c)	Explain with neat sketch concept of PDSA cycle.	U	MEG 418.4	04
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	b)	Draw the X –R control chart and explain the following terms on it (i) Extreme variations (ii) Shift (iii) Indication of trend (iv) Erratic Fluctuations	A	MEG 418.3	04
	c)	Explain Juran's steps for quality improvements.	A	MEG 418.4	04
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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG303**

COURSE NAME **MACHINE DRAWING**

MAX. MARKS : **80** TIME : **04 Hrs.** DATE :- **08/ 12 / 2023**

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
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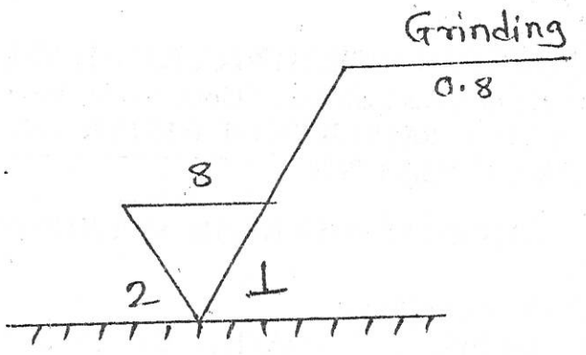
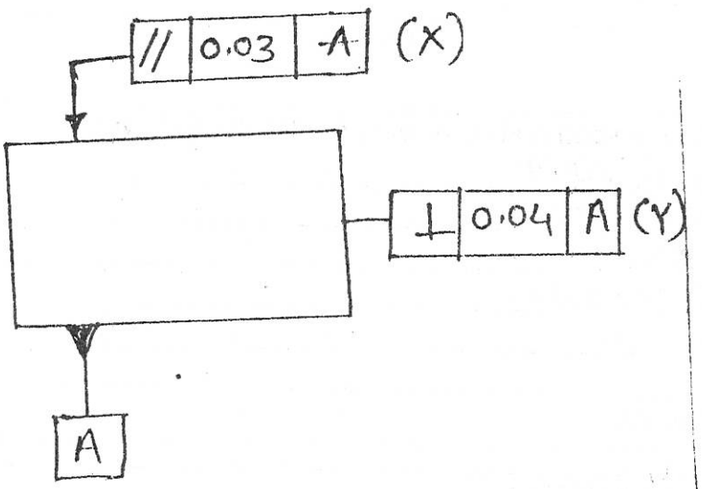
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

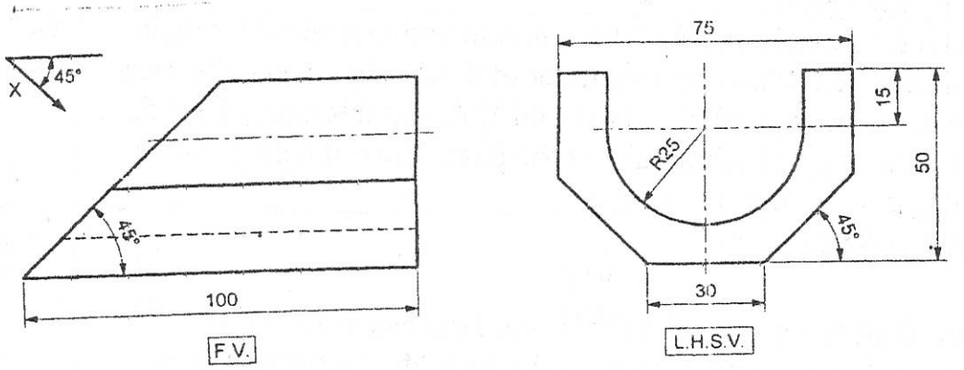
QN	SQN	Question Text	R/ U/ A	Co MEG 303	Marks
Q.1		Draw the conventional representation for the following. (Attempt any **FOUR)**			**08**
	a)	Straight Knurling.	R	2	
	b)	Zinc metal.	R	2	
	c)	Rack & Pinion gear.	R	2	
	d)	Counter bore.	R	2	
	e)	Plug	R	2	
	f)	Socket joint.	R	2	
Q.2		Attempt any **TWO:**			**16**
	a)	A vertical square prism, base 35mm side has its vertical faces equally inclined to V.P. It is penetrated by another square prism, side of base 35mm so that its axis is parallel to both H.P. and V.P. and is 10mm infront of the axis of vertical prism. The faces of the penetrating prism are equally inclined to H.P. Draw the projections of the prisms showing lines of inter section.	U/ A	3	
	b)	A vertical cone, diameter of base 80mm and axis 90mm long is completely penetrated by a cylinder of 44mm diameter. The axis of the cylinder is parallel to H.P. and V.P. and intersects the axis of the cone at point 25mm above the base. Draw the projections showing curves of intersections.	U/ A	3	
	c)	i) Explain types of fits. ii) The shaft has a size of $40^{-0.04}_{+0.02}$ and hole has a size of $40^{-0.04}_{-0.02}$. Find the allowances to determine the type of fit between them.	U A	4 4	
Q.3		Attempt any **TWO:**			16
	a)	1) Draw symbol of the following i) Position ii) Angularity iii) Cylindricity iv) Flatness 2) State the meaning of the symbol showing in Fig. 3 (i) a.	R U	4 4	
	b)	1) Draw the symbols for the following i) Square butt weld ii) Fillet weld iii) Single U-butt weld iv) Seam weld. 2) Refer fig. 3 (ii) (b) What is meaning of symbol at 'X' & 'Y'?	A U	4 4	
	c)	Fig. 3 (iii) (c) Shows front view and L.H.S.V. Draw auxiliary view with the help of given views	R	2	



Q-3) a.) fig. 3 (i) a



Q.3) b. ii) fig. 3 (ii) (b)



Q-3- c) fig. 3(iii) (c)

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 3 PROGRAM : MECHANICAL

COURSE CODE :- MEG303

COURSE NAME :- MACHINE DRAWING.

MAX. MARKS : **80** TIME : **04 Hrs** DATE :-08/12/23

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
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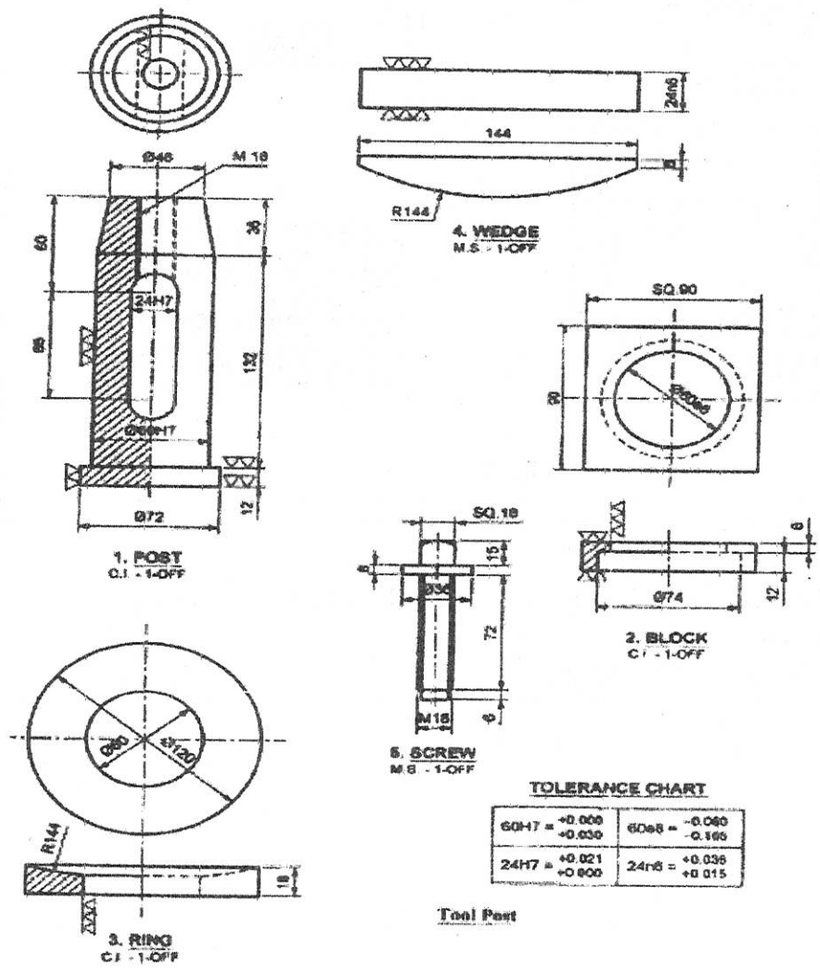
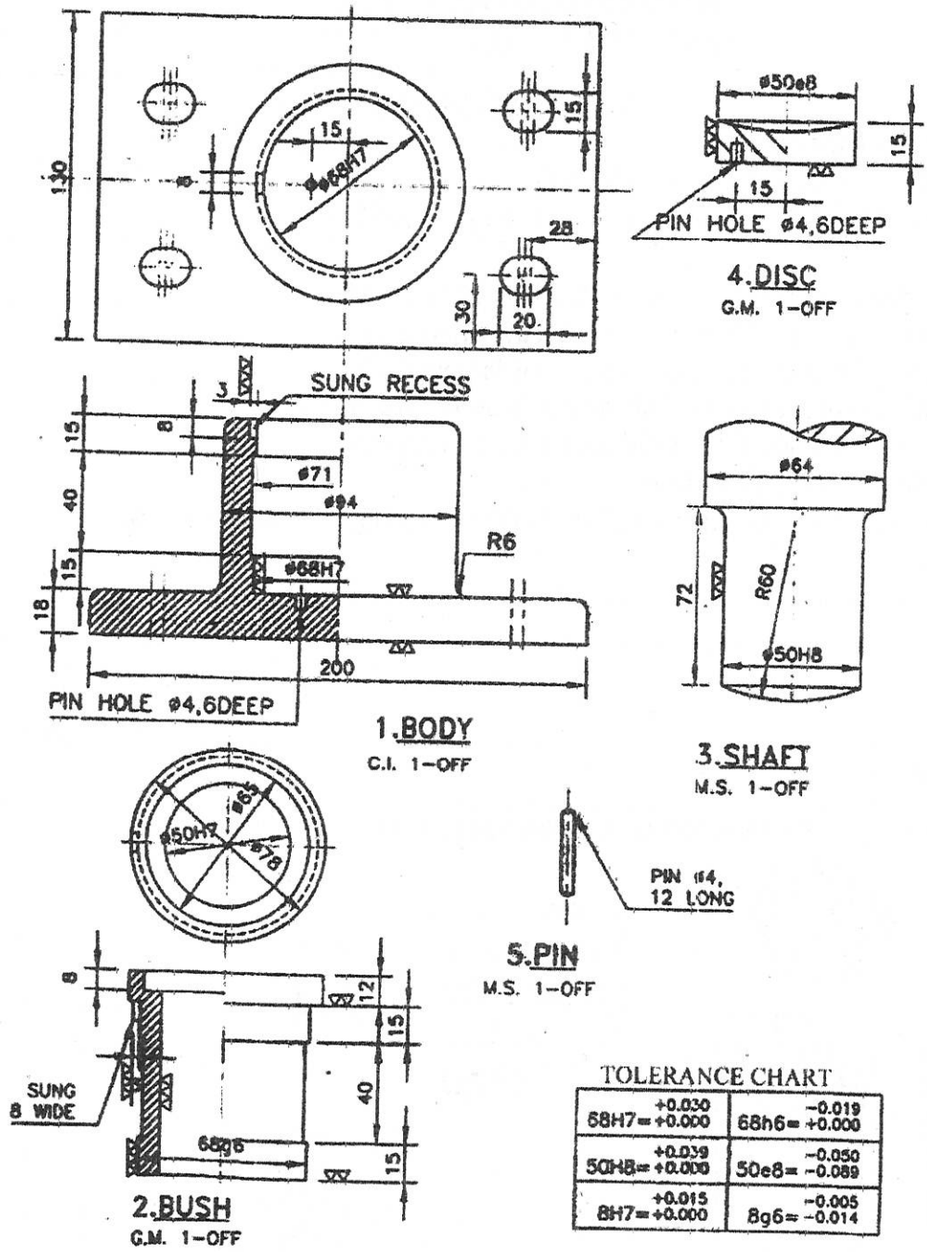
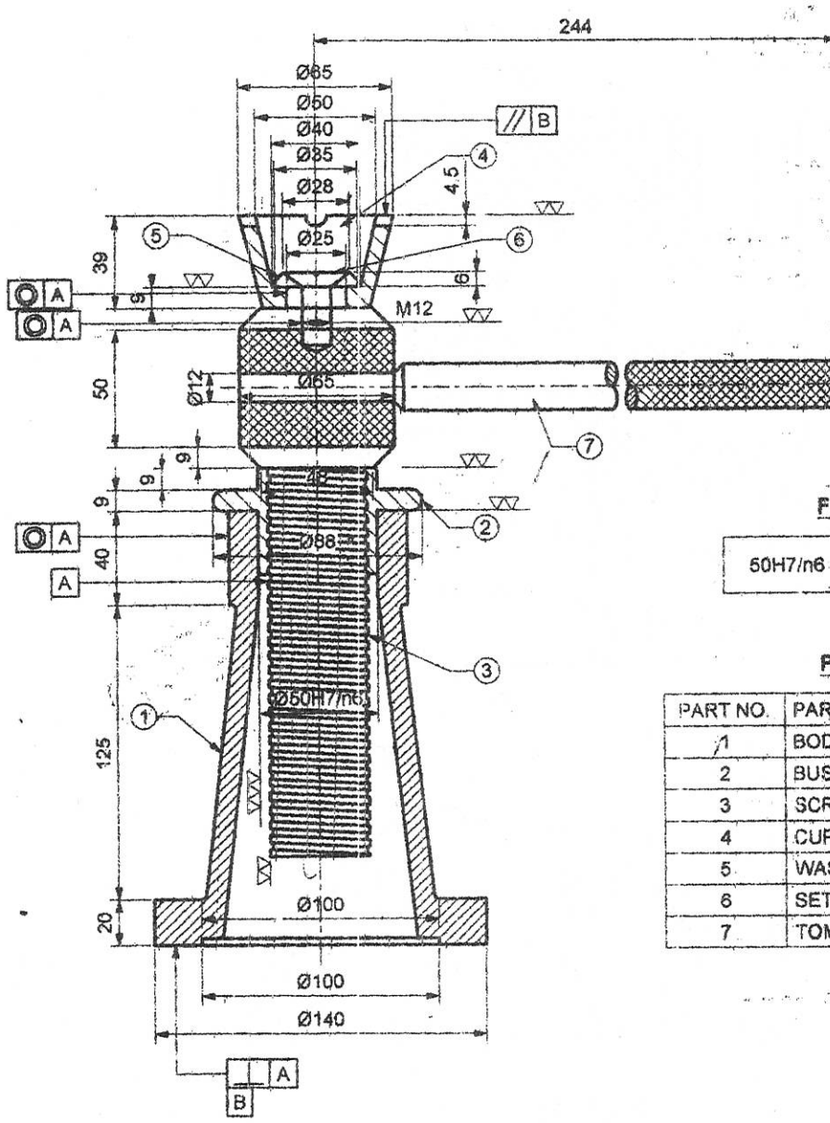
QN	S QN		R/ U/ A	Co	Marks
Q.4		Attempt any **ONE:**			**20**
	a)	**(a) Fig. 1 shows the details of Piller type tool post.**  **Fig. 1** **Draw : (i) Half sectional front view of assembly.** **(ii) Top view of assembly.**	A	5	20
		"OR"			

P-3/6

	b)	☐ Figure No. 2 shows the details of foot step bearing. Draw sectional F.V. and T.V. of the Assembly prepare bill of material.  **Fig. 2.**	A	5	20
Q.5		Attempt any **ONE:**			**20**
	a)	Figure shows the Assembly of Screw Jack. Draw details of the following: i) Body : Sectional FV and TV ii) Bush iii) Screw iv) Tommy Bar.	A	5	20



FIT CHART

50H7/n6	TANSINTION FIT

PART LIST

PART NO.	PART NAME	MATL.	QTY.
1	BODY	C.I.	1
2	BUSH	M.S.	1
3	SCREW	M.S.	1
4	CUP	C.I.	1
5	WASHER	M.S.	1
6	SET SCREW	M.S.	1
7	TOMY BAR	M.S.	1

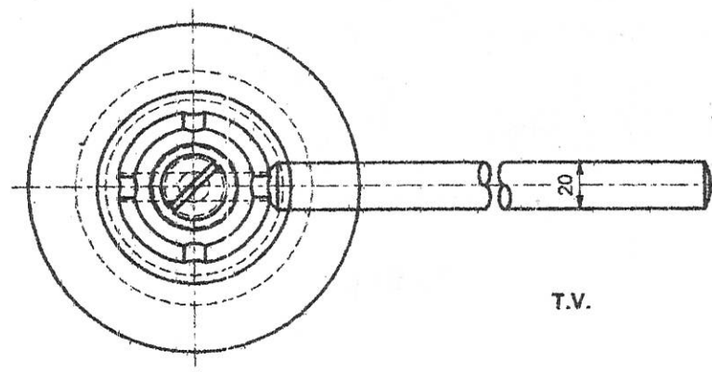
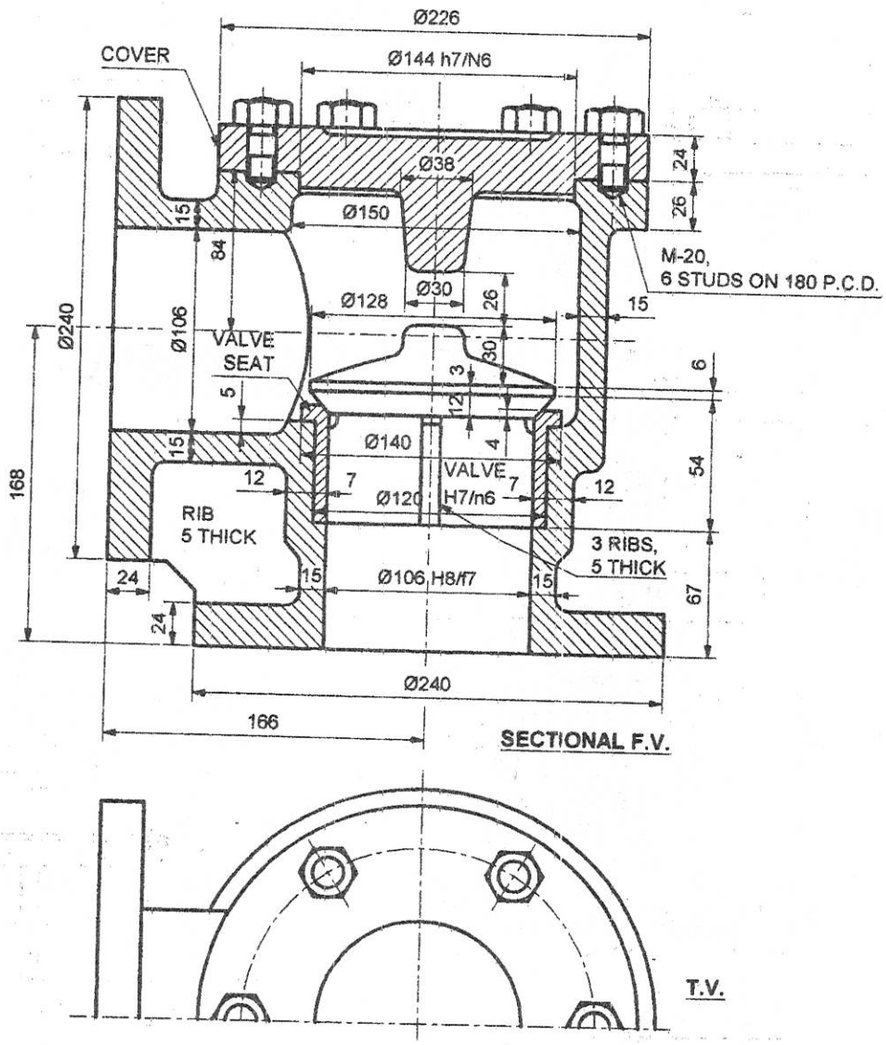


Fig - **Assembly of Screw jack coupling**

		"OR"			
	b)	Figure shows the Assembly of Non Return Valve. Draw details: i) Body : Sectional FV and TV ii) Valve Seat iii) Cover iv) Valve.	A	5	20



