

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM NOV./DEC.-2018**EXAM SEAT NO.**

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LEVEL :- FIFTH PROGRAM : MECHANICAL ENGINEERING**COURSE CODE :- MEE503/ME404****COURSE NAME QUALITY MANAGEMENT****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 20/12/2018****Instruction :-**

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

QN		S	Section- I	Marks
Q.1			Attempt any FOUR :	08
	a)		List any four product features for service industry.	
	b)		Define i) Serviceability ii) Durability.	
	c)		Define “Quality Assurance”.	
	d)		Give any two categories of cost associated with ‘external failure cost’.	
	e)		Give any two categories of cost associated with “Appraisal cost”.	
	f)		Define “Value of quality”.	
Q.2			Attempt any FOUR :	16
	a)		Define “Maintainability”. Explain general approaches to improve maintainability of design.	
	b)		Describe “Need of Inspection”.	
	c)		List the Role of upper management in quality.	
	d)		Define “Quality Audit”. Give the purpose of Quality Audit.	
	e)		Explain the concept “Quality Circle”.	
	f)		List the categories of “internal failure cost”.	
Q.3			Attempt any FOUR :	16
	a)		Give the fundamental topics to be included in quality policy.	
	b)		Define “Reliability”. Give the activities included in reliability programme.	
	c)		Discuss the responsibilities of “Quality Assurance”.	
	d)		List the essential ingredients for successful Quality Audit programme.	
	e)		Explain the benefits of “Quality Circle”.	
	f)		Describe the economics of “Quality of Design” and “Quality of Conformance”.	

P.T.O.

QN	S Q N	Section- II		Ma rks
Q.4		Attempt any FOUR :		08
	a)	Define mean and mode.		
	b)	Define Standard Deviation.		
	c)	What is basic concept of TQM		
	d)	What is Quality Statement		
	e)	Define Benchmarking.		
	f)	Why ISO is necessary?		
Q.5		Attempt any FOUR :		16
	a)	List the steps to prepare $\bar{X}$ and R charts		
	b)	Define process capability and state how it is achieved.		
	c)	Explain Trends and causes of $\bar{X}$ control chart on variation and shift.		
	d)	Discuss PDSA cycle in improving quality.		
	e)	List Eight quality Leaders characteristics.		
	f)	What is Deming philosophy? Explain in brief.		
Q.6		Attempt any FOUR :		16
	a)	List characteristics of successful teams.		
	b)	Explain how process flow diagram is used on tool and TQM.		
	c)	Explain theory of 5's improving Quality.		
	d)	List application of six sigma and explain principle.		
	e)	List Benefits of ISO 14000 series of standard.		
	f)	Explain Pareto diagram used in improving quality.		

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ODD TERM END EXAM NOV/DEC -2018

EXAM SEAT NO.

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LEVEL: FIFTH

PROGRAM: MECHANICAL ENGINEERING

COURSE CODE: MEE509/ME410

COURSE NAME: AUTOMOBILE ENGINEERING

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 30/11/2018

Instruction:-

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

Section – I			Marks
Q.1	Attempt any FOUR	(08)	
	a) Enlist the various types of automobile bodies.		
	b) State advantages of Rear Wheel drive.		
	c) Give classification of clutch.		
	d) Explain need of gear box.		
	e) Define camber.		
	f) What is caster ?		
Q.2	Attempt any FOUR	(16)	
	a) Draw chassis layout of automobile and explain.		
	b) Explain working of single plate clutch with neat sketch.		
	c) Enlist the design condition of gear box.		
	d) Draw and explain working of constant mesh gear box.		
	e) Explain with sketch working of over drive.		
	f) Explain construction of universal joint.		
Q.3	Attempt any FOUR	(16)	
	a) Explain with neat sketch working and construction of differential gear box.		
	b) State the requirement of steering mechanism.		
	c) List advantages of power breaking system.		
	d) Explain construction and working of master cylinder.		
	e) Differentiate between disc brake and drum brake.		
	f) Define negative scrub radius and negative camber.		
Section – II			Marks
Q.4	Attempt any FOUR	(08)	
	a) Why suspension is necessary in automobile ?		
	b) Classify suspension system.		

	c)	Give classification of tyre.		
	d)	Give specification of tyre.		
	e)	Define battery rating.		
	f)	What is the function of bendix drive ?		
Q.5		Attempt any FOUR		(16)
	a)	Explain torsion bar for rear suspension.		
	b)	Explain working of air suspension system with sketch.		
	c)	Differentiate spring and shock absorber.		
	d)	Draw neat sketch of tube tyre and label it.		
	e)	Differentiate tube and tubeless tyre.		
	f)	State various factors affecting tyre life.		
Q.6		Attempt any FOUR		(16)
	a)	Draw sketch of Battery and Label the parts.		
	b)	Explain electronic ignition system with sketch.		
	c)	Explain with neat sketch working of alternator.		
	d)	Draw working of fuel level gauge system.		
	e)	Explain construction of water temperature gauge.		
	f)	Why micro processor is used in modern vehicles ?		