PART LIST

PART NO.	PART NAME	MATERIAL	QTY.
1	BODY	C.I.	1
2	VALVE SEAT	G.M.	1
3	VALVE	G.M.	1
4	COVER	C.I.	1
5	STUD WITH NUT	M.S.	6

Fig. : **Assembly of non-return valve**

P-6/6

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG303**

COURSE NAME **MACHINE DRAWING**

MAX. MARKS : **80** TIME : **04 Hrs.** DATE :- **08/ 12 / 2023**

Instruction :-

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	b)	A vertical cone, diameter of base 80mm and axis 90mm long is completely penetrated by a cylinder of 44mm diameter. The axis of the cylinder is parallel to H.P. and V.P. and intersects the axis of the cone at point 25mm above the base. Draw the projections showing curves of intersections.	U/ A	3	
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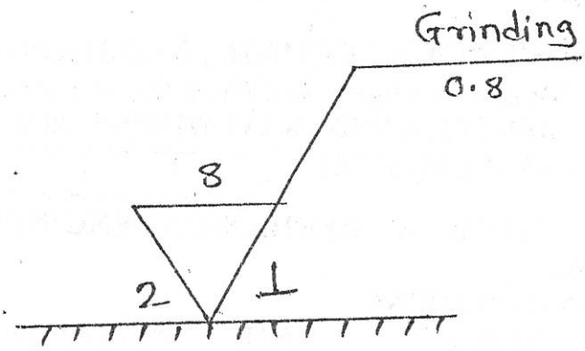
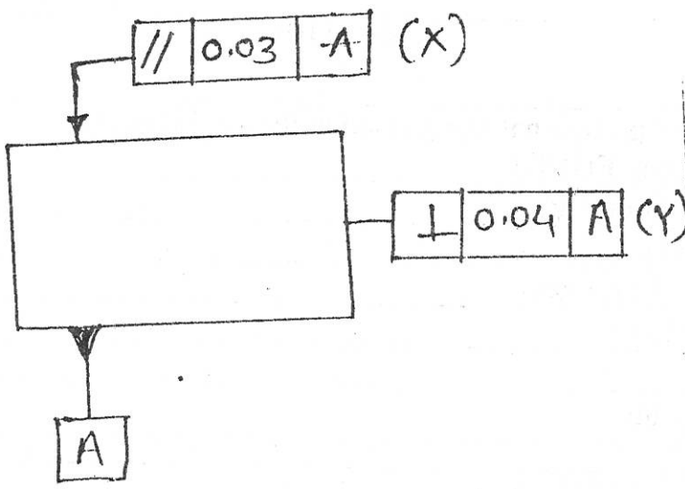
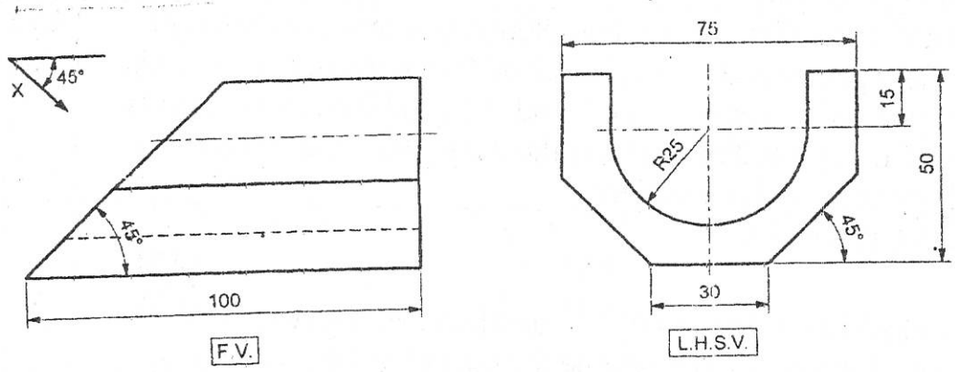
Q.3		Attempt any **TWO:**			16
	a)	1) Draw symbol of the following i) Position ii) Angularity iii) Cylindricity iv) Flatness 2) State the meaning of the symbol showing in Fig. 3 (i) a.	R U	4 4	
	b)	1) Draw the symbols for the following i) Square butt weld ii) Fillet weld iii) Single U-butt weld iv) Seam weld. 2) Refer fig. 3 (ii) (b) What is meaning of symbol at 'X' & 'Y'?	A U	4 4	
	c)	Fig. 3 (iii) (c) Shows front view and L.H.S.V. Draw auxiliary view with the help of given views	R	2	



Q-3) a-) fig. 3 (i) a



Q-3) b-ii) fig. 3 (ii) (b)



Q-3- c) fig. 3(iii) (c)

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 3 PROGRAM : MECHANICAL

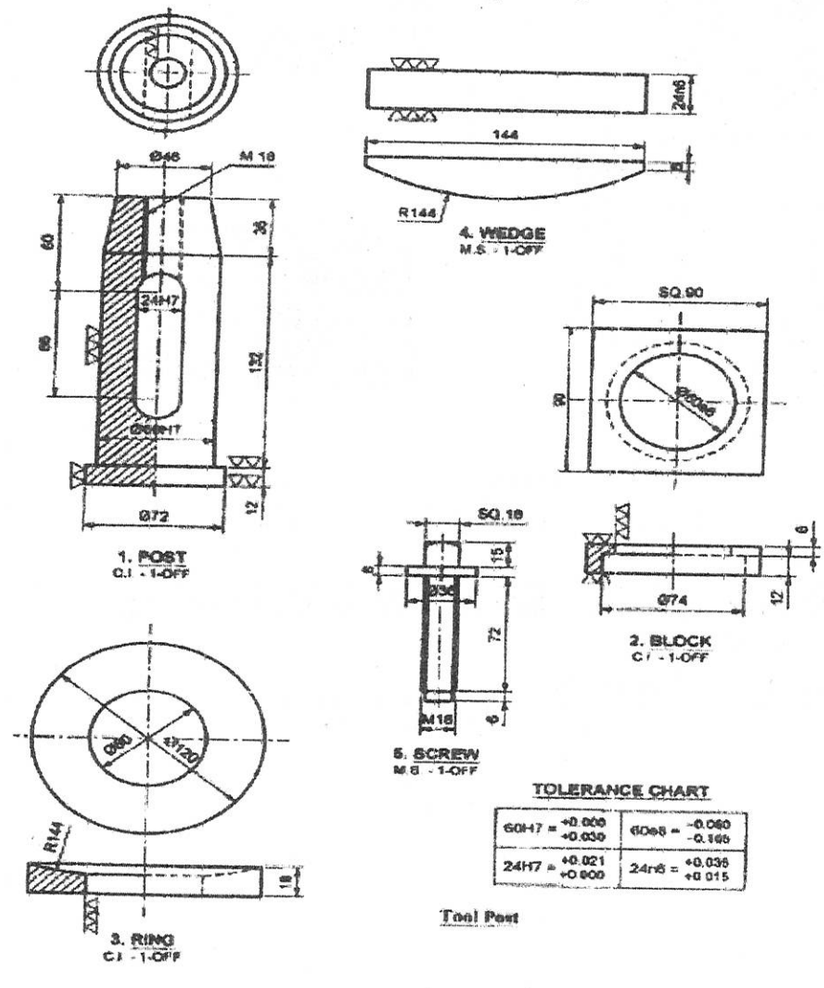
COURSE CODE :- MEG303

COURSE NAME :- MACHINE DRAWING.

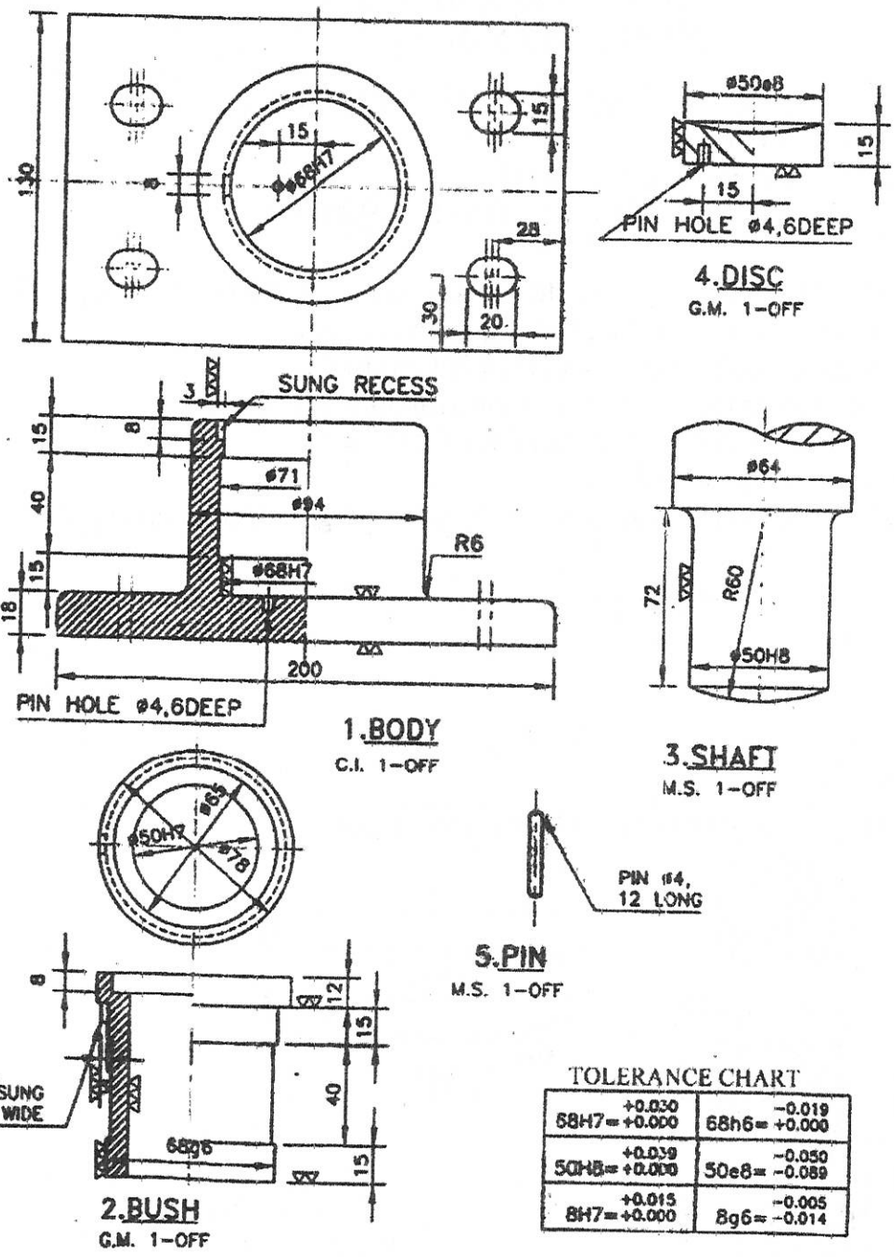
MAX. MARKS : **80** TIME : **04 Hrs** DATE :-08/12/23

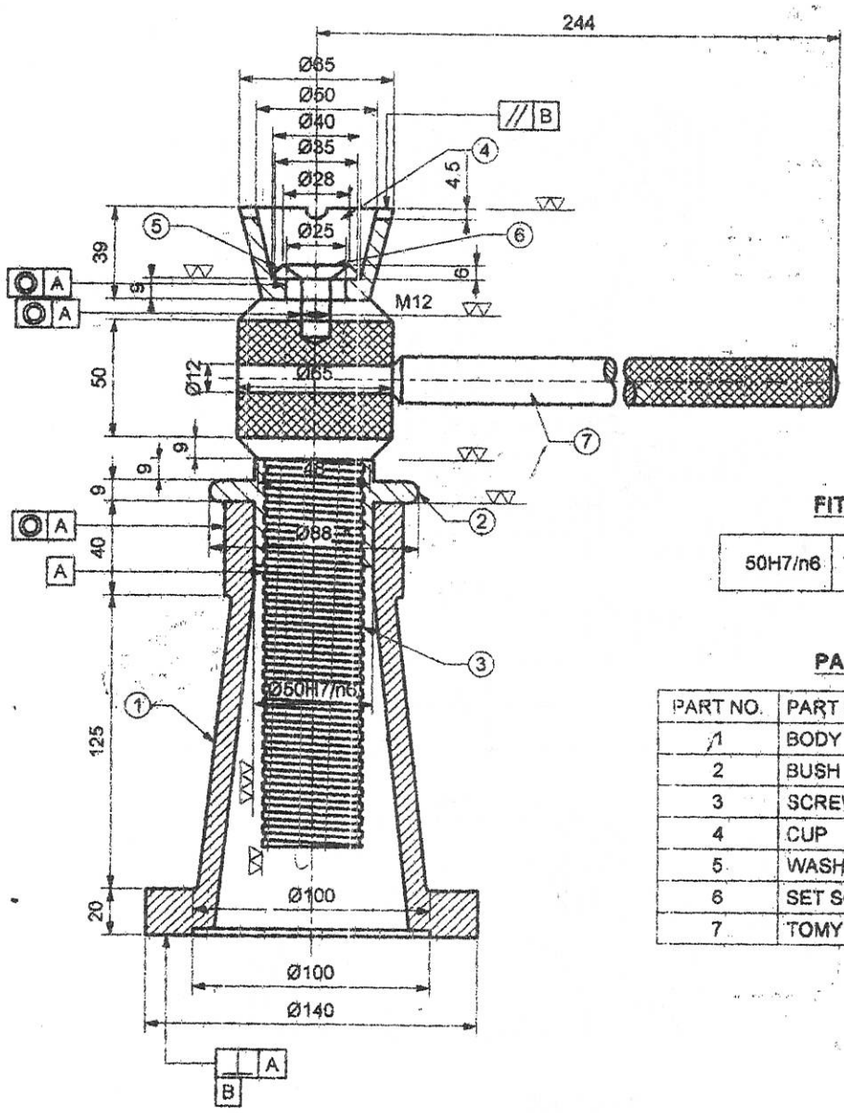
Instruction :-

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

QN	S QN		R/ U/ A	Co	Marks
Q.4		Attempt any **ONE:**			**20**
	a)	**(a) Fig. 1 shows the details of Piller type tool post.**  **Fig. 1** **Draw :** **(i) Half sectional front view of assembly.** **(ii) Top view of assembly.**	A	5	20
		"OR"			

P-3/6

	b)	☐ Figure No. 2 shows the details of foot step bearing. Draw sectional F.V. and T.V. of the Assembly prepare bill of material.  TOLERANCE CHART 68H7 = +0.030 / +0.000 ; 68h6 = −0.019 / +0.000 50H8 = +0.039 / +0.000 ; 50e8 = −0.050 / −0.089 8H7 = +0.015 / +0.000 ; 8g6 = −0.005 / −0.014 Fig. 2.	A	5	20
Q.5		Attempt any **ONE:**			**20**
	a)	Figure shows the Assembly of Screw Jack. Draw details of the following: i) Body : Sectional FV and TV ii) Bush iii) Screw iv) Tommy Bar.	A	5	20



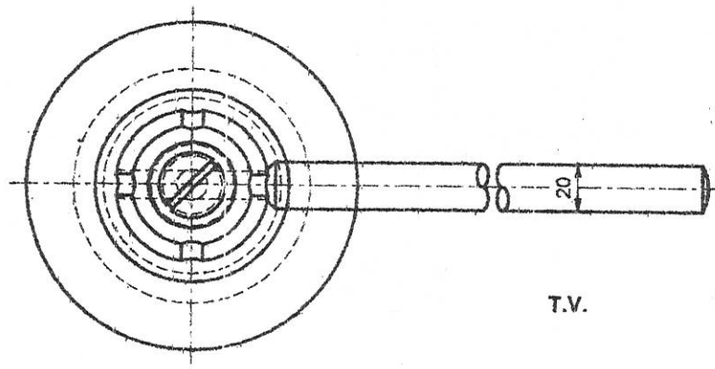
SECTIONAL F.V.

FIT CHART

50H7/n6	TANSINTION FIT

PART LIST

PART NO.	PART NAME	MATL.	QTY.
1	BODY	C.I.	1
2	BUSH	M.S.	1
3	SCREW	M.S.	1
4	CUP	C.I.	1
5	WASHER	M.S.	1
6	SET SCREW	M.S.	1
7	TOMY BAR	M.S.	1

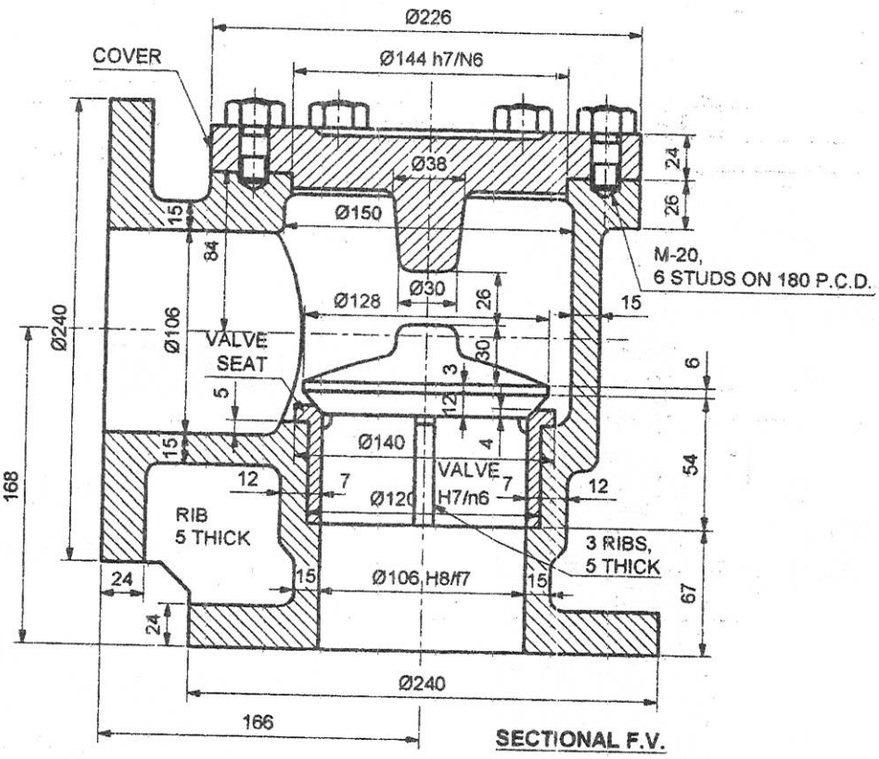


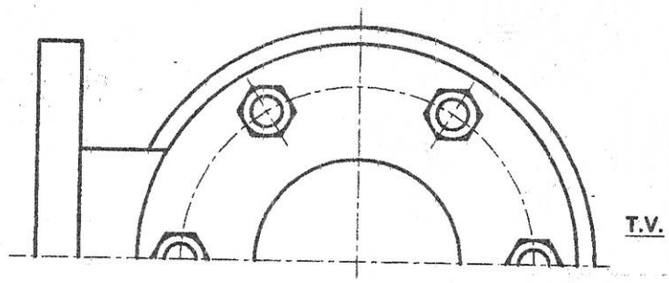
T.V.

Fig - **Assembly of Screw jack coupling**

		"OR"			
	b)	Figure shows the Assembly of Non Return Valve. Draw details: i) Body : Sectional FV and TV ii) Valve Seat iii) Cover iv) Valve.	A	5	20

P-5/6





PART LIST

PART NO.	PART NAME	MATERIAL	QTY.
1	BODY	C.I.	1
2	VALVE SEAT	G.M.	1
3	VALVE	G.M.	1
4	COVER	C.I.	1
5	STUD WITH NUT	M.S.	6

Fig. : **Assembly of non-return valve**

P-6/6

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG306**

COURSE NAME **MACHINE TOOLS**

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

Instruction :-

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

QN	SQN	Question Text	R/U/A	Co MEG 306	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Write the function of coolant.	R	1	
	b)	Write the list of different turning operations.	U	2	
	c)	Define feed and cutting speed in case of lathe machine.	U	1	
	d)	Write different operations performed on drilling machine.	U	2	
	e)	Draw neat sketch for spot Facing operation.	U	1	
	f)	Write the Formula for cutting Feed of drilling machine.	A	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw diagram showing nomenclature of single point cutting tool.	U	1	
	b)	Draw block diagram of Radial drilling machine. Lable the parts.	U	2	
	c)	Explain turning operation performed in lathe machine with neat sketch.	U	1	
	d)	What is the function of cutting Fluid and list properties of cutting Fluid?	U	1	
	e)	Define following operations i) Parting off ii) Knurling iii) Facing iv) Threading	U	2	
	f)	List various operations in drilling machine and explain any two with neat sketch.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw the diagram for twist drill nomenclature and lable parts.	A	1	
	b)	Explain the Functions of any two basic parts of lathe with neat sketch.	U	2	
	c)	Explain main parts of sensitive drilling machine with neat sketch.	U	2	
	d)	Give the detail classifications of lathe.	U	2	
	e)	Explain chip formation process with different types.	U	1	
	f)	Explain any Four cutting tool parameters for metal cutting.	U	1	

P.T.O

QN	SQN	Question Text	R/U/A	Co MEG 306	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State principle of shaper machine.	R	2	
	b)	Define push type broaching.	R	3	
	c)	Explain feed and depth of cut for slotter machine.	R	2	
	d)	State material used for broach.	R	2	
	e)	Enlist the material properties of grinding wheel.	R	2	
	f)	Explain need of surface finishing processes.	R	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Compare slotter and planner machine.	A	2	
	b)	Draw neat sketch of shaper machine and name all parts.	A	2	
	c)	Sketch a broach and name its parts.	A	2	
	d)	Explain with neat sketch centreless grinding.	U	3	
	e)	List and sketch types of grinding wheel.	A	2	
	f)	State advantages and limitations of honing.	A	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain quick return mechanism with suitable sketch.	U	2	
	b)	Enlist various broaching application.	A	2	
	c)	Explain tool and outer grinding in brief with sketch.	U	2	
	d)	Explain 'grit' and 'structure' of grinding wheel.	U	2	
	e)	Explain buffing process and write its application.	U	4	
	f)	Write advantages and applications of Burnishing process.	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG306**

COURSE NAME **MACHINE TOOLS**

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

Instruction :-

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

QN	SQN	Question Text	R/U/A	Co MEG 306	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Write the function of coolant.	R	1	
	b)	Write the list of different turning operations.	U	2	
	c)	Define feed and cutting speed in case of lathe machine.	U	1	
	d)	Write different operations performed on drilling machine.	U	2	
	e)	Draw neat sketch for spot Facing operation.	U	1	
	f)	Write the Formula for cutting Feed of drilling machine.	A	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw diagram showing nomenclature of single point cutting tool.	U	1	
	b)	Draw block diagram of Radial drilling machine. Lable the parts.	U	2	
	c)	Explain turning operation performed in lathe machine with neat sketch.	U	1	
	d)	What is the function of cutting Fluid and list properties of cutting Fluid?	U	1	
	e)	Define following operations i) Parting off ii) Knurling iii) Facing iv) Threading	U	2	
	f)	List various operations in drilling machine and explain any two with neat sketch.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw the diagram for twist drill nomenclature and lable parts.	A	1	
	b)	Explain the Functions of any two basic parts of lathe with neat sketch.	U	2	
	c)	Explain main parts of sensitive drilling machine with neat sketch.	U	2	
	d)	Give the detail classifications of lathe.	U	2	
	e)	Explain chip formation process with different types.	U	1	
	f)	Explain any Four cutting tool parameters for metal cutting.	U	1	

P.T.O

QN	SQN	Question Text	R/U/A	Co MEG 306	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State principle of shaper machine.	R	2	
	b)	Define push type broaching.	R	3	
	c)	Explain feed and depth of cut for slotter machine.	R	2	
	d)	State material used for broach.	R	2	
	e)	Enlist the material properties of grinding wheel.	R	2	
	f)	Explain need of surface finishing processes.	R	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Compare slotter and planner machine.	A	2	
	b)	Draw neat sketch of shaper machine and name all parts.	A	2	
	c)	Sketch a broach and name its parts.	A	2	
	d)	Explain with neat sketch centreless grinding.	U	3	
	e)	List and sketch types of grinding wheel.	A	2	
	f)	State advantages and limitations of honing.	A	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain quick return mechanism with suitable sketch.	U	2	
	b)	Enlist various broaching application.	A	2	
	c)	Explain tool and outer grinding in brief with sketch.	U	2	
	d)	Explain 'grit' and 'structure' of grinding wheel.	U	2	
	e)	Explain buffing process and write its application.	U	4	
	f)	Write advantages and applications of Burnishing process.	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL : - 4TH PROGRAM : MECHANICAL ENGINEERING

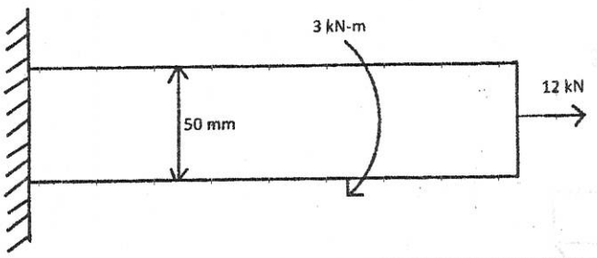
COURSE CODE :- MEG 402

COURSE NAME :- MACHINE DESIGN

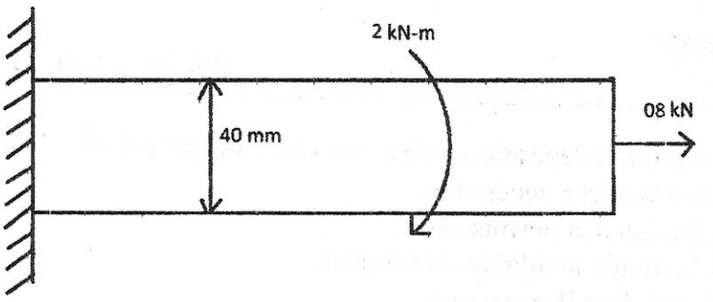
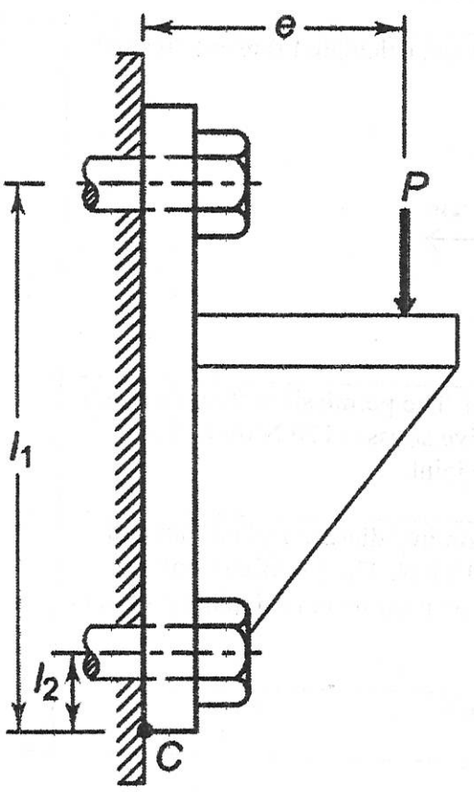
MAX. MARKS : 40 TIME : 1:30Hrs DATE : 28 / 11 / 23

Instruction :-

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

QN	SQN	SECTION –I	R/U/A	Co MEG402	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Name four colour and their meaning in aesthetic consideration of design	R	MEG402-1	
	b)	Name the material of following designation. I) FeE 320 ii) 55C8	R& U	MEG402-1	
	c)	Define i) modulus of elasticity ii) modulus of rigidity	R	MEG402-1	
	d)	Why taper is given to cotter in a cotter joint	U	MEG402-2	
	e)	Define Power screw	R	MEG402-3	
	f)	Name type of stress induced in bolt and member due to preload	R	MEG402-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain ergonomic consideration in design.	A	MEG402-1	
	b)	Describe stress- strain diagram for ductile material	U	MEG402-1	
	c)	A round bar is subjected to axial and torsion load. calculate Principal Normal stress 	A	MEG402-2	
	d)	Knuckle joint is used to carry a load of 60 kN. The permissible stresses are as below. Tensile stress = 70 N/mm², compressive stress = 120 N/mm², Shear stress = 50 N/mm². Design "Pin" of Knuckle joint.	A	MEG402-2	
	e)	A square threaded double start screw has a nominal diameter of 60 mm and pitch 10 mm. The screw has to lift a load of 10 KN. The Coefficient of friction at thread surface is 0.12. Neglect collar friction and calculate principal Shear stress in screw.	A	MEG402-3	
	f)	Describe metric screw threads with neat sketch	U	MEG402-3	

P.T.O

Q.3		Attempt any **FOUR:**			**16**
	a)	Discuss the use of standards in design.	U	MEG402-1	
	b)	A round bar is subjected to axial and torsion load As shown in figure. Calculate Principal shear stress in bar. 	A	MEG402-1	
	c)	Draw the neat sketch of cotter joint.	R	MEG402-1	
	d)	A following date is given for machinist vice. i) single start square thread. ii) Nominal diameter = 20 mm, iii) pitch = 5 mm. iv) mean collar friction radius = 8 mm v) $\mu = \mu_c = 0.15$. The operator exert a force of 150 N on handle at a distance of 150 mm. Calculate load on the Vice.	A	MEG402-3	
	e)	Draw a neat sketch & Forms of threads used in power screw and discuss their merits and demerits	R	MEG402-3	
	f)	Following data is given for a bracket as shown below, P = 25 KN, e = 100 mm, l_1 = 150 mm, l_2 = 25 mm Permissible shear stress = 70 N/mm². Use maximum shear stress theory and calculate size & bolt. 	A	MEG402-3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL : - 4TH PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG 402

COURSE NAME :- MACHINE DESIGN

MAX. MARKS :40 TIME : 1:30Hrs DATE :-28/11/23

QN	S N	SECTION –II	R/ U/ A	Co MEG 402	Ma rks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define endurance limit.	R	1	02
	b)	State the classification of coupling.	R	4	02
	c)	State any four function of spring.	R	5	02
	d)	State types of gears.	R	5	02
	e)	Define i) spring index ii) spring stiffness	R	6	02
	f)	Define i) circular pitch ii) module	R	6	02
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain any four methods to reduce stress concentration.	U	1	04
	b)	The shaft running at 130 r.p.m. transmits 400 kW. Find the diameter of shaft if the angle of twist in shaft must not be more than 1° on a length of 2 meter. The modulus of rigidity G = 81000 N/mm².	U	4	04
	c)	A line shaft rotating at 450 r. p .m. is transmit 35 kW. The shaft is having an allowable shear stress 42 MPa. Find diameter of shaft.	A	4	04
	d)	Draw a neat sketch of helical compression spring and explain following terms i) solid length ii) compressed length iii) free length	A	5	04
	e)	Explain Lewis equation for the strength of gear tooth. Give the meaning of each term.	U	5	04
	f)	Explain with neat sketch i) deep groove ball bearing ii) cylindrical roller bearing	A	6	04
Q.6		Attempt any **FOUR:**			**16**
	a)	A shaft of 2 m length has a pulley of a 300 mm dia. at the midpoint of shaft. The pulley has tension on tight side 6000 N. and tension on slack side 3000 N, and weight of pulley is 1000 N. permissible shear stress is 75 N/mm². Calculate diameter of shaft.	A	4	04
	b)	State various types of spring and give one application for each.	U	5	04
	c)	A 24 tooth spur pinion has a module of 8 mm and runs at a speed of 1200 r.p.m .The driven gear has 72 teeth. Find the (i) speed of driven gear (ii) Circular Pitch	U	5	04
	d)	List the types of rolling contact bearings. mention any one application of each bearing.	U	6	04
	e)	Design a rectangular key to be used for a shaft of diameter 70 mm. both are having same material .Take shear stress = 52MPa and crushing stress=80 MPa. (Assume b= d/4, h=d/6)	A	4	04
	f)	State the steps involved in selection of proper ball bearing from manufactures catalogue.	U	6	04

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL : - 4TH PROGRAM : MECHANICAL ENGINEERING

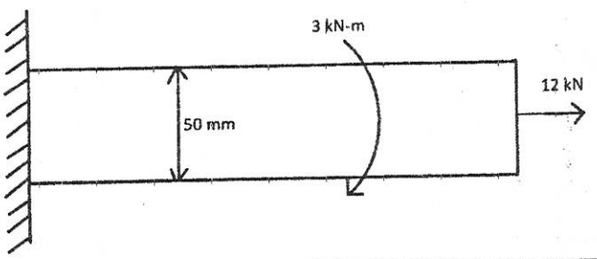
COURSE CODE :- MEG 402

COURSE NAME :- MACHINE DESIGN

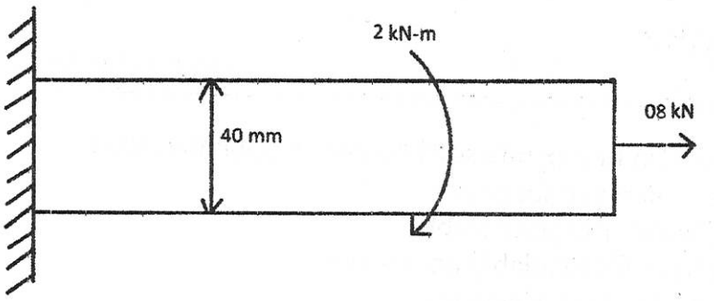
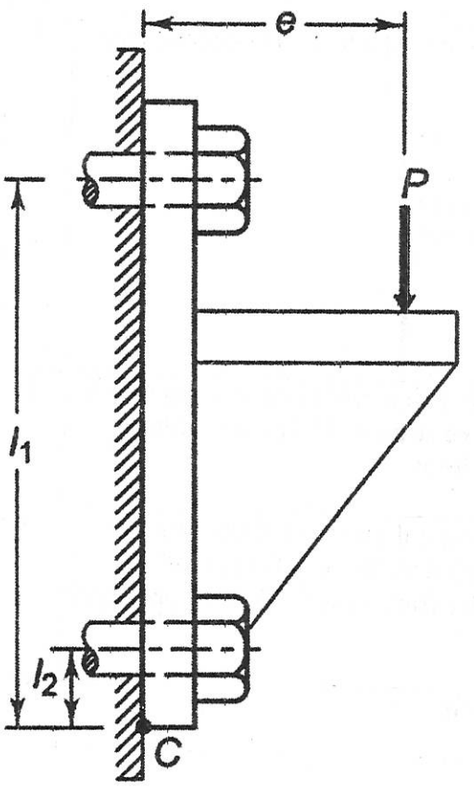
MAX. MARKS : 40 TIME : 1·30Hrs DATE :-28/11/23

Instruction :-

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

QN	SQN	SECTION –I	R/U/A	Co MEG 402	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Name four colour and their meaning in aesthetic consideration of design	R	MEG402-1	
	b)	Name the material of following designation. I) FeE 320 ii) 55C8	R& U	MEG402-1	
	c)	Define i) modulus of elasticity ii) modulus of rigidity	R	MEG402-1	
	d)	Why taper is given to cotter in a cotter joint	U	MEG402-2	
	e)	Define Power screw	R	MEG402-3	
	f)	Name type of stress induced in bolt and member due to preload	R	MEG402-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain ergonomic consideration in design.	A	MEG402-1	
	b)	Describe stress- strain diagram for ductile material	U	MEG402-1	
	c)	A round bar is subjected to axial and torsion load. calculate Principal Normal stress 	A	MEG402-2	
	d)	Knuckle joint is used to carry a load of 60 kN. The permissible stresses are as below. Tensile stress = 70 N/mm², compressive stress = 120 N/mm², Shear stress = 50 N/mm². Design "Pin" of Knuckle joint.	A	MEG402-2	
	e)	A square threaded double start screw has a nominal diameter of 60 mm and pitch 10 mm. The screw has to lift a load of 10 KN. The Coefficient of friction at thread surface is 0.12. Neglect collar friction and calculate principal Shear stress in screw.	A	MEG402-3	
	f)	Describe metric screw threads with neat sketch	U	MEG402-3	

P.T.O

Q.3		Attempt any **FOUR:**			**16**
	a)	Discuss the use of standards in design.	U	MEG402-1	
	b)	A round bar is subjected to axial and torsion load As shown in figure. Calculate Principal shear stress in bar.  	A	MEG402-1	
	c)	Draw the neat sketch of cotter joint.	R	MEG402-1	
	d)	A following date is given for machinist vice. i) single start square thread. ii) Nominal diameter = 20 mm, iii) pitch = 5 mm. iv) mean collar friction radius = 8 mm v) $\mu = \mu_c = 0.15$. The operator exert a force of 150 N on handle at a distance of 150 mm. Calculate load on the Vice,	A	MEG402-3	
	e)	Draw a neat sketch & Forms of threads used in power screw and discuss their merits and demerits	R	MEG402-3	
	f)	Following data is given for a bracket as shown below, P = 25 KN, e = 100 mm, l_1 = 150 mm, l_2 = 25 mm Permissible shear stress = 70 N/mm². Use maximum shear stress theory and calculate size & bolt.  	A	MEG402-3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL : - 4TH PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG 402

COURSE NAME :- MACHINE DESIGN

MAX. MARKS :40 TIME : 1:30Hrs DATE :-28/11/23

QN	S N	SECTION –II	R/ U/ A	Co MEG 402	Ma rks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define endurance limit.	R	1	02
	b)	State the classification of coupling.	R	4	02
	c)	State any four function of spring.	R	5	02
	d)	State types of gears.	R	5	02
	e)	Define i) spring index ii) spring stiffness	R	6	02
	f)	Define i) circular pitch ii) module	R	6	02
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain any four methods to reduce stress concentration.	U	1	04
	b)	The shaft running at 130 r.p.m. transmits 400 kW. Find the diameter of shaft if the angle of twist in shaft must not be more than 1° on a length of 2 meter. The modulus of rigidity G = 81000 N/mm².	U	4	04
	c)	A line shaft rotating at 450 r. p .m. is transmit 35 kW. The shaft is having an allowable shear stress 42 MPa. Find diameter of shaft.	A	4	04
	d)	Draw a neat sketch of helical compression spring and explain following terms i) solid length ii) compressed length iii) free length	A	5	04
	e)	Explain Lewis equation for the strength of gear tooth. Give the meaning of each term.	U	5	04
	f)	Explain with neat sketch i) deep groove ball bearing ii) cylindrical roller bearing	A	6	04
Q.6		Attempt any **FOUR:**			**16**
	a)	A shaft of 2 m length has a pulley of a 300 mm dia. at the midpoint of shaft. The pulley has tension on tight side 6000 N. and tension on slack side 3000 N, and weight of pulley is 1000 N. permissible shear stress is 75 N/mm². Calculate diameter of shaft.	A	4	04
	b)	State various types of spring and give one application for each.	U	5	04
	c)	A 24 tooth spur pinion has a module of 8 mm and runs at a speed of 1200 r.p.m .The driven gear has 72 teeth. Find the (i) speed of driven gear (ii) Circular Pitch	U	5	04
	d)	List the types of rolling contact bearings. mention any one application of each bearing.	U	6	04
	e)	Design a rectangular key to be used for a shaft of diameter 70 mm. both are having same material .Take shear stress = 52MPa and crushing stress=80 MPa. (Assume b= d/4, h=d/6)	A	4	04
	f)	State the steps involved in selection of proper ball bearing from manufactures catalogue.	U	6	04

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - FIFTH PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG507 / MEF507

COURSE NAME :- INDUSTRIAL HYADRAULICS & PNEUMATICS.

MAX. MARKS : 40 TIME : 1·30**Hrs** DATE :- 28/11/23

QN	SQN	**SECTION –II**	R/U/A	Co **MEG 507**	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw symbol of unidirectional air motor.	A	1	2
	b)	State any two advantages of using flexible hose pipe over rigid pipe.	R	2	2
	c)	List any four pipe fittings used in pneumatic system.	R	2	2
	d)	State any two applications of pneumatic system.	R	2	2
	e)	Give any two merits of pneumatic system.	R	2	2
	f)	State the function of dual pressure valve	R	3	2
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain with neat sketch construction and working of single acting linear actuator.	U	3	4
	b)	Explain reciprocating compressor used in pneumatic system.	U	3	4
	c)	With neat sketch describe construction and working of air motor.	U	3	4
	d)	Sketch and explain working of 5/2 DC pneumatic valve.	U	3	4
	e)	Draw and explain control of single acting cylinder using OR valve.	A	5	4
	f)	List the factors to be considered while selecting pipes for pneumatic system.	U	3	4
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain general layout of pneumatic system.	U	2	4
	b)	Explain with neat sketch working of quick exhaust valve.	U	3	4
	c)	State the function of FRL unit. Draw separate and combined symbol of FRL unit.	U	3	4
	d)	Draw and explain speed control pneumatic circuit for bi-directional motor.	A	5	4
	e)	Draw and explain working of pneumatic circuit using time delay valve.	A	5	4
	f)	Develop a pneumatic circuit for operation of two double acting cylinders such that one operates after other using travel dependent sequencing.	A	5	4

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG507 / MEF507

COURSE NAME :- INDUSTRIAL HYDRAULICS AND PNEUMATICS

MAX. MARKS : 40 TIME : 1·30**Hrs** DATE :-28/11/23

Instruction :-

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

QN	SQN	**SECTION -I**	R/U/A	Co **MEG 507**	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Draw symbols of i)Pressure relief valve ii) Non return valve	U	2	
	b)	Define viscosity index of oil.	R	1	
	c)	State functions of oil in hydraulic system.	R	1	
	d)	Define positive displacement pump.	R	3	
	e)	State functions of seals in hydraulic system.	R	4	
	f)	Enlist any four pipe materials used in hydraulic system.	R	4	
Q.2		Attempt any **FOUR:**			**16**
	a)	State applications of hydraulic systems.	R	1	
	b)	State various valve actuating methods, show their symbols.	U	4	
	c)	Classify valves used in hydraulic system.	U	4	
	d)	Draw labelled sketch of double acting cylinder.	U	4	
	e)	Draw neat sketch of 4/3 D.C. valve.	U	4	
	f)	State criteria for selection of pumps	R	3	
Q.3		Attempt any **TWO:**			**16**
	a)	Draw hydraulic circuit for Milling machine.	A	5	
	b)	Draw meter in circuit.	A	5	
	c)	Explain with neat sketch any one accumulator. State functions of accumulators	R	4	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - FIFTH PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG507 / MEF507

COURSE NAME :- INDUSTRIAL HYADRAULICS & PNEUMATICS.

MAX. MARKS : 40 TIME : 1·30**Hrs** DATE :- 28/11/23

QN	SQN	**SECTION –II**	R/U/A	Co **MEG 507**	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw symbol of unidirectional air motor.	A	1	2
	b)	State any two advantages of using flexible hose pipe over rigid pipe.	R	2	2
	c)	List any four pipe fittings used in pneumatic system.	R	2	2
	d)	State any two applications of pneumatic system.	R	2	2
	e)	Give any two merits of pneumatic system.	R	2	2
	f)	State the function of dual pressure valve	R	3	2
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain with neat sketch construction and working of single acting linear actuator.	U	3	4
	b)	Explain reciprocating compressor used in pneumatic system.	U	3	4
	c)	With neat sketch describe construction and working of air motor.	U	3	4
	d)	Sketch and explain working of 5/2 DC pneumatic valve.	U	3	4
	e)	Draw and explain control of single acting cylinder using OR valve.	A	5	4
	f)	List the factors to be considered while selecting pipes for pneumatic system.	U	3	4
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain general layout of pneumatic system.	U	2	4
	b)	Explain with neat sketch working of quick exhaust valve.	U	3	4
	c)	State the function of FRL unit. Draw separate and combined symbol of FRL unit.	U	3	4
	d)	Draw and explain speed control pneumatic circuit for bi-directional motor.	A	5	4
	e)	Draw and explain working of pneumatic circuit using time delay valve.	A	5	4
	f)	Develop a pneumatic circuit for operation of two double acting cylinders such that one operates after other using travel dependent sequencing.	A	5	4

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG507 / MEF507

COURSE NAME :- INDUSTRIAL HYDRAULICS AND PNEUMATICS

MAX. MARKS : 40 TIME : 1:30 Hrs DATE :-28/11/23

Instruction :-

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

QN	SQN	**SECTION -I**	R/U/A	Co MEG 507	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Draw symbols of i)Pressure relief valve ii) Non return valve	U	2	
	b)	Define viscosity index of oil.	R	1	
	c)	State functions of oil in hydraulic system.	R	1	
	d)	Define positive displacement pump.	R	3	
	e)	State functions of seals in hydraulic system.	R	4	
	f)	Enlist any four pipe materials used in hydraulic system.	R	4	
Q.2		Attempt any **FOUR:**			**16**
	a)	State applications of hydraulic systems.	R	1	
	b)	State various valve actuating methods, show their symbols.	U	4	
	c)	Classify valves used in hydraulic system.	U	4	
	d)	Draw labelled sketch of double acting cylinder.	U	4	
	e)	Draw neat sketch of 4/3 D.C. valve.	U	4	
	f)	State criteria for selection of pumps	R	3	
Q.3		Attempt any **TWO:**			**16**
	a)	Draw hydraulic circuit for Milling machine.	A	5	
	b)	Draw meter in circuit.	A	5	
	c)	Explain with neat sketch any one accumulator. State functions of accumulators	R	4	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG314/MEF407**

COURSE NAME **ENGINEERING METROLOGY**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **29/ 11 / 2023**

Instruction :-

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

QN	SQN	Question Text	R/U/A	Co MEG 314	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define terms i) Precision ii) Reproducibility.	R	2	
	b)	A micrometer has 0.5 mm marks on the main scale. It has 100 equal divisions on circular scale. For one rotation of circular scale it advances on 0.5 mm at main scale. Calculate least count of micrometer.	A	1	
	c)	State any two advantages of line standard and end standard each.	R+U	4 2	
	d)	Define comparator. Enlist the types of comparators.	R	4 2	
	e)	Define terms i) Fit ii) Tolerance.	R	3	
	f)	State any four advantages of CMM (Co-ordinate Measuring Machine)	R	4	
Q.2		Attempt any **FOUR:**			**16**
	a)	State factors are to be considered for selection of measuring instrument.	U	1	
	b)	Built up dimension of 59.123 mm using following slip gauge set with protection slip of 1mm each on both sides.	A	5	
	c)	Compare hole basis system with shaft basis system.	U	3	
	d)	In a limit system, following limits are specified to give a clearance fit between a shaft and hole. *Shaft* 60 $^{-0.006mm}_{-0.020mm}$ *Hole* 60 $^{+0.03mm}_{-0.00mm}$ Find i) Basic Size ii) Tolerance on shaft and Hole iii) Maximum clearance iv) Minimum clearance.	A	3	

Range(mm)	Step (mm)	Pieces(No)
1.001-1.009	0.001	09
1.01-1.49	0.01	49
0.5-24.5	0.5	49
25-100	25	04
1.005	1.005	01

P.T.O

	e)	Describe design factors of CMM (Co-ordinate Measuring Machine)	U	4	
	f)	Explain Taylors principle of gauge design with neat sketch.	U	4 2	
Q.3		Attempt any **FOUR:**			16
	a)	State types of metrology and explain any two.	R	1	
	b)	Explain construction and working of dial gauge indicator with neat sketch.	U	5	
	c)	Explain concept of interchangeability and state advantages of interchangeability.	R+ U	1	
	d)	Interpreter meaning of 40 H8S6 with respect to fit and basis system.	A	3	
	e)	Draw symbol for i) Circularity ii) Concentricity iii) Parallelism iv) Flatness.	A	4	
	f)	Differentiate between end standard and wavelength standard.	U	4 2	
Q.4		Attempt any **FOUR:**			**08**
	a)	Define 'Effective Diameter' of screw thread.	R	4	
	b)	Define 'Backlash' related to gear.	R	4	
	c)	State methods of measuring tooth thickness of gears.	R	4	
	d)	Define calibration.	R	6	
	e)	Define CLA valve.	R	4	
	f)	State any two limitations of Sine bar.	R	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Compare between angle gauges and slip gauges.	U	4	
	b)	State the importance of calibration of measuring instrument.	A	6	
	c)	Explain the procedure of calibration of dial gauge.	A	6	
	d)	Explain the corrections to be applied in measurement of effective screw diameter by the method of wire.	U	4	
	e)	Explain two wire methods with neat sketch.	A	4	
	f)	Explain constant chord methods for measuring tooth thickness of gears.	A	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Suggest the measuring instruments to measure the following features of screw thread. i) Major diameter ii) Effective diameter iii) Pitch iv) Thread angle.	A	4	
	b)	Classify the following inspection parameters properly into analytical and functional inspection of gears. i) Noise in gear ii) Vibration of gear iii)Hardness of gear blank iv) Alignment of gear tooth.	A	4	
	c)	Explain the principle of measurement of gear tooth thickness using a gear tooth Vernier.	U	4	
	d)	Outline Tomlinson's surface tester.	R	4	
	e)	Fine Rz and Ra value form readings 10.2, 10.1, 10.0, 11.0, 10.9, 10.6, 10.5, 10.1, 10.3, 10.4.	A	5	
	f)	State the meaning of i) Texture ii) Waviness iii) Lay iv) Roughness with respect to surface finish.	U	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG314/MEF407**

COURSE NAME **ENGINEERING METROLOGY**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **29/ 11 / 2023**

Instruction :-

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

QN	SQN	Question Text	R/U/A	Co MEG 314	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define terms i) Precision ii) Reproducibility.	R	2	
	b)	A micrometer has 0.5 mm marks on the main scale. It has 100 equal divisions on circular scale. For one rotation of circular scale it advances on 0.5 mm at main scale. Calculate least count of micrometer.	A	1	
	c)	State any two advantages of line standard and end standard each.	R+U	4 2	
	d)	Define comparator. Enlist the types of comparators.	R	4 2	
	e)	Define terms i) Fit ii) Tolerance.	R	3	
	f)	State any four advantages of CMM (Co-ordinate Measuring Machine)	R	4	
Q.2		Attempt any **FOUR:**			**16**
	a)	State factors are to be considered for selection of measuring instrument.	U	1	
	b)	Built up dimension of 59.123 mm using following slip gauge set with protection slip of 1mm each on both sides.	A	5	
	c)	Compare hole basis system with shaft basis system.	U	3	
	d)	In a limit system, following limits are specified to give a clearance fit between a shaft and hole. *Shaft* 60 $^{-0.006mm}_{-0.020mm}$ *Hole* 60 $^{+0.03mm}_{-0.00mm}$ Find i) Basic Size ii) Tolerance on shaft and Hole iii) Maximum clearance iv) Minimum clearance.	A	3	

Range(mm)	Step (mm)	Pieces(No)
1.001-1.009	0.001	09
1.01-1.49	0.01	49
0.5-24.5	0.5	49
25-100	25	04
1.005	1.005	01

P.T.O

	e)	Describe design factors of CMM (Co-ordinate Measuring Machine)	U	4	
	f)	Explain Taylors principle of gauge design with neat sketch.	U	4 2	
Q.3		Attempt any **FOUR:**			16
	a)	State types of metrology and explain any two.	R	1	
	b)	Explain construction and working of dial gauge indicator with neat sketch.	U	5	
	c)	Explain concept of interchangeability and state advantages of interchangeability.	R+ U	1	
	d)	Interpreter meaning of 40 H8S6 with respect to fit and basis system.	A	3	
	e)	Draw symbol for i) Circularity ii) Concentricity iii) Parallelism iv) Flatness.	A	4	
	f)	Differentiate between end standard and wavelength standard.	U	4 2	
Q.4		Attempt any **FOUR:**			**08**
	a)	Define 'Effective Diameter' of screw thread.	R	4	
	b)	Define 'Backlash' related to gear.	R	4	
	c)	State methods of measuring tooth thickness of gears.	R	4	
	d)	Define calibration.	R	6	
	e)	Define CLA valve.	R	4	
	f)	State any two limitations of Sine bar.	R	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Compare between angle gauges and slip gauges.	U	4	
	b)	State the importance of calibration of measuring instrument.	A	6	
	c)	Explain the procedure of calibration of dial gauge.	A	6	
	d)	Explain the corrections to be applied in measurement of effective screw diameter by the method of wire.	U	4	
	e)	Explain two wire methods with neat sketch.	A	4	
	f)	Explain constant chord methods for measuring tooth thickness of gears.	A	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Suggest the measuring instruments to measure the following features of screw thread. i) Major diameter ii) Effective diameter iii) Pitch iv) Thread angle.	A	4	
	b)	Classify the following inspection parameters properly into analytical and functional inspection of gears. i) Noise in gear ii) Vibration of gear iii)Hardness of gear blank iv) Alignment of gear tooth.	A	4	
	c)	Explain the principle of measurement of gear tooth thickness using a gear tooth Vernier.	U	4	
	d)	Outline Tomlinson's surface tester.	R	4	
	e)	Fine Rz and Ra value form readings 10.2, 10.1, 10.0, 11.0, 10.9, 10.6, 10.5, 10.1, 10.3, 10.4.	A	5	
	f)	State the meaning of i) Texture ii) Waviness iii) Lay iv) Roughness with respect to surface finish.	U	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

ODD TERM END EXAM Winter -2023

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **MECHANICAL ENGINEERING**

COURSE CODE: **MEG310/MEF310** COURSE NAME: **ENGG. METALLURGY & MATERIALS**

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

Instruction -

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

QN	SQN	QUESTION TEXT	RUA	CO MEG 310	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Draw unit cell of BCC and FCC structure.	R/U	1	
	b)	State packing factor of BCC and FCC structure with meaning of packing factor.	R/U	1	
	c)	List metals having HCP structure.	R	1	
	d)	State the phase rule.	U	2	
	e)	Define Pearlite.	R/U	1	
	f)	Write composition of High speed steel.	R	2	
Q.2		Attempt any **FOUR**			**(16)**
	a)	State seven types of Crystal structures along with lattice parameters relationship.	R/U	1	
	b)	State various lattice imperfection of crystal and explain Point defects,	U	1	
	c)	Describe mechanism of Crystallization of metal with sketch.	U	1	
	d)	State lever arm principle with it's application.	A	2	
	e)	State and explain Eutectic and peritectic reactions.	U	2	
	f)	Draw equilibrium diagram of isomorphous system and explain various features.	R	2	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Draw cooling curve of pure iron and show temperature and various changes in it Explain allotropic transformation of pure iron.	R/U	1	
	b)	Draw iron- iron carbide equilibrium diagram and show various phases and temperature. State general reactions in it.	R	1	
	c)	Explain changes in microstructures during slow cooling of hypoeutectoid steel with sketch.	U	1	
	d)	Write various applications of white cast iron and Nodular cast iron.	A	1	
	e)	State and explain various stainless steel with their applications.	A	1	
	f)	Explain effects of ferrite stabilizer alloying elements on Iron carbon diagram.	U	1	

P.T.O.

QN	SQN	QUESTION TEXT	RUA	CO MEG 310	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	Write two effects of tempering process on Steel.	R	3	
	b)	Write purpose of normalization.	R	3	
	c)	State objectives of martempering.	R	3	
	d)	State the properties of the copper.	R	4	
	e)	State the meaning of smart material.	R	4	
	f)	State the applications of nondestructive testing.	U	5	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain isothermal transformation of austenite.	A	3	
	b)	Explain TTT diagram of eutectoid steel.	U	3	
	c)	Write names of copper alloys and their composition.	A	4	
	d)	List types of rubber and explain any one.	U	4	
	e)	Explain penetrant test with neat sketch.	U	4	
	f)	Explain ultrasonic testing with neat sketch.	U	5	
Q.6		Attempt any **FOUR**			**(16)**
	a)	List case hardning methods and explain any one.	U	3	
	b)	Explain normalizing process.	U	3	
	c)	Explain annealing process.	U	3	
	d)	Write properties and application of Vinyl and Nylons.	A	4	
	e)	List different types of aluminium alloys and state composition, properties and application of any one.	A	4	
	f)	Explain magna flux test with neat sketch.	U	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER/SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL : - FIFTH PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG401

COURSE NAME :- Power Engineering

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

Instruction :-

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

QN	SQN	SECTION -I	R/ U/ A	Co MEG 401.	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Represent Otto cycle on P-V diagram. Name the processes.	U	1	
	b)	Define the terms i)Bore and ii)Stroke of an I.C.Engine	R	1	
	c)	State the function of cam shaft and piston rings in an I.C.Engine.	R	1	
	d)	Define brake power and bsfc for an I.C.Engine.	R	2	
	e)	List various types of sensors used in modern types of I.C. Engines.	R	2	
	f)	Write the formula to calculate heat absorbed by cooling water during testing of I.C.Engine . Write meaning of each term.	U	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Represent Diesel cycle on P-V and T-S diagrams. Name the processes.	U	1	
	b)	Explain four strokes of a four stroke cycle petrol engine.	R	1	
	c)	Compare SI and CI Engines. On the basis of i) Thermodynamic cycle ii) Compression ratio iii) Air- fuel ratio & iv) Applications.	U	1	
	d)	Draw a neat sketch of battery ignition system.	R	1	
	e)	State any four important pollutants in exhaust gas of an I.C.Engine with their effects on Environment and human body.	R	2	
	f)	Explain the purpose of I.C.Engine testing. List various methods of I.C.Engine testing.	U	2	
Q.3		Attempt any **TWO**			**16**
	a)	In an otto cycle , maximum temperature is 2000^0C and minimum temperature is 300^0C .Mass flow rate is 1 kg per minute. Compression ratio is 8. Calculate the power developed. Take γ=1.41 and Cv=0.716 kJ/kg^0 K	A	1	
	b)	i) Prove that efficiency of Otto cycle is a function of compression ratio only with suitable example. ii)Describe with neat sketch construction & working of simple carburettor.	U	2	
	c)	A four cylinder four stroke petrol engine works on mean effective pressure of 5 bar and engine speed is 1250 rpm. Find the indicated power developed by engine if piston diameter is 100 mm and stroke length is 150 mm. Also, calculate power available at crank shaft if mechanical efficiency is 80 %.	A	2	

PTO

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL : - 5th PROGRAM :

COURSE CODE :- MEG 401

COURSE NAME :- POWER ENGINEERING

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

QN	SQN	SECTION –II	R/U/A	Co MEG 401	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Write any four industrial applications of compressed air.	R	5	
	b)	Define the term 'Tones of refrigeration'.	U	1	
	c)	Draw a neat sketch of open cycle gas turbine & label its parts.	R	5	
	d)	Write classification of jet propulsion system.	R	5	
	e)	Define the term ' Isothermal efficiency' of compressor. List the methods used to improve isothermal efficiency of compressor.	U	6	
	f)	A single stage compressor is required to compress 1 kg of air from 1 bar pressure to 4 bar pressure. The initial temperature of air is 27°C & compression follows law $PV^{1.2} = C$. Determine the work required to drive the compressor. (Take R= 287 J/kg K)	A	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Differentiate between reciprocating air compressors & rotary air compressors (Any four points)	U	1	
	b)	Write classification of rotary air compressors. Write any four advantages of rotary air compressors.	R	5	
	c)	With neat sketch describe construction & working of turbo jet.	U	1	
	d)	With neat sketch describe construction & working of open cycle gas turbine.	U	6	
	e)	Draw the layout of vapor compression refrigeration cycle label the parts & write function of each part.	U	6	
	f)	Define the term " Air conditioning". Classify air conditioning systems according to i) purpose ii) season iii) arrangement of equipments.	R	5	
Q.6		Attempt any **FOUR:**			**16**
	a)	A single acting two stage reciprocating air compressor with complete intercooling delivers 6 kg of air at 16 bar. The suction occurs at 1 bar & 15° C & index of compression is n=1.3 then calculate i) Intermediate pressure. ii) The power required to drive the compressor.	A	4	
	b)	Write any four advantages of multi stage compression.	R	5	
	c)	Describe working of gas turbine plant with inter cooling.	U	6	
	d)	With neat sketch describe construction & working of turbo propeller.	U	6	
	e)	Define the term " Psychrometry". Write significance of Psychrometric chart.	R	5	
	f)	Draw a line diagram of ice plant & label its parts.	R	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 41600

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL : - FIFTH PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG401

COURSE NAME :- Power Engineering

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

Instruction :-

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

QN	SQN	SECTION -I	R/ U/ A	Co MEG 401.	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Represent Otto cycle on P-V diagram. Name the processes.	U	1	
	b)	Define the terms i)Bore and ii)Stroke of an I.C.Engine	R	1	
	c)	State the function of cam shaft and piston rings in an I.C.Engine.	R	1	
	d)	Define brake power and bsfc for an I.C.Engine.	R	2	
	e)	List various types of sensors used in modern types of I.C. Engines.	R	2	
	f)	Write the formula to calculate heat absorbed by cooling water during testing of I.C.Engine . Write meaning of each term.	U	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Represent Diesel cycle on P-V and T-S diagrams. Name the processes.	U	1	
	b)	Explain four strokes of a four stroke cycle petrol engine.	R	1	
	c)	Compare SI and CI Engines. On the basis of i) Thermodynamic cycle ii) Compression ratio iii) Air- fuel ratio & iv) Applications.	U	1	
	d)	Draw a neat sketch of battery ignition system.	R	1	
	e)	State any four important pollutants in exhaust gas of an I.C.Engine with their effects on Environment and human body.	R	2	
	f)	Explain the purpose of I.C.Engine testing. List various methods of I.C.Engine testing.	U	2	
Q.3		Attempt any **TWO**			**16**
	a)	In an otto cycle , maximum temperature is 2000^0C and minimum temperature is 300^0C .Mass flow rate is 1 kg per minute. Compression ratio is 8. Calculate the power developed. Take γ=1.41 and Cv=0.716 kJ/kg^0 K	A	1	
	b)	i) Prove that efficiency of Otto cycle is a function of compression ratio only with suitable example. ii)Describe with neat sketch construction & working of simple carburettor.	U	2	
	c)	A four cylinder four stroke petrol engine works on mean effective pressure of 5 bar and engine speed is 1250 rpm. Find the indicated power developed by engine if piston diameter is 100 mm and stroke length is 150 mm. Also, calculate power available at crank shaft if mechanical efficiency is 80 %.	A	2	

PTO

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL : - 5th PROGRAM :

COURSE CODE :- MEG 401

COURSE NAME :- POWER ENGINEERING

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

QN	SQN	SECTION –II	R/U/A	Co MEG 401	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Write any four industrial applications of compressed air.	R	5	
	b)	Define the term 'Tones of refrigeration'.	U	1	
	c)	Draw a neat sketch of open cycle gas turbine & label its parts.	R	5	
	d)	Write classification of jet propulsion system.	R	5	
	e)	Define the term ' Isothermal efficiency' of compressor. List the methods used to improve isothermal efficiency of compressor.	U	6	
	f)	A single stage compressor is required to compress 1 kg of air from 1 bar pressure to 4 bar pressure. The initial temperature of air is 27°C & compression follows law $PV^{1.2} = C$. Determine the work required to drive the compressor. (Take R= 287 J/kg K)	A	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Differentiate between reciprocating air compressors & rotary air compressors (Any four points)	U	1	
	b)	Write classification of rotary air compressors. Write any four advantages of rotary air compressors.	R	5	
	c)	With neat sketch describe construction & working of turbo jet.	U	1	
	d)	With neat sketch describe construction & working of open cycle gas turbine.	U	6	
	e)	Draw the layout of vapor compression refrigeration cycle label the parts & write function of each part.	U	6	
	f)	Define the term " Air conditioning". Classify air conditioning systems according to i) purpose ii) season iii) arrangement of equipments.	R	5	
Q.6		Attempt any **FOUR:**			**16**
	a)	A single acting two stage reciprocating air compressor with complete intercooling delivers 6 kg of air at 16 bar. The suction occurs at 1 bar & 15° C & index of compression is n=1.3 then calculate i) Intermediate pressure. ii) The power required to drive the compressor.	A	4	
	b)	Write any four advantages of multi stage compression.	R	5	
	c)	Describe working of gas turbine plant with inter cooling.	U	6	
	d)	With neat sketch describe construction & working of turbo propeller.	U	6	
	e)	Define the term " Psychrometry". Write significance of Psychrometric chart.	R	5	
	f)	Draw a line diagram of ice plant & label its parts.	R	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - 5 PROGRAM : MECHANICAL

COURSE CODE :- MEG506 / MEF506

COURSE NAME :- AUTOMOBILE ENGINEERING

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

QN	SQN	**SECTION –II**	R/ U/ A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw neat sketch of leaf spring.	R	MEG506.4	
	b)	Why suspension system is important in automobile?	A	MEG506.4	
	c)	Enlist the Factors affecting on tyre life.	U	MEG506.4	
	d)	Draw neat sketch of bendix drive.	R	MEG506.4	
	e)	What is purpose of Lighting system in vehicle?	A	MEG506.5	
	f)	Which types of gauges are used in vehicle?	U	MEG506.5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain with neat sketch Construction & working of McPherson suspensions.	U	MEG506.4	
	b)	Explain with neat sketch Construction & working of telescopic shock absorbers	U	MEG506.4	
	c)	Compare tubed and tubeless tyre.	R	MEG506.4	
	d)	Write short note on Wheel Alignment and Balancing.	R	MEG506.4	
	e)	Explain with neat sketch Construction & Working of electronic ignition system.	R	MEG506.5	
	f)	How charging system works in automobile?	A	MEG506.5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain air suspension system.	R	MEG506.4	
	b)	Compare radial and cross- ply tyre.	R	MEG506.4	
	c)	Explain wishbone and trailing link suspensions system	U	MEG506.4	
	d)	Explain with neat sketch CDI ignition system.	U	MEG506.5	
	e)	How microprocessor is useful in automobile?	A	MEG506.5	
	f)	Explain with neat sketch Working and Construction of battery.	U	MEG506.5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 202

EXAM SEAT NO. | | | | | | |

LEVEL : - **05** PROGRAM : ME
COURSE CODE :- MEG506 / MEF 506
COURSE NAME :- AUTOMOBILE ENGINEERING
MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 30/11/23

Instruction :-

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

QN	SQ N	SECTION -I	R/ U/ A	CO MEG 506.	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Classify automobiles.	U	1	2
	b)	State function of propeller shaft.	R	2	2
	c)	State application of single plate clutch.	U	.2	2
	d)	State necessity of braking system.	R	.3	2
	e)	Enlist any four requirements of steering system in automobile.	U	3	2
	f)	Define vehicle layout.	R	1	2
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw and explain vehicle layout of front engine rear wheel drive.	U	.1	**4**
	b)	Explain diaphragm spring type clutch with neat sketch.	R	.2	**4**
	c)	Explain with neat sketch working of constant mesh gear box.	U	.2	**4**
	d)	Explain hydraulic braking system with neat sketch.	U	3	**4**
	e)	Explain with neat sketch working of Torque converter.	R	.2	**4**
	f)	Explain camber and caster with neat sketch.	U	3	**4**
Q.3		Attempt any **FOUR:**			**16**
	a)	State the importance of aerodynamic shape body of an automobile.	R	.1	**4**
	b)	Explain with neat sketch construction and working of Differential unit.	U	.2	**4**
	c)	Explain construction and working of rack and pinion type steering gearbox with neat sketch.	R	.3	**4**
	d)	Differentiate between single plate clutch and multi plate clutch.	U	2	**4**
	e)	Explain working of power steering with its advantages and disadvantages.	U	.3	**4**
	f)	Explain working of overdrive with neat sketch.	U	2	**4**

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - 5 PROGRAM : MECHANICAL

COURSE CODE :- MEG506 / MEF506

COURSE NAME :- AUTOMOBILE ENGINEERING

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

QN	SQN	**SECTION –II**	R/ U/ A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw neat sketch of leaf spring.	R	MEG506.4	
	b)	Why suspension system is important in automobile?	A	MEG506.4	
	c)	Enlist the Factors affecting on tyre life.	U	MEG506.4	
	d)	Draw neat sketch of bendix drive.	R	MEG506.4	
	e)	What is purpose of Lighting system in vehicle?	A	MEG506.5	
	f)	Which types of gauges are used in vehicle?	U	MEG506.5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain with neat sketch Construction & working of McPherson suspensions.	U	MEG506.4	
	b)	Explain with neat sketch Construction & working of telescopic shock absorbers	U	MEG506.4	
	c)	Compare tubed and tubeless tyre.	R	MEG506.4	
	d)	Write short note on Wheel Alignment and Balancing.	R	MEG506.4	
	e)	Explain with neat sketch Construction & Working of electronic ignition system.	R	MEG506.5	
	f)	How charging system works in automobile?	A	MEG506.5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain air suspension system.	R	MEG506.4	
	b)	Compare radial and cross- ply tyre.	R	MEG506.4	
	c)	Explain wishbone and trailing link suspensions system	U	MEG506.4	
	d)	Explain with neat sketch CDI ignition system.	U	MEG506.5	
	e)	How microprocessor is useful in automobile?	A	MEG506.5	
	f)	Explain with neat sketch Working and Construction of battery.	U	MEG506.5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 202

EXAM SEAT NO. | | | | | | |

LEVEL : - **05** PROGRAM : ME
COURSE CODE :- MEG506 / MEF 506
COURSE NAME :- AUTOMOBILE ENGINEERING
MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 30/11/23

Instruction :-

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

QN	SQN	**SECTION -I**	R/ U/ A	CO MEG 506.	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Classify automobiles.	U	1	2
	b)	State function of propeller shaft.	R	2	
	c)	State application of single plate clutch.	U	.2	2
	d)	State necessity of braking system.	R	.3	2
	e)	Enlist any four requirements of steering system in automobile.	U	3	2
	f)	Define vehicle layout.	R	1	2
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw and explain vehicle layout of front engine rear wheel drive.	U	.1	**4**
	b)	Explain diaphragm spring type clutch with neat sketch.	R	.2	**4**
	c)	Explain with neat sketch working of constant mesh gear box.	U	.2	**4**
	d)	Explain hydraulic braking system with neat sketch.	U	3	**4**
	e)	Explain with neat sketch working of Torque converter.	R	.2	**4**
	f)	Explain camber and caster with neat sketch.	U	3	**4**
Q.3		Attempt any **FOUR:**			**16**
	a)	State the importance of aerodynamic shape body of an automobile.	R	.1	**4**
	b)	Explain with neat sketch construction and working of Differential unit.	U	.2	**4**
	c)	Explain construction and working of rack and pinion type steering gearbox with neat sketch.	R	.3	**4**
	d)	Differentiate between single plate clutch and multi plate clutch.	U	2	**4**
	e)	Explain working of power steering with its advantages and disadvantages.	U	.3	**4**
	f)	Explain working of overdrive with neat sketch.	U	2	**4**

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG309**

COURSE NAME **BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **01/ 12 / 2023**

Instruction :-

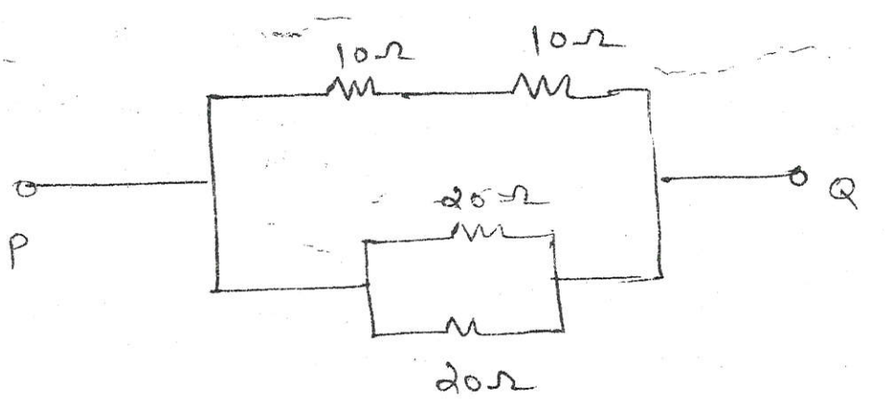
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention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

QN	SQN	SECTION –I	R/U/A	Co MEG 309	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State Ohm's Law for Electric circuit.	U	1	
	b)	Define the following terms related to magnetic circuit i) MMF ii) Reluctance	R	1	
	c)	What is the purpose of ammeter in Electrical circuit and how it is connected in electrical circuit.	R	2	
	d)	Define transformer efficiency.	R	3	
	e)	Why starter is required at the starting of motor.	A	3	
	f)	Write down the importance of earthing.	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw delta connected load, State relation between i) Line voltage and phase voltage. ii) Line current and phase current.	A	2	
	b)	Draw schematic diagram of capacitor start capacitor run induction motor. Give any two applications of same.	U	3	
	c)	Define the following term related to sinusoidal waveform i) Time period ii) Frequency iii) RMS value iv) Peak value.	U	2	
	d)	State working principle and transformer. Explain in detail construction of transformer.	A	3	
	e)	Calculate total equivalent resistance between P and Q. (See Fig No.1)	A	1	
	f)	Explain in detail working principle of single phase induction motor with its construction and labelled diagram.	U	3	
Q.3		Attempt any **FOUR:**			16
	a)	State the types of transformer i) According to construction ii) According to application.	A	3	
	b)	Define phase sequence and state it's any two advantages.	U	2	
	c)	Write down any two applications of following meters. i) Clip on meter. ii) Digital multimeter.	A	2	
	d)	Explain in detail constructional features of three phase induction motor.	R	3	
	e)	Compare electric circuit and Magnetic circuit on basis of any four points.	U	1	
	f)	Draw schematic diagram of split phase single phase induction motor. Give its any two applications.	U	3	

P.T.O

QN	SQN	SECTION –II	R/U/A	Co MEG 309	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw the symbol of capacitor and state its unit.	R	4	
	b)	List out different types of filters used in Rectifier.	R	5	
	c)	Define PIV and ripple factor for full wave bridge rectifier.	R	5	
	d)	Define β. Give relationship between α and β.	R	6	
	e)	Define the following parameters with respect to BJT of common base configuration i) I/P Resistance ii) O/P resistance	R	6	
	f)	Draw the V-I input characteristics of transistor in common emitter mode.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	List out different types of capacitors and resistors.	R	4	
	b)	Find the values of resistor from the given colour code. i) Orange, Red, Brown, Silver. ii) Brown, Black, Brown, Gold.	A	4	
	c)	Explain full wave rectifier (~~centre tapped~~ Bridge) with suitable diagram.	U	5	
	d)	Explain zener diode as a voltage regulator. With suitable circuit diagram ~~for line regulation~~.	U	6	
	e)	Explain the operating principles of NPN transistor.	U	6	
	f)	Describe the operation of a transistor as a switch with suitable diagram.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Compare analog and digital IC's	R	4	
	b)	Draw and explain C-L-C filter with full wave bridge rectifier.	U	5	
	c)	Define rectifier. Explain the need of rectification. State the types of rectifier.	U	5	
	d)	Compare conductor, insulator and semiconductors. (any four points)	R	5	
	e)	Compare CB, CC and CE configuration of BJT.	R	6	
	f)	Define transistor Biasing and explain the need of transistor biasing and list of its types.	R	6	

Q 2. e)



(Fig No 1)

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG309**

COURSE NAME **BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **01/ 12 / 2023**

Instruction :-

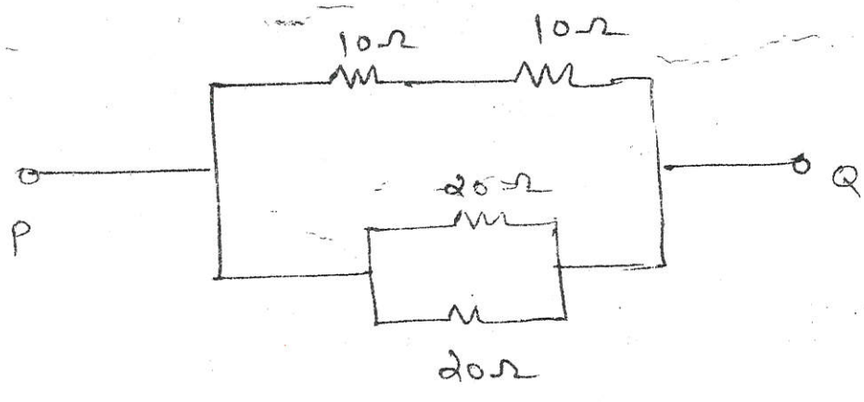
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention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

QN	SQN	SECTION –I	R/U/A	Co MEG 309	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State Ohm's Law for Electric circuit.	U	1	
	b)	Define the following terms related to magnetic circuit i) MMF ii) Reluctance	R	1	
	c)	What is the purpose of ammeter in Electrical circuit and how it is connected in electrical circuit.	R	2	
	d)	Define transformer efficiency.	R	3	
	e)	Why starter is required at the starting of motor.	A	3	
	f)	Write down the importance of earthing.	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw delta connected load, State relation between i) Line voltage and phase voltage. ii) Line current and phase current.	A	2	
	b)	Draw schematic diagram of capacitor start capacitor run induction motor. Give any two applications of same.	U	3	
	c)	Define the following term related to sinusoidal waveform i) Time period ii) Frequency iii) RMS value iv) Peak value.	U	2	
	d)	State working principle and transformer. Explain in detail construction of transformer.	A	3	
	e)	Calculate total equivalent resistance between P and Q. (See Fig No.1)	A	1	
	f)	Explain in detail working principle of single phase induction motor with its construction and labelled diagram.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	State the types of transformer i) According to construction ii) According to application.	A	3	
	b)	Define phase sequence and state it's any two advantages.	U	2	
	c)	Write down any two applications of following meters. i) Clip on meter, ii) Digital multimeter.	A	2	
	d)	Explain in detail constructional features of three phase induction motor.	R	3	
	e)	Compare electric circuit and Magnetic circuit on basis of any four points.	U	1	
	f)	Draw schematic diagram of split phase single phase induction motor. Give its any two applications.	U	3	

P.T.O

QN	SQN	SECTION –II	R/U/A	Co MEG 309	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw the symbol of capacitor and state its unit.	R	4	
	b)	List out different types of filters used in Rectifier.	R	5	
	c)	Define PIV and ripple factor for full wave bridge rectifier.	R	5	
	d)	Define β. Give relationship between α and β.	R	6	
	e)	Define the following parameters with respect to BJT of common base configuration i) I/P Resistance ii) O/P resistance	R	6	
	f)	Draw the V-I input characteristics of transistor in common emitter mode.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	List out different types of capacitors and resistors.	R	4	
	b)	Find the values of resistor from the given colour code. i) Orange, Red, Brown, Silver. ii) Brown, Black, Brown, Gold.	A	4	
	c)	Explain full wave rectifier (~~centre tapped~~ Bridge) with suitable diagram.	U	5	
	d)	Explain zener diode as a voltage regulator. With suitable circuit diagram ~~for line regulation~~.	U	6	
	e)	Explain the operating principles of NPN transistor.	U	6	
	f)	Describe the operation of a transistor as a switch with suitable diagram.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Compare analog and digital IC's	R	4	
	b)	Draw and explain C-L-C filter with full wave bridge rectifier.	U	5	
	c)	Define rectifier. Explain the need of rectification. State the types of rectifier.	U	5	
	d)	Compare conductor, insulator and semiconductors. (any four points)	R	5	
	e)	Compare CB, CC and CE configuration of BJT.	R	6	
	f)	Define transistor Biasing and explain the need of transistor biasing and list of its types.	R	6	

Q 2 e)



(Fig No 1)

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG316/MEF410**

COURSE NAME **MECHANICAL ENGINEERING MEASUREMENTS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **01/ 12 / 2023**

Instruction :-

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

QN	SQN	Question Text	R/U/A	Co MEG 316	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define the term i) Reliability ii) Calibration	R	1	
	b)	State any four applications of Displacement transducers.	A	3	
	c)	Define i) Absorption Dynamometer ii) Transmission Dynamometer.	R	2	
	d)	List any four low pressure Measuring Instrumentor gauges.	U	3	
	e)	Convert -40^{0}C temperature into i) Fahrenheit (F) ii) Kelvin(K)	U	3	
	f)	State the law of Intermediate temperature.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare between active and passive transducers.	U	1	
	b)	Explain Hysteresis on Measuring instrument with curve.	A	1	
	c)	Draw a neat sketch of linear potentiometer for displacement measurement, explain its working.	A	2	
	d)	Explain with neat sketch Eddy current Dynamometer with a neat labelled diagram.	U	2	
	e)	A prony brake dynamometer with a lever arm 1m was used to determine power output of engine running of 1000 rpm. The net load on engine is 200N. Calculate brake power output.	U	2	
	f)	Explain working principle of thermistor, state its types.	R	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Define i) Fidelity ii) Overshoot iii) Dead time iv) Speed ~~and of~~ response.	R	1	
	b)	Classify the errors and explain any one type of error in detail.	U	1	
	c)	State various applications of LVDT.	A	2	
	d)	Explain with neat sketch strain gauge load cell.	U	2	
	e)	Explain with neat sketch construction and working of thermocouple.	U	3	
	f)	Differentiate between RTD (Resistors thermometer) and thermistor.	A	3	

P.T.O

QN	SQN	Question Text	R/U/A	Co MEG 316	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List different obstruction flow meters.	R	4	
	b)	Define uniform flow.	U	4	
	c)	State the materials of tube and float of rotameter.	A	4	
	d)	List types of microphones.	R	6	
	e)	Name the different direct liquid level measurement devices.	A	6	
	f)	State limitations of capacitive type liquid level meter.	U	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain variable area meter with neat sketch.	U	4	
	b)	Explain oscillating piston flow meter.	R	4	
	c)	Explain in brief carbon microphone.	R	6	
	d)	Explain briefly with neat sketch shaft and float guage liquid level measurement device.	U	6	
	e)	State advantages of stroboscope.	U	5	
	f)	Write selection and installation of strain gauges.	A	5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain turbine type flowmeter with neat sketch.	U	4	
	b)	Explain Gama liquid level sensor with sketch.	A	6	
	c)	Explain in brief FFT analyzer.	A	5	
	d)	State requirements of an ideal strain gauge.	A	3	
	e)	Explain A.C. Tachogenerator.	A	5	
	f)	Give desirable characteristics of grid material.	A	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG316/MEF410**

COURSE NAME **MECHANICAL ENGINEERING MEASUREMENTS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **01/ 12 / 2023**

Instruction :-

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

QN	SQN	Question Text	R/U/A	Co MEG 316	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define the term i) Reliability ii) Calibration	R	1	
	b)	State any four applications of Displacement transducers.	A	3	
	c)	Define i) Absorption Dynamometer ii) Transmission Dynamometer.	R	2	
	d)	List any four low pressure Measuring Instrumentor gauges.	U	3	
	e)	Convert -40^{0}C temperature into i) Fahrenheit (F) ii) Kelvin(K)	U	3	
	f)	State the law of Intermediate temperature.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare between active and passive transducers.	U	1	
	b)	Explain Hysteresis on Measuring instrument with curve.	A	1	
	c)	Draw a neat sketch of linear potentiometer for displacement measurement, explain its working.	A	2	
	d)	Explain with neat sketch Eddy current Dynamometer with a neat labelled diagram.	U	2	
	e)	A prony brake dynamometer with a lever arm 1m was used to determine power output of engine running of 1000 rpm. The net load on engine is 200N. Calculate brake power output.	U	2	
	f)	Explain working principle of thermistor, state its types.	R	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Define i) Fidelity ii) Overshoot iii) Dead time iv) Speed ~~and~~ of response.	R	1	
	b)	Classify the errors and explain any one type of error in detail.	U	1	
	c)	State various applications of LVDT.	A	2	
	d)	Explain with neat sketch strain gauge load cell.	U	2	
	e)	Explain with neat sketch construction and working of thermocouple.	U	3	
	f)	Differentiate between RTD (Resistors thermometer) and thermistor.	A	3	

P.T.O

QN	SQN	Question Text	R/U/A	Co MEG 316	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List different obstruction flow meters.	R	4	
	b)	Define uniform flow.	U	4	
	c)	State the materials of tube and float of rotameter.	A	4	
	d)	List types of microphones.	R	6	
	e)	Name the different direct liquid level measurement devices.	A	6	
	f)	State limitations of capacitive type liquid level meter.	U	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain variable area meter with neat sketch.	U	4	
	b)	Explain oscillating piston flow meter.	R	4	
	c)	Explain in brief carbon microphone.	R	6	
	d)	Explain briefly with neat sketch shaft and float guage liquid level measurement device.	U	6	
	e)	State advantages of stroboscope.	U	5	
	f)	Write selection and installation of strain gauges.	A	5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain turbine type flowmeter with neat sketch.	U	4	
	b)	Explain Gama liquid level sensor with sketch.	A	6	
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	d)	State requirements of an ideal strain gauge.	A	3	
	e)	Explain A.C. Tachogenerator.	A	5	
	f)	Give desirable characteristics of grid material.	A	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER-WINTER- 20

EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : Mech. Engg.

COURSE CODE :- MEG403

COURSE NAME :- Advanced Machining Processes

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

Instruction :-

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

SECTION 1

QN	SQN	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Classify non-traditional machining process.	R	MEG 403-3	
	b)	Write function of dielectric fluid in EDM.	R	MEG 403-3	
	c)	Write working principle of milling.	A	MEG 403-1	
	d)	Draw suitable sketch of any two milling cutter.	U	MEG 403-1	
	e)	What is indexing. Enlist its types.	R	MEG 403-2	
	f)	State the need of gear finishing process.	U	MEG 403-2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Differentiate between EDM and LBM process.	U	MEG 403-3	
	b)	Explain with neat sketch working of Electrochemical machining process.	A	MEG 403-3	
	c)	Draw neat labeled sketch of column and knee type milling machine.	R	MEG 403-1	
	d)	Explain side and straddle milling operation with neat sketch.	U	MEG 403-1	
	e)	Explain parameters needed to completely specify column and knee type milling machine.	U	MEG 403-1	
	f)	Explain procedure for indexing 69 division by compound indexing.	A	MEG 403-2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain the effect of process parameters on metal removal rate in EDM process.	U	MEG 403-3	
	b)	Explain with neat sketch set up element of WEDM process.	U	MEG 403-3	
	c)	Differentiate between up milling and down milling.	U	MEG 403-1	
	d)	Explain the operation of cutting T slot with suitable sketch.	A	MEG 403-1	
	e)	Explain with neat sketch gear hobbing process.	U	MEG 403-2	
	f)	Describe rack cutter gear shaping process.	U	MEG 403-1	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER - 2023

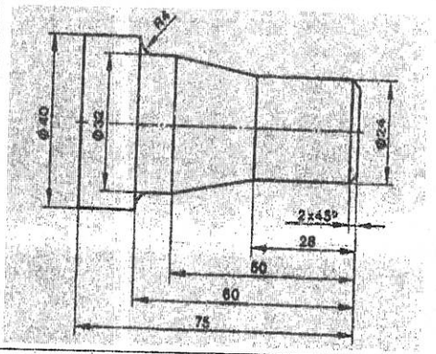
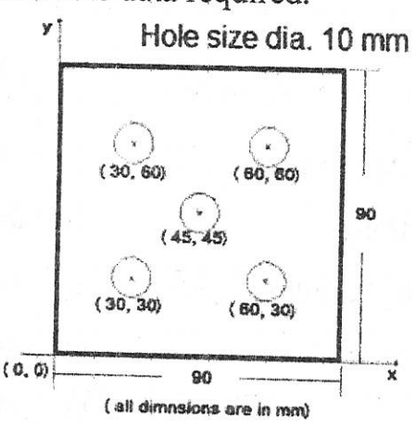
EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : MECHANICAL

COURSE CODE :- MEG 403

COURSE NAME :- ADVANCED MACHINING PROCESSES

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

QN	SQN	SECTION –II	R/U/A	Co MEG 403	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Write limitations of CNC machines.	R	4	
	b)	Write process of Tool change in CNC machines.	R	4	
	c)	Write advantages of Closed loop control system over open loop.	U	4	
	d)	Draw axis used in CNC Lathe machine.	U	4	
	e)	Write meaning of Circular Interpolation Function (G02).	U	4	
	f)	Write meaning of low cost automation.	R	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	In a CNC program write the meaning of block "N004 G02 G91 X60 Z20"	A	4	
	b)	Explain Universal Machining Centre.	R	4	
	c)	Explain incremental co-ordinate systems used in CNC programming and write when it is useful.	U	4	
	d)	Explain the use of 'Canned cycle' in CNC programming.	A	4	
	e)	Define and explain Group Technology concept.	U	5	
	f)	Explain the concept of FMS.	U	5	
Q.6		Attempt any **TWO:**			**16**
	a)	Prepare a part program to machine work piece as shown in figure below on a CNC lathe. Assume suitable data. All dimensions are in mm. 	A	4	
	b)	Prepare a part program to drill holes as shown in figure below on a CNC milling. Neglect cutter radius compensation and assume suitable data required. 	A	4	
	c)	Explain various components of Robot with their applications.	U	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER-WINTER- 20

EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : Mech. Engg.

COURSE CODE :- MEG403

COURSE NAME :- Advanced Machining Processes

MAX. MARKS : **80** TIME : **03Hrs.** DATE :-02/12/ 2022

Instruction :-

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

SECTION 1

QN	SQN	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Classify non-traditional machining process.	R	MEG 403-3	
	b)	Write function of dielectric fluid in EDM.	R	MEG 403-3	
	c)	Write working principle of milling.	A	MEG 403-1	
	d)	Draw suitable sketch of any two milling cutter.	U	MEG 403-1	
	e)	What is indexing. Enlist its types.	R	MEG 403-2	
	f)	State the need of gear finishing process.	U	MEG 403-2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Differentiate between EDM and LBM process.	U	MEG 403-3	
	b)	Explain with neat sketch working of Electrochemical machining process.	A	MEG 403-3	
	c)	Draw neat labeled sketch of column and knee type milling machine.	R	MEG 403-1	
	d)	Explain side and straddle milling operation with neat sketch.	U	MEG 403-1	
	e)	Explain parameters needed to completely specify column and knee type milling machine.	U	MEG 403-1	
	f)	Explain procedure for indexing 69 division by compound indexing.	A	MEG 403-2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain the effect of process parameters on metal removal rate in EDM process.	U	MEG 403-3	
	b)	Explain with neat sketch set up element of WEDM process.	U	MEG 403-3	
	c)	Differentiate between up milling and down milling.	U	MEG 403-1	
	d)	Explain the operation of cutting T slot with suitable sketch.	A	MEG 403-1	
	e)	Explain with neat sketch gear hobbing process.	U	MEG 403-2	
	f)	Describe rack cutter gear shaping process.	U	MEG 403-1	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER - 2023

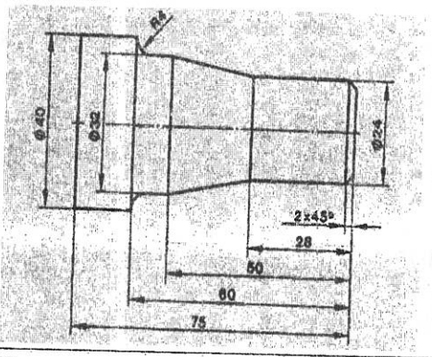
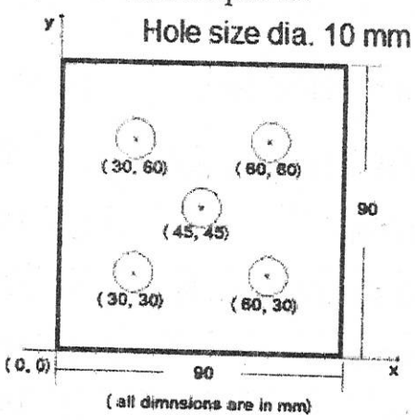
EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : MECHANICAL

COURSE CODE :- MEG 403

COURSE NAME :- ADVANCED MACHINING PROCESSES

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

QN	SQN	SECTION –II	R/U/A	Co MEG 403	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Write limitations of CNC machines.	R	4	
	b)	Write process of Tool change in CNC machines.	R	4	
	c)	Write advantages of Closed loop control system over open loop.	U	4	
	d)	Draw axis used in CNC Lathe machine.	U	4	
	e)	Write meaning of Circular Interpolation Function (G02).	U	4	
	f)	Write meaning of low cost automation.	R	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	In a CNC program write the meaning of block "N004 G02 G91 X60 Z20"	A	4	
	b)	Explain Universal Machining Centre.	R	4	
	c)	Explain incremental co-ordinate systems used in CNC programming and write when it is useful.	U	4	
	d)	Explain the use of 'Canned cycle' in CNC programming.	A	4	
	e)	Define and explain Group Technology concept.	U	5	
	f)	Explain the concept of FMS.	U	5	
Q.6		Attempt any **TWO:**			**16**
	a)	Prepare a part program to machine work piece as shown in figure below on a CNC lathe. Assume suitable data. All dimensions are in mm. 	A	4	
	b)	Prepare a part program to drill holes as shown in figure below on a CNC milling. Neglect cutter radius compensation and assume suitable data required. 	A	4	
	c)	Explain various components of Robot with their applications.	U	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG503 COURSE NAME :- INDUSTRIAL ENGINEERING

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

Instruction :-

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

QN	S QN	**SECTION -I**	R/ U/ A	Co MEG 503	Ma rks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define Productivity.	R	1	2
	b)	State the factors affecting site selection.	R	2	2
	c)	State the need for material handling	U	2	2
	d)	State the functions of dispatching	R	3	2
	e)	State the meaning of Plant efficiency	R	3	2
	f)	Enlist the factors that govern scheduling.	R	3	2
Q.2		Attempt any **FOUR:**			**16**
	a)	Enlist various production systems. Explain any one of them	U/R	1	4
	b)	State the symptoms of bad plant layout.	U	2	4
	c)	Explain cellular technology.	U	2	4
	d)	Explain dispatch procedure in production planning and control.	U	3	4
	e)	There are seven jobs which are processed first on machine I and then on machine II. Processing time in hours are given below:	A	3	4

Job	A	B	C	D	E	F	G
Machine I	6	24	30	12	20	22	18
Machine II	16	20	20	13	24	2	6

Find the optimal sequence and total elapsed time. Compute the idle time on machine II.

	f)	Explain the factors affecting planning of process.	A	3	4
Q.3		Attempt any **FOUR:**			**16**
	a)	An assembly line produces 288 units in an 8 hour shift. The processing steps along with time required for making a unit of product is as follows:	A	3	4

Task	**Predecessor**	**Task Time (Sec)**
A	–	90
B	–	30
C	A	70
D	A, B	10
E	D	30
F	C	60
G	C	50
H	E, F, G	50

Carry out line balancing.

	b)	State the applications (uses) of various material handling instruments.	A	2	4
	c)	State the information required to decide the manufacturing sequence.	A	3	4
	d)	Explain the techniques that help in improving productivity	A	1	4
	e)	State the advantages of line balancing.	U	3	4
	f)	Explain Gantt Chart.	U	3	4

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

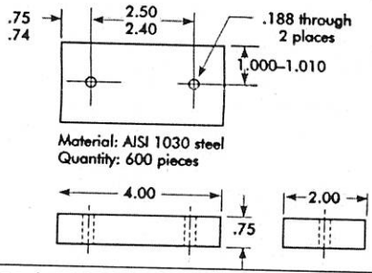
EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : MECHANICAL

COURSE CODE :- MEG 503

COURSE NAME :- INDUSTRIAL ENGINEERING

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

QN	SQN	SECTION –II	R/U/A	Co *MEG 503.*	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define Jig and fixture.	R	4	
	b)	Write function of clamping in jig and fixture.	U	4	
	c)	Define ergonomics.	R	5	
	d)	Explain man machine relationship.	U	5	
	e)	Define Work study.	R	6	
	f)	Write symbols used in charts for recording the facts.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain 3-2-1 principle of location in jig.	U	4	
	b)	Design a simple jig for drilling holes for the component shown. 	A	4	
	c)	Write four ergonomic considerations applied to types and location of display.	U	5	
	d)	Explain the use of anatomy data in design of controls.	A	5	
	e)	Explain flow process chart material type with example.	A	6	
	f)	Define allowances and write the need.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain the critical examination questions in work study.	U	6	
	b)	Operator under observation for work study observed for 2 days of 8 hours shift. He has completed 48 jobs. The performance rating is 110 and allowances are 20 %. Calculate the standard time of job in minutes.	A	6	
	c)	A job was measured five times. The observed time are 12, 13, 12, 12.5, 13 in minutes. The performance rating of operator is 120. Calculate standard time if allowances are 20%.	A	6	
	d)	Explain Just in Time manufacturing system.	R	6	
	e)	Explain concept of Flexible manufacturing system.	U	6	
	f)	Describe waste reduction by 5'S'.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - VI PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG503 COURSE NAME :- INDUSTRIAL ENGINEERING

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

Instruction :-

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

QN	S QN	**SECTION -I**	R/ U/ A	Co MEG 503	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define Productivity.	R	1	2
	b)	State the factors affecting site selection.	R	2	2
	c)	State the need for material handling	U	2	2
	d)	State the functions of dispatching	R	3	2
	e)	State the meaning of Plant efficiency	R	3	2
	f)	Enlist the factors that govern scheduling.	R	3	2
Q.2		Attempt any **FOUR:**			**16**
	a)	Enlist various production systems. Explain any one of them	U/R	1	4
	b)	State the symptoms of bad plant layout.	U	2	4
	c)	Explain cellular technology.	U	2	4
	d)	Explain dispatch procedure in production planning and control.	U	3	4
	e)	There are seven jobs which are processed first on machine I and then on machine II. Processing time in hours are given below: **Job** A B C D E F G **Machine I** 6 24 30 12 20 22 18 **Machine II** 16 20 20 13 24 2 6 Find the optimal sequence and total elapsed time. Compute the idle time on machine II.	A	3	4
	f)	Explain the factors affecting planning of process.	A	3	4
Q.3		Attempt any **FOUR:**			**16**
	a)	An assembly line produces 288 units in an 8 hour shift. The processing steps along with time required for making a unit of product is as follows: **Task** / **Predecessor** / **Task Time (Sec)** A – 90 B – 30 C A 70 D A, B 10 E D 30 F C 60 G C 50 H E, F, G 50 Carry out line balancing.	A	3	4
	b)	State the applications (uses) of various material handling instruments.	A	2	4
	c)	State the information required to decide the manufacturing sequence.	A	3	4
	d)	Explain the techniques that help in improving productivity	A	1	4
	e)	State the advantages of line balancing.	U	3	4
	f)	Explain Gantt Chart.	U	3	4

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

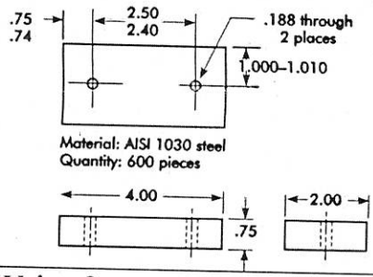
EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : MECHANICAL

COURSE CODE :- MEG 503

COURSE NAME :- INDUSTRIAL ENGINEERING

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

QN	SQN	SECTION –II	R/U/A	Co *MEG 503.*	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define Jig and fixture.	R	4	
	b)	Write function of clamping in jig and fixture.	U	4	
	c)	Define ergonomics.	R	5	
	d)	Explain man machine relationship.	U	5	
	e)	Define Work study.	R	6	
	f)	Write symbols used in charts for recording the facts.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain 3-2-1 principle of location in jig.	U	4	
	b)	Design a simple jig for drilling holes for the component shown. 	A	4	
	c)	Write four ergonomic considerations applied to types and location of display.	U	5	
	d)	Explain the use of anatomy data in design of controls.	A	5	
	e)	Explain flow process chart material type with example.	A	6	
	f)	Define allowances and write the need.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain the critical examination questions in work study.	U	6	
	b)	Operator under observation for work study observed for 2 days of 8 hours shift. He has completed 48 jobs. The performance rating is 110 and allowances are 20 %. Calculate the standard time of job in minutes.	A	6	
	c)	A job was measured five times. The observed time are 12, 13, 12, 12.5, 13 in minutes. The performance rating of operator is 120. Calculate standard time if allowances are 20%.	A	6	
	d)	Explain Just in Time manufacturing system.	R	6	
	e)	Explain concept of Flexible manufacturing system.	U	6	
	f)	Describe waste reduction by 5'S'.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER-2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM :DIPLOMA IN **MECHANICAL ENGINEERING**

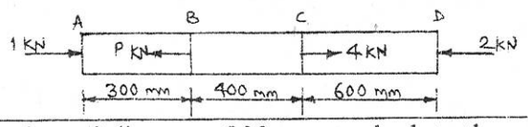
COURSE CODE :- **MEG305 / MEF305**

COURSE NAME :- **STRENGTH OF MATERIALS**

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

Instructions :-

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

QN	SQN	SECTION -I	R/U/A	Co MEG 305	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define eccentric load with neat sketch.	R	1	
	b)	State the relation between Lateral strain and Poisson's ratio for a loaded member and define volumetric strain.	R	1	
	c)	Define shear modulus of Easticity. State its SI unit.	R	1	
	d)	Write the mathematical expression for temperature stress and comment on nature.	R	1	
	e)	Define radius of gyration with its unit.	R	3	
	f)	State formulae for MI about both the centroidal axes for square section.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw and explain stress-strain curve for a ductile material showing important points.	u	1	
	b)	A square R.C.C. column of 300 mm × 300 mm in section with 8 steel bars of 20 mm diameter carries a load of 360 kN. Find the stresses induced in steel and concrete. Take modular ratio as 15.	A	1	
	c)	For a given material, Young's modulus is 110 GN/m^2 and shear modulus is 42 GN/m^2. Find the Bulk modulus and lateral contraction of a round bar of 37.5 mm diameter and 2.4 m length when stretched by 2.5 mm. when subjected to an axial load.	A	1	
	d)	A bar of length 1.5 m and 25 mm diameter subjected to an axial load of 45 kN applied suddenly. Calculate instantaneous stress and deformation if E = 210 GPa.	A	2	
	e)	Define Strain energy, proof resilience and modulus of resilience with suitable expressions.	R	2	
	f)	State and explain parallel axis theorem with neat sketch.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	A bar of uniform cross sectional area 100 mm^2 is subjected to axial forces as shown in Fig. Calculate the net change in length of the bar. Take E = 2 × 10^5 N/mm^2. 	A	1	
	b)	For a circular lamina of diameter 200 mm, calculate the moment of inertia and radius of gyration about any tangent at any point on the circle.	A	3	
	c)	Calculate the moment of inertia for an inverted T-section about its horizontal centroidal axis. Take the size of flange 100 mm × 30 mm and vertical web 30 mm × 120 mm, overall depth = 150 mm.	A	3	

P.T.O.

	d)	Derive the expression for limit of eccentricity for a rectangular section to have only one type of stress associated with loading..	U	4	
	e)	A hollow circular column having external diameter 400 mm and Internal diameter 200 mm carries a vertical load of 200 kN acting at outer edge of section. Calculate maximum and minimum stresses developed in the section.	A	4	
	f)	Calculate intensity of stresses at base of rectangular column 300 mm × 200 mm subjected to vertical load of 150 kN in a plane bisecting 200 mm side with 50 mm eccentricity.	A	4	

Q.4		Attempt any **FOUR**			**(08)**
	a)	Define torque and state it's S. I. unit.	R	8	
	b)	Define principal planes and principal stress.	R	7	
	c)	State flexural formula giving meaning of each term used.	R	6	
	d)	State any four assumptions made in the theory of simple bending.	R	6	
	e)	Draw SFD for a cantilever beam of span 'ℓ' and having a point load 'W' at the free end.	U	5	
	f)	Draw BMD for the cantilever beam in above question no. (e)	U	5	
Q.5		Attempt any **FOUR**			**(16)**
	a)	A cantilever of 2.5 m length carries a point load of 10kN at free end and udl of 5kN/m for a distance of 1m from free end. Draw SFD & BMD.	A	5	
	b)	A simply supported beam of span 'L' carries a central point load 'W'. Draw SFD & BMD.	U	5	
	c)	A symmetrical section 300mm deep has a moment of inertia of $22.6X10^6$ mm^4 about its N.A. determine the longest simply supported span of the beam to carry a udl of 4kN/m run without exceeding the bending stress of 1.25MPa.	A	6	
	d)	A cross section of the beam is a rectangle 50X150mm. the maximum shear stress is 10MPa. Calculate shear stress at i) 75mm above the N.A. ii) 50mm below the N.A.	A	6	
	e)	At a point in a strained material the principal stressed are $120N/mm^2$ and 60 N/mm^2 both tensile. Calculate normal, tangential and resultant stress and direction of resultant stress on a plane inclined at 60^0 to the direction of major principal plane.	A	7	
	f)	Find the diameter of a solid shaft, if it transmits a torque of $15X10^6$ N.mm The maximum shearing stress is not to exceed 45 N/mm^2	A	8	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Find the power that can be transmitted by a shaft 40mm diameter rotating at 200rpm. if maximum permissible shear stress is 85 MPa.	A	8	
	b)	A solid circular shaft of 100 mm diameter is transmitting power 100kW at 50 r.p.m. Calculate the intensity of shear stress in the shaft.	A	8	
	c)	A rectangular beam 300mm deep is simply supported over a span of 4m. calculate udl per meter the beam can carry if the bending stress is not exceed to 120 N/mm^2. Take I $8X10^6$ mm^4	A	6	
	d)	Draw B. M. diagram for the given beam shown in figure 1. Calculate the point of Contraflexure if any.	A	5	
	e)	Draw SFD and BMD of the beam loaded as shown in figure No. 2.	A	5	
	f)	At a point in a strained material there are two mutually perpendicular stresses of 600 N/mm^2 and 400 N/mm^2 both tensile. They are accompanied by a shear stress of 100 N/mm^2 Calculate i) Principal stress ii) Position of principal planes, iii) Maximum shear stress.	A	7	

P-2/3

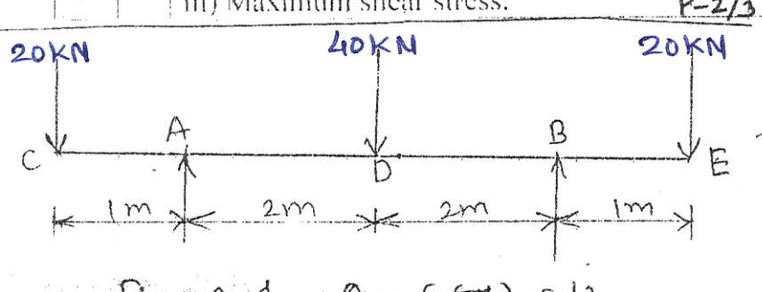


Figure 1 · Qu. 6 (d)

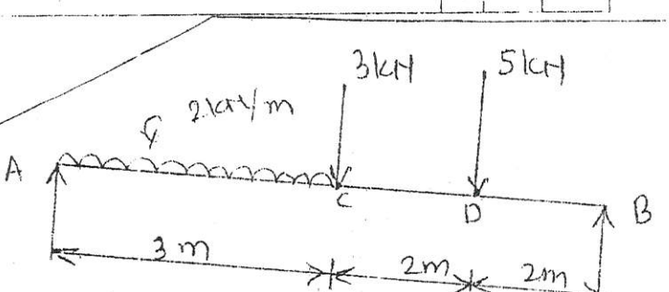


figure 2 Qu. 6 (e)

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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SUMMER/WINTER-2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM :DIPLOMA IN **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG305 / MEF305**

COURSE NAME :- **STRENGTH OF MATERIALS**

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

Instructions :-

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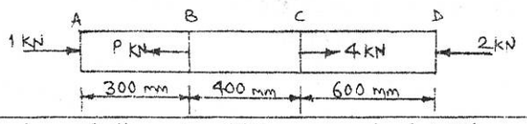
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	SECTION -I	R/U/A	Co MEG 305	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define eccentric load with neat sketch.	R	1	
	b)	State the relation between Lateral strain and Poisson's ratio for a loaded member and define volumetric strain.	R	1	
	c)	Define shear modulus of Easticity. State its SI unit.	R	1	
	d)	Write the mathematical expression for temperature stress and comment on nature.	R	1	
	e)	Define radius of gyration with its unit.	R	3	
	f)	State formulae for MI about both the centroidal axes for square section.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw and explain stress-strain curve for a ductile material showing important points.	u	1	
	b)	A square R.C.C. column of 300 mm × 300 mm in section with 8 steel bars of 20 mm diameter carries a load of 360 kN. Find the stresses induced in steel and concrete. Take modular ratio as 15.	A	1	
	c)	For a given material, Young's modulus is 110 GN/m^2 and shear modulus is 42 GN/m^2. Find the Bulk modulus and lateral contraction of a round bar of 37.5 mm diameter and 2.4 m length when stretched by 2.5 mm. when subjected to an axial load.	A	1	
	d)	A bar of length 1.5 m and 25 mm diameter subjected to an axial load of 45 kN applied suddenly. Calculate instantaneous stress and deformation if E = 210 GPa.	A	2	
	e)	Define Strain energy, proof resilience and modulus of resilience with suitable expressions.	R	2	
	f)	State and explain parallel axis theorem with neat sketch.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	A bar of uniform cross sectional area 100 mm^2 is subjected to axial forces as shown in Fig. Calculate the net change in length of the bar. Take E = 2 × 10^5 N/mm^2. 	A	1	
	b)	For a circular lamina of diameter 200 mm, calculate the moment of inertia and radius of gyration about any tangent at any point on the circle.	A	3	
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P.T.O.

	d)	Derive the expression for limit of eccentricity for a rectangular section to have only one type of stress associated with loading..	U	4	
	e)	A hollow circular column having external diameter 400 mm and Internal diameter 200 mm carries a vertical load of 200 kN acting at outer edge of section. Calculate maximum and minimum stresses developed in the section.	A	4	
	f)	Calculate intensity of stresses at base of rectangular column 300 mm × 200 mm subjected to vertical load of 150 kN in a plane bisecting 200 mm side with 50 mm eccentricity.	A	4	

Q.4		Attempt any **FOUR**			**(08)**
	a)	Define torque and state it's S. I. unit.	R	8	
	b)	Define principal planes and principal stress.	R	7	
	c)	State flexural formula giving meaning of each term used.	R	6	
	d)	State any four assumptions made in the theory of simple bending.	R	6	
	e)	Draw SFD for a cantilever beam of span 'ℓ' and having a point load 'W' at the free end.	U	5	
	f)	Draw BMD for the cantilever beam in above question no. (e)	U	5	
Q.5		Attempt any **FOUR**			**(16)**
	a)	A cantilever of 2.5 m length carries a point load of 10kN at free end and udl of 5kN/m for a distance of 1m from free end. Draw SFD & BMD.	A	5	
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Q.6		Attempt any **FOUR**			**(16)**
	a)	Find the power that can be transmitted by a shaft 40mm diameter rotating at 200rpm. if maximum permissible shear stress is 85 MPa.	A	8	
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	d)	Draw B. M. diagram for the given beam shown in figure 1. Calculate the point of Contraflexure if any.	A	5	
	e)	Draw SFD and BMD of the beam loaded as shown in figure No. 2.	A	5	
	f)	At a point in a strained material there are two mutually perpendicular stresses of 600 N/mm^2 and 400 N/mm^2 both tensile. They are accompanied by a shear stress of 100 N/mm^2 Calculate i) Principal stress ii) Position of principal planes, iii) Maximum shear stress.	A	7	

P-2/3

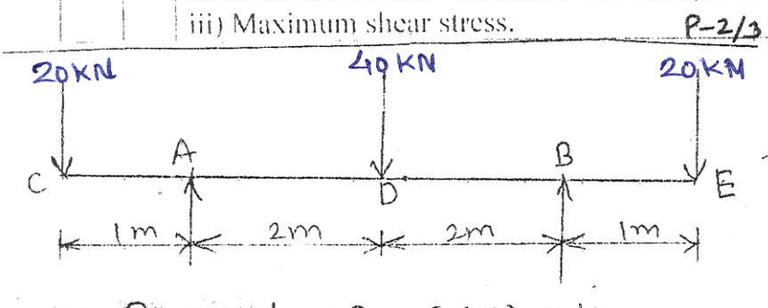

Figure 1 ·Qu. 6 (d)

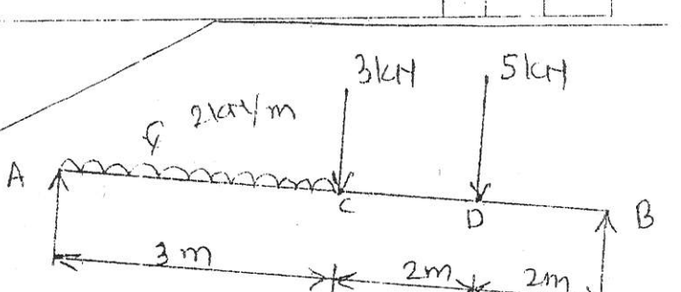

figure 2 Qu. 6(e)

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG302**

COURSE NAME **THERMAL ENGINEERING**

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

Instruction :-

1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
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7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co MEG 302	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State what is "cyclic process".	R	1	
	b)	Define isolated system and give its an example.	R	1	
	c)	Give any one clausius statement of second law of thermodynamic.	U	2	
	d)	Represent graphically "Charle's Law".	U	2	
	e)	A sample of an ideal gas occupies $20m^3$ under a pressure of 0.5 bar and under isothermal condition. On increasing its pressure to 1.0 bar. What will be its volume?	A	2	
	f)	State what is forced convection heat transfer?	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	State with examples what are intensive and extensive properties?	R	1	
	b)	Using first law of thermodynamics derive steady flow energy equations for open system.	U	2	
	c)	3kg of air in a rigid and perfectly insulated vessel of $0.15m^3$ capacity at 150KPa pressure are stirred until the pressure becomes 750KPa. Determine the work input. Take R=287Nm/KgK and C_v=717 J/KgK.	A	2	
	d)	State the equations of work and heat, with P-V and T-S diagram for Adiabatic process.	U	3	
	e)	Explain the conduction mode of heat transfer.	R	3	
	f)	An iron plate with area $1.5m^2$ and thickness 0.03m, is maintained 80^0C with one surface and other at 40^0Cand a heat at the rate of 140KW was supplied across it. Determine the thermal conductivity of the hot plate.	A	3	
Q.3		Attempt any **TWO:**			**16**
	a)	Define thermodynamic system. Explain with neat sketch various types of thermodynamic systems. Briefly explain thermodynamic equilibrium.	R	1	
	b)	With schematic diagram show that violation of Kelvin planks statement of second law of thermodynamic leads to the violation of clausious statement. State clausious statement of second law of thermodynamics.	U	2	
	c)	With P-V & T-S diagram explain constant pressure process. A sealed and evacuated drum of volume $0.2m^3$ contains saturated water at 64.56^0C. It is heated till the pressure and temperature of steam becomes 15 bar and 260^0C respectively. Calculate i) The man of water contained in the drum. ii) The heat required.	A	2	

P.T.O

QN	SQN	Question Text	R/U/A	Co MEG 302	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Determine the dryness fraction of steam if 0.8kg of water is in suspension with 45kg of dry steam.	A	4	
	b)	Define Nozzle efficiency.	R	6	
	c)	Define sensible heat of water.	R	4	
	d)	Write any two boiler mountings and any two boiler accessories.	R	5	
	e)	State Dalton's Law of Partial Prenure.	R	6	
	f)	Define the term "Boiler mounting".	R	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	With a neat labelled h-s diagram explain in brief formation of steam.	U	4	
	b)	i) Sketch Bourdon Tube Prenure gauge. ii) Draw a neat sketch of Carnot cycle.	U U	4 6	
	c)	i) Explain why steam Nozzles are used in steam turbine. ii) State the objectives of condenser.	U R	6 6	
	d)	Describe the method of reheat of steam to improve turbine efficiency.	U	6	
	e)	Write classification of steam turbine.	R	6	
	f)	What are the sources of air leakage in condenser and effects of air leakage in condenser?	U	6	
Q.6		Attempt any **TWO:**			**16**
	a)	i) Internal energy of 1kg mass of steam at 10 bar absolute Pressure is 2400 KJ. Calculate the dryness fraction of the steam at 10 bar Pressure, data from steam table. Saturation temperature, $T_{sat} = 179.91^0C$ Enthalpy of water = $h_f = 762.82$ KJ/Kg Enthalpy of saturated steam = $h_g = 2778.1$KJ/Kg Latent heat = $h_{fg} = 2015.3$ KJ/kg. Specific volume of steam = $V_g = 01944\ m^3/Kg$. ii) Show the steam Pressure and velocity distribution for an impulse turbine.	A A	4 6	
	b)	Explain with a neat sketch Benson boiler.	U	5	
	c)	i) What type of condenser will you employ if the condensate is to be directly fed to the boiler? Give reasons. ii) Define 1) Wet steam 2) Dry saturated steam 3) Superheated steam 4) Critical point	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG302**

COURSE NAME **THERMAL ENGINEERING**

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

Instruction :-

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7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co MEG 302	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State what is "cyclic process".	R	1	
	b)	Define isolated system and give its an example.	R	1	
	c)	Give any one clausius statement of second law of thermodynamic.	U	2	
	d)	Represent graphically "Charle's Law".	U	2	
	e)	A sample of an ideal gas occupies $20m^3$ under a pressure of 0.5 bar and under isothermal condition. On increasing its pressure to 1.0 bar. What will be its volume?	A	2	
	f)	State what is forced convection heat transfer?	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	State with examples what are intensive and extensive properties?	R	1	
	b)	Using first law of thermodynamics derive steady flow energy equations for open system.	U	2	
	c)	3kg of air in a rigid and perfectly insulated vessel of $0.15m^3$ capacity at 150KPa pressure are stirred until the pressure becomes 750KPa. Determine the work input. Take R=287Nm/KgK and C_v=717 J/KgK.	A	2	
	d)	State the equations of work and heat, with P-V and T-S diagram for Adiabatic process.	U	3	
	e)	Explain the conduction mode of heat transfer.	R	3	
	f)	An iron plate with area $1.5m^2$ and thickness 0.03m, is maintained 80^0C with one surface and other at 40^0Cand a heat at the rate of 140KW was supplied across it. Determine the thermal conductivity of the hot plate.	A	3	
Q.3		Attempt any **TWO:**			**16**
	a)	Define thermodynamic system. Explain with neat sketch various types of thermodynamic systems. Briefly explain thermodynamic equilibrium.	R	1	
	b)	With schematic diagram show that violation of Kelvin planks statement of second law of thermodynamic leads to the violation of clausious statement. State clausious statement of second law of thermodynamics.	U	2	
	c)	With P-V & T-S diagram explain constant pressure process. A sealed and evacuated drum of volume $0.2m^3$ contains saturated water at 64.56^0C. It is heated till the pressure and temperature of steam becomes 15 bar and 260^0C respectively. Calculate i) The man of water contained in the drum. ii) The heat required.	A	2	

P.T.O

QN	SQN	Question Text	R/U/A	Co MEG 302	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Determine the dryness fraction of steam if 0.8kg of water is in suspension with 45kg of dry steam.	A	4	
	b)	Define Nozzle efficiency.	R	6	
	c)	Define sensible heat of water.	R	4	
	d)	Write any two boiler mountings and any two boiler accessories.	R	5	
	e)	State Dalton's Law of Partial Prenure.	R	6	
	f)	Define the term "Boiler mounting".	R	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	With a neat labelled h-s diagram explain in brief formation of steam.	U	4	
	b)	i) Sketch Bourdon Tube Prenure gauge. ii) Draw a neat sketch of Carnot cycle.	U U	4 6	
	c)	i) Explain why steam Nozzles are used in steam turbine. ii) State the objectives of condenser.	U R	6 6	
	d)	Describe the method of reheat of steam to improve turbine efficiency.	U	6	
	e)	Write classification of steam turbine.	R	6	
	f)	What are the sources of air leakage in condenser and effects of air leakage in condenser?	U	6	
Q.6		Attempt any **TWO:**			**16**
	a)	i) Internal energy of 1kg mass of steam at 10 bar absolute Pressure is 2400 KJ. Calculate the dryness fraction of the steam at 10 bar Pressure, data from steam table. Saturation temperature, $T_{sat} = 179.91^0C$ Enthalpy of water = $h_f = 762.82$ KJ/Kg Enthalpy of saturated steam = $h_g = 2778.1$KJ/Kg Latent heat = $h_{fg} = 2015.3$ KJ/kg. Specific volume of steam = $V_g = 01944\ m^3/Kg$. ii) Show the steam Pressure and velocity distribution for an impulse turbine.	A A	4 6	
	b)	Explain with a neat sketch Benson boiler.	U	5	
	c)	i) What type of condenser will you employ if the condensate is to be directly fed to the boiler? Give reasons. ii) Define 1) Wet steam 2) Dry saturated steam 3) Superheated steam 4) Critical point	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - FOURTH PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG 406FLUID MECHANICS AND MACHINERY

COURSE NAME :- Fluid Mechanics and Machinery

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 05/12/23

Instruction :-

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

QN	SQN	SECTION -I	R/ U/ A	CO	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Define vapour pressure.	R	MEG 406-1	
	b)	Define dynamic viscosity and state its unit..	R	MEG 406-1	
	c)	Differentiate between liquid and gases .	U	MEG 406-1	
	d)	Define ideal fluid and real fluid.	R	MEG 406-1	
	e)	Define laminar flow and turbulent flow,	R	MEG 406-2	
	f)	Determine pressure 5 m below free surface of water.	A	MEG 406-1	
Q.2		Attempt any **FOUR:**			16
	a)	Determine total pressure and centre of pressure on a plane rectangular surface 1 m wide and 3 m deep when its upper edge is horizontal and 2 m below free water surface.	A	MEG 406-1	
	b)	A differential manometer is connected with two points at the same level in a pipe containing liquid of specific gravity 0.85 as shown in fig1find difference of pressure if difference of mercury level is 150 mm.	A	MEG 406-1	
	c)	Explain with neat sketch working of Venturimeter.	U	MEG 406-1	
	d)	A pipe of diameter 0.6 m branches into two pipes of dia 0.4 m and 0.3 m . The average velocity in main pipe is 4.5 m/s. .Determine the velocity in the 0.3 m diameter pipe if the average velocity in 0.4 m pipe is 3.5 m/s.	A	MEG 406-2	
	e)	Explain hydraulic gradient line and total energy line with neat sketch.	U	MEG 406-3	
	f)	State laws of fluid friction for laminar flow and turbulent flow.	R	MEG 406-3	
Q.3		Attempt any **FOUR:**			16
	a)	Define and show relationship between atmospheric pressure , gauge pressure, vaccum pressure and absolute pressure on a chart.	U	MEG 406-1	
	b)	A simple U tube manometer is used to measure pressure of water flowing in a pipe .The manometer containing mercury shows reading as shown in fig2.Find pressure in pipe.	A	MEG 406-1	
	c)	Derive equation for discharge through Venturimeter,	U	MEG 406-2	
	d)	State Bernoulli's theorem and its limitations.	R	MEG 406-2	
	e)	Classify losses in pipes. State Darcy's equation.	U	MEG 406-1	
	f)	A pipe of diameter 300 mm and length 3500 m is used for transmission of power by water . The total head available at the inlet of pipe is 500 m. find maximum power available at outlet of pipe if value of $f = 0.006$.	A	MEG 406-3	

P.T.O.

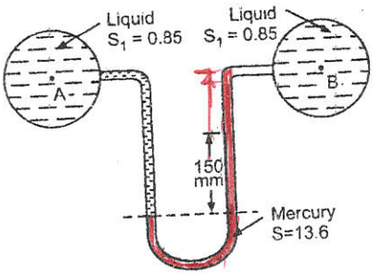

Fig. 1

Q. 2. b)

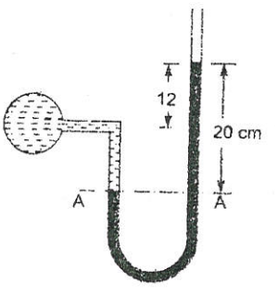

Fig. 2.

Q. 3. b.

QN	S QN	SECTION –II	R/ U/ A	CO MEG 406	Marks
Q.4		Attempt any **FOUR:**			08
	a)	State the formula to calculate force exerted by jet of fluid in the direction normal to the stationary vertical plate.	R	4	
	b)	Define the terms 1) Gross Head 2) Net Head	R	5	
	c)	State the applications of Centrifugal pump. (any two)	R	6	
	d)	Write the formula to calculate force exerted by a jet of fluid on the flat moving plate when the jet strikes the plate at the center.	R	4	
	e)	State the function of draft tube.	R	5	
	f)	List the four basic components of reciprocating pump.	R	6	
Q.5		Attempt any **FOUR:**			16
	a)	Explain the construction & working of a hydroelectric power plant with neat sketch.	U	5	
	b)	Differentiate between Francis turbine with Kaplan turbine.	U	5	
	c)	A Pelton wheel develops 95.6475 kW shaft power under a head of 60 m of water. It rotates at 200 rpm. Overall efficiency is 85% and co-efficient of the velocity is equal to 0.98. Calculate: 1) Discharge 2) Diameter of the jet	A	5	
	d)	Draw indicator diagrams of a reciprocating pump showing the effect of acceleration on suction and delivery pipes.	U	6	
	e)	Explain the construction & working of Centrifugal pump with neat sketch.	U	6	
	f)	A centrifugal pump has the following characteristics: Outer diameter of impeller = 800 mm; width of impeller vanes at outlet = 100 mm; angle of impeller vanes at outlet = 40°. The impeller runs at 550 rpm and delivers 0.98 m^3 of water per second under an effective head of 35 m. Determine Manometric efficiency assuming water enters the impeller vanes radially at inlet.	A	6	
Q.6		Attempt any **FOUR:**			16
	a)	A jet of water having 40 mm diameter moving at a velocity of 20 m/s, strikes normally a flat smooth plate. Determine the thrust on the plate: 1) If the plate is at rest. 2) If the plate is moving in the same direction as the jet with a velocity of 10 m/s.	A	4	
	b)	Draw neat sketches different types of draft tubes used in reaction turbines.	U	5	
	c)	Select suitable turbine for following conditions: 1) High head and low discharge 2) Low head and high discharge 3) Specific speed between 60 to 400 4) Medium head and high discharge	A	5	
	d)	In a Francis Turbine the inlet diameter of wheel is 0.5 m. The width of the wheel at inlet is 150 mm and the velocity of flow at inlet is 1.5 m/s. Find the rate of flow passing through the turbine.	A	5	
	e)	Differentiate between centrifugal pump and reciprocating pump.	U	6	
	f)	A single acting reciprocating pump running at 50 rpm delivers 0.00736 m^3/s of water. The diameter of piston is 200 mm and stroke length is 300 mm, the suction and delivery heads are 3.5 m and 11.5 m respectively. Determine: 1) Theoretical discharge 2) Slip	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - FOURTH PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEG 406FLUID MECHANICS AND MACHINERY

COURSE NAME :- Fluid Mechanics and Machinery

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 05/12/23

Instruction :-

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

QN	SQN	SECTION -I	R/ U/ A	CO	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Define vapour pressure.	R	MEG 406-1	
	b)	Define dynamic viscosity and state its unit..	R	MEG 406-1	
	c)	Differentiate between liquid and gases .	U	MEG 406-1	
	d)	Define ideal fluid and real fluid.	R	MEG 406-1	
	e)	Define laminar flow and turbulent flow,	R	MEG 406-2	
	f)	Determine pressure 5 m below free surface of water.	A	MEG 406-1	
Q.2		Attempt any **FOUR:**			16
	a)	Determine total pressure and centre of pressure on a plane rectangular surface 1 m wide and 3 m deep when its upper edge is horizontal and 2 m below free water surface.	A	MEG 406-1	
	b)	A differential manometer is connected with two points at the same level in a pipe containing liquid of specific gravity 0.85 as shown in fig1find difference of pressure if difference of mercury level is 150 mm.	A	MEG 406-1	
	c)	Explain with neat sketch working of Venturimeter.	U	MEG 406-1	
	d)	A pipe of diameter 0.6 m branches into two pipes of dia 0.4 m and 0.3 m . The average velocity in main pipe is 4.5 m/s. .Determine the velocity in the 0.3 m diameter pipe if the average velocity in 0.4 m pipe is 3.5 m/s.	A	MEG 406-2	
	e)	Explain hydraulic gradient line and total energy line with neat sketch.	U	MEG 406-3	
	f)	State laws of fluid friction for laminar flow and turbulent flow.	R	MEG 406-3	
Q.3		Attempt any **FOUR:**			16
	a)	Define and show relationship between atmospheric pressure , gauge pressure, vaccum pressure and absolute pressure on a chart.	U	MEG 406-1	
	b)	A simple U tube manometer is used to measure pressure of water flowing in a pipe .The manometer containing mercury shows reading as shown in fig2.Find pressure in pipe.	A	MEG 406-1	
	c)	Derive equation for discharge through Venturimeter,	U	MEG 406-2	
	d)	State Bernoulli's theorem and its limitations.	R	MEG 406-2	
	e)	Classify losses in pipes. State Darcy's equation.	U	MEG 406-1	
	f)	A pipe of diameter 300 mm and length 3500 m is used for transmission of power by water . The total head available at the inlet of pipe is 500 m. find maximum power available at outlet of pipe if value of f = 0.006.	A	MEG 406-3	

P.T.O.

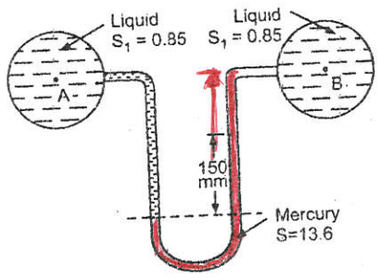

fig. 1

Q. 2. b)

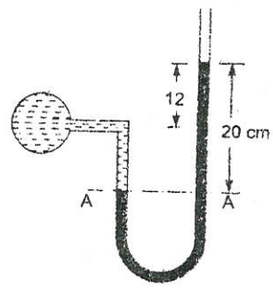

fig. 2.

Q. 3. b.

QN	S QN	SECTION –II	R/ U/ A	CO MEG 406	Marks
Q.4		Attempt any **FOUR:**			08
	a)	State the formula to calculate force exerted by jet of fluid in the direction normal to the stationary vertical plate.	R	4	
	b)	Define the terms 1) Gross Head 2) Net Head	R	5	
	c)	State the applications of Centrifugal pump. (any two)	R	6	
	d)	Write the formula to calculate force exerted by a jet of fluid on the flat moving plate when the jet strikes the plate at the center.	R	4	
	e)	State the function of draft tube.	R	5	
	f)	List the four basic components of reciprocating pump.	R	6	
Q.5		Attempt any **FOUR:**			16
	a)	Explain the construction & working of a hydroelectric power plant with neat sketch.	U	5	
	b)	Differentiate between Francis turbine with Kaplan turbine.	U	5	
	c)	A Pelton wheel develops 95.6475 kW shaft power under a head of 60 m of water. It rotates at 200 rpm. Overall efficiency is 85% and co-efficient of the velocity is equal to 0.98. Calculate: 1) Discharge 2) Diameter of the jet	A	5	
	d)	Draw indicator diagrams of a reciprocating pump showing the effect of acceleration on suction and delivery pipes.	U	6	
	e)	Explain the construction & working of Centrifugal pump with neat sketch.	U	6	
	f)	A centrifugal pump has the following characteristics: Outer diameter of impeller = 800 mm; width of impeller vanes at outlet = 100 mm; angle of impeller vanes at outlet = 40°. The impeller runs at 550 rpm and delivers 0.98 m^3 of water per second under an effective head of 35 m. Determine Manometric efficiency assuming water enters the impeller vanes radially at inlet.	A	6	
Q.6		Attempt any **FOUR:**			16
	a)	A jet of water having 40 mm diameter moving at a velocity of 20 m/s, strikes normally a flat smooth plate. Determine the thrust on the plate: 1) If the plate is at rest. 2) If the plate is moving in the same direction as the jet with a velocity of 10 m/s.	A	4	
	b)	Draw neat sketches different types of draft tubes used in reaction turbines.	U	5	
	c)	Select suitable turbine for following conditions: 1) High head and low discharge 2) Low head and high discharge 3) Specific speed between 60 to 400 4) Medium head and high discharge	A	5	
	d)	In a Francis Turbine the inlet diameter of wheel is 0.5 m. The width of the wheel at inlet is 150 mm and the velocity of flow at inlet is1.5 m/s. Find the rate of flow passing through the turbine.	A	5	
	e)	Differentiate between centrifugal pump and reciprocating pump.	U	6	
	f)	A single acting reciprocating pump running at 50 rpm delivers 0.00736 m^3/s of water. The diameter of piston is 200 mm and stroke length is 300 mm, the suction and delivery heads are 3.5 m and 11.5 m respectively. Determine: 1) Theoretical discharge 2) Slip	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG304**

COURSE NAME **MANUFACTURING PROCESSES**

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

Instruction :-

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

QN	SQN	Question Text	R/U/A	Co MEG 304	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State types of allowances.	R	4	
	b)	Give colour codes for loose piece and machined part.	R	1	
	c)	Give properties of moulding sand.	R	1	
	d)	State uses of core print.	U	4	
	e)	Give names of defects in casting.	R	1	
	f)	Give principle of casting.	U	4	
Q.2		Attempt any **FOUR:**			**16**
	a)	Give factors for selection of material for pattern.	R	1	
	b)	Explain sweep pattern with neat sketch.	U	4	
	c)	Give properties of moulding sand.	U	1	
	d)	Explain Green sand moulding process.	U	1	
	e)	Give difference between Hot Chamber die casting method and cold chamber die casting method.	U	4	
	f)	Describe induction furnace with neat sketch.	U	4	
Q.3		Attempt any **FOUR:**			**16**
	a)	Give characteristics of good pattern material.	R	1	
	b)	Explain Machine Moulding process.	U	4	
	c)	Explain Shell moulding process.	U	4	
	d)	Draw neat sketch of Cupola.	U	4	
	e)	Explain any two defects of casting with causes and remedies.	R	1	
	f)	Explain cold chamber die casting method with sketch.	U	1	

P.T.O

QN	SQN	Question Text	R/U/A	Co MEG 304	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define brazing.	R	1,5	
	b)	Give practical applications of spot welding.	U	1,5	
	c)	Explain principle of Extrusion.	U	1	
	d)	List any four welding defects.	R	1,5	
	e)	Name any four operations that are performed on press.	R	1	
	f)	Give classification of press.	R	1	
Q.5		Attempt any **FOUR:**			**16**
	a)	Describe with neat sketch of oxyacetylene gas welding.	U	1,5	
	b)	State the principle of resistance welding and state its types.	U	1,5	
	c)	State the advantages and limitations of soldering.	A	1,5	
	d)	Differentiate between brazing and soldering (any four points)	A	1,5	
	e)	Draw the block diagram of die set component and lable it.	A	1	
	f)	Enlist the press operations. Explain blanking operation in detail.	U	1	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain Upset forging with sketch.	U	1	
	b)	Compare hot rolling with cold rolling process. (any four points)	A	1	
	c)	Draw neat sketch of three high roll mills.	U	1	
	d)	Differentiate between open die and closed die forging.	A	1	
	e)	With neat sketch explain direct extension process.	A	1	
	f)	Enlist advantages and disadvantages of In-direct extrusion process.	R	1	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEG304**

COURSE NAME **MANUFACTURING PROCESSES**

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

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7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co MEG 304	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State types of allowances.	R	4	
	b)	Give colour codes for loose piece and machined part.	R	1	
	c)	Give properties of moulding sand.	R	1	
	d)	State uses of core print.	U	4	
	e)	Give names of defects in casting.	R	1	
	f)	Give principle of casting.	U	4	
Q.2		Attempt any **FOUR:**			**16**
	a)	Give factors for selection of material for pattern.	R	1	
	b)	Explain sweep pattern with neat sketch.	U	4	
	c)	Give properties of moulding sand.	U	1	
	d)	Explain Green sand moulding process.	U	1	
	e)	Give difference between Hot Chamber die casting method and cold chamber die casting method.	U	4	
	f)	Describe induction furnace with neat sketch.	U	4	
Q.3		Attempt any **FOUR:**			**16**
	a)	Give characteristics of good pattern material.	R	1	
	b)	Explain Machine Moulding process.	U	4	
	c)	Explain Shell moulding process.	U	4	
	d)	Draw neat sketch of Cupola.	U	4	
	e)	Explain any two defects of casting with causes and remedies.	R	1	
	f)	Explain cold chamber die casting method with sketch.	U	1	

P.T.O

QN	SQN	Question Text	R/U/A	Co MEG 304	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define brazing.	R	1,5	
	b)	Give practical applications of spot welding.	U	1,5	
	c)	Explain principle of Extrusion.	U	1	
	d)	List any four welding defects.	R	1,5	
	e)	Name any four operations that are performed on press.	R	1	
	f)	Give classification of press.	R	1	
Q.5		Attempt any **FOUR:**			**16**
	a)	Describe with neat sketch of oxyacetylene gas welding.	U	1,5	
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	f)	Enlist the press operations. Explain blanking operation in detail.	U	1	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain Upset forging with sketch.	U	1	
	b)	Compare hot rolling with cold rolling process. (any four points)	A	1	
	c)	Draw neat sketch of three high roll mills.	U	1	
	d)	Differentiate between open die and closed die forging.	A	1	
	e)	With neat sketch explain direct extension process.	A	1	
	f)	Enlist advantages and disadvantages of In-direct extrusion process.	R	1	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER- 22

EXAM SEAT NO. | | | | | | |

LEVEL : - Third PROGRAM : Mechanical Engineering

COURSE CODE :- MEG 308

COURSE NAME :- Theory of Machine

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

Instruction :-

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

QN	SQN	Question Text	R/ U/ A	CO MEG308	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Enlist the types of kinematic pairs according to the type of relative motion between the elements.	R	1	
	b)	Define the term "Inversion of mechanism".	R	1	
	c)	Draw a neat labelled sketch of Oldham's coupling.	U	1	
	d)	Define flywheel.	R	3	
	e)	Define the terms i)height of governor ii) Sleeve lift	R	3	
	f)	Write the importance of balancing.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain with neat sketch coupling rod of locomotive.	R&U	1	
	b)	Differentiate between machine and structure. (Any 4 points)	R&U	1	
	c)	The crank and connecting rod of a reciprocating engine are 200 mm and 700 mm respectively. The crank is rotating in clockwise direction at 120 rad/sec. Find with the help of Klein's construction at the instant when the crank is at 30^0 to I.D.C (Inner dead centre) i) velocity and acceleration of the piston ii) Angular velocity and angular acceleration of the connecting rod.	A	2	
	d)	Explain the method of balancing of several masses rotating in the same plane by analytical method.	R&U	3	
	e)	Explain the turning moment diagram for four stroke cycle Internal Combustion Engine.	R&U	3	
	f)	Differentiate between flywheel and Governor.	R&U		
Q.3		Attempt any **TWO:**			**16**
	a)	An engine mechanism is shown in Fig. I .The crank CB = 100mm and the connecting rod BA = 300mm with centre of Gravity G, 100mm from B. In the position shown the crankshaft has a speed of 75 rad/sec. and an angular acceleration of 1200rad/sec^2.Find i) Velocity of G and Angular velocity of AB ii) Acceleration of G and Angular acceleration of AB	A	2	

P.T.O

	b)	PQRS is a four bar chain with link PS fixed. The length of the links are PQ = 62.5mm ; and QR = 175mm ; RS = 112.5mm; PS = 200mm . The crank PQ rotates at 10rad/s clockwise. Draw the velocity and acceleration diagram when angle QPS = 60^0 and Link QR lie on the opposite side of link PS. Find the angular velocity and angular acceleration of link QR and RS	A	2	
	c)	i)Explain completely constrained motion and successfully constrained motion with suitable example. ii)With neat labelled sketch explain rotary internal combustion engine.	R&U	1	

P.T.O.

Q.3 a)

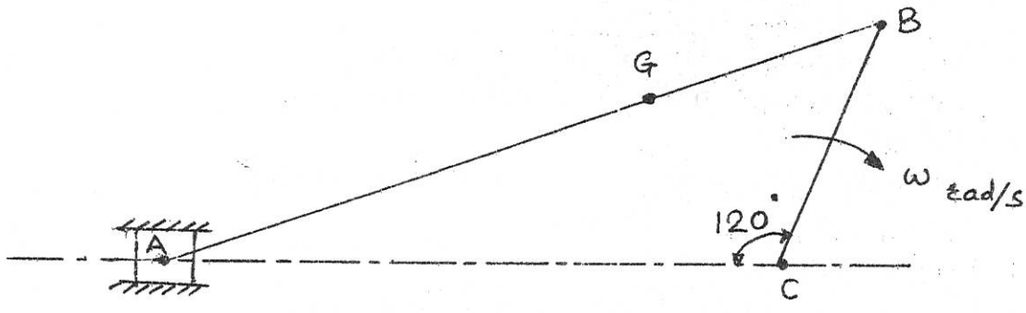

Fig. I

QN	SQN		R/U/A	CO MEG 308	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Classify the cam.	R	6	
	b)	State the function of clutch.	R	4	
	c)	List any four application of cam and follower.	R	5	
	d)	State the limitation of shoe brake.	R	6	
	e)	Define slip of the belt.	R	5	
	f)	State the limitations of knife edge follower.	A	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Write the advantages of 'V' belt drive over flat belt drive.	U	4	
	b)	Explain the working of single plate clutch with neat diagram.	U	5	
	c)	In a compound gear train the driving gears have 20 and 30 teeth respectively if the driven gears have 50and 60 teeth and driving shaft is rotating in clockwise direction at 400 rpm. Determine speed and direction of rotation of driven shaft.	U	6	
	d)	Explain with neat sketch internal expanding Brake.	A	4	
	e)	Classify follower according to surface in contact. Draw suitable sketches	A	5	
	f)	Compare open belt drive and cross Belt drive	A	6	
Q.6		Attempt any **TWO:**			**16**
	a)	Draw profile of cam operating knife edged follower from following data i) follower to move outwards through 40mm during $60^0$of cam rotation ii) follower Dwell for next 45^0. iii) follower to return to its original position during next 90^0. iv) follower to dwell for rest of rotation. The displacement of the follower is to take place with S.H.M. during both outward and return stroke. The Least radius of cam is 50 mm if the cam rotates at 300 rpm.	U	6	
	b)	Two pulleys one 450mm diameter and other 200mm diameter are on parallel shaft 1.95 M apart and are connected by cross belt drive. Find the length of the belt required and angle of contact between belt and each pulley. What power can be transmitted by belt when larger pulley rotates at 200 rpm if maximum permissible tension in the belt is 1000N , μ= 0.25	A	4	
	c)	i) A multiple clutch has three pairs of contact surface ,the outer and inner radii of contact surface are 100 mm and 50mm respectively .The maximum axial spring force is limited to 1 KN if μ= 0.35 and Assuming uniform wear. Find power transmitted by clutch at 1500 rpm. ii) Explain with neat sketch centrifugal cluth.	A	5	

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