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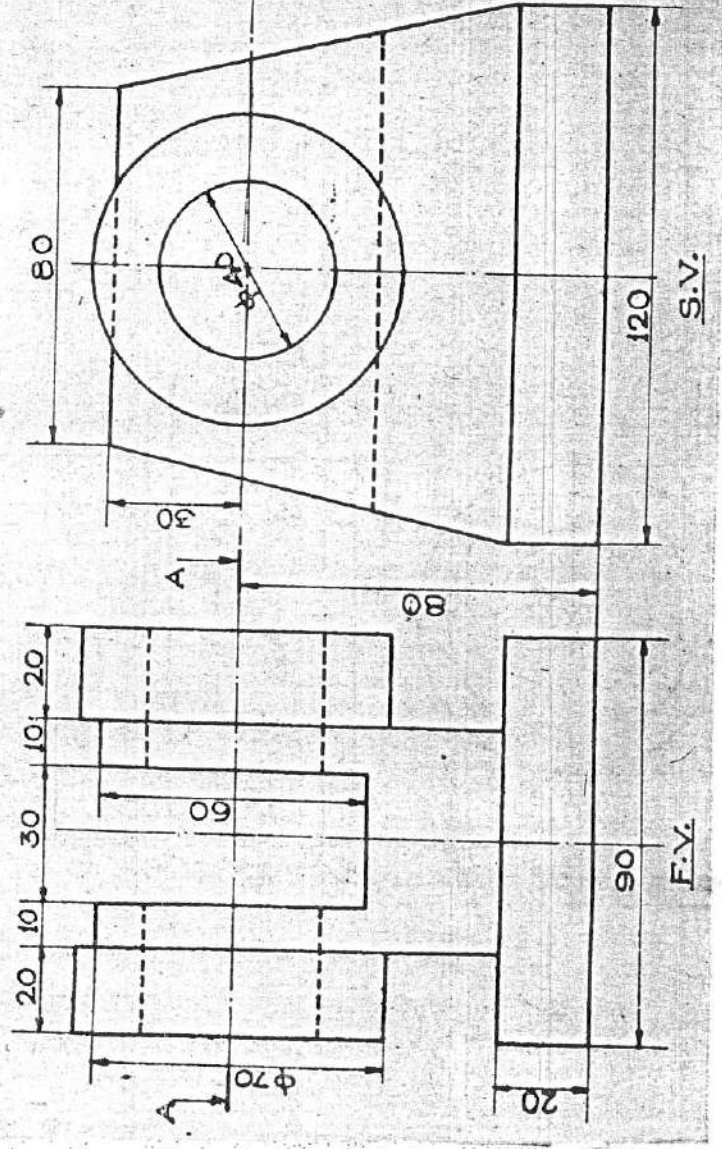
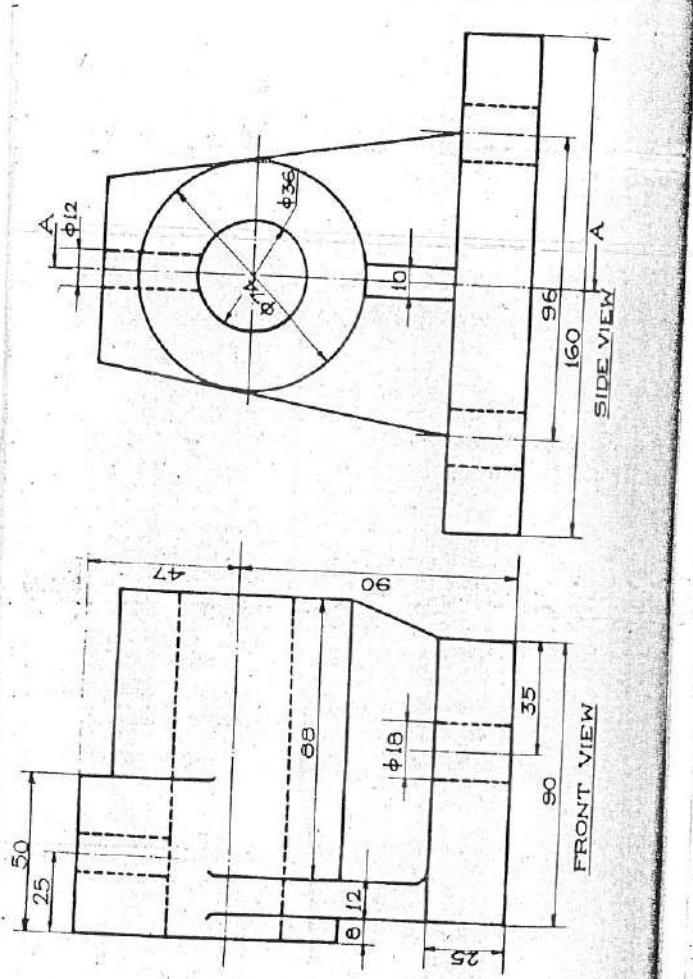
LEVEL :- FIRST PROGRAM : CE/ME/SM/MT**COURSE CODE :- CCF108/R110/CCE108/X107****COURSE NAME :- ENGINEERING DRAWING - II****MAX. MARKS : 80 TIME : 4 HRS. DATE :- 30/ 11 / 2018****Instruction :-**

- 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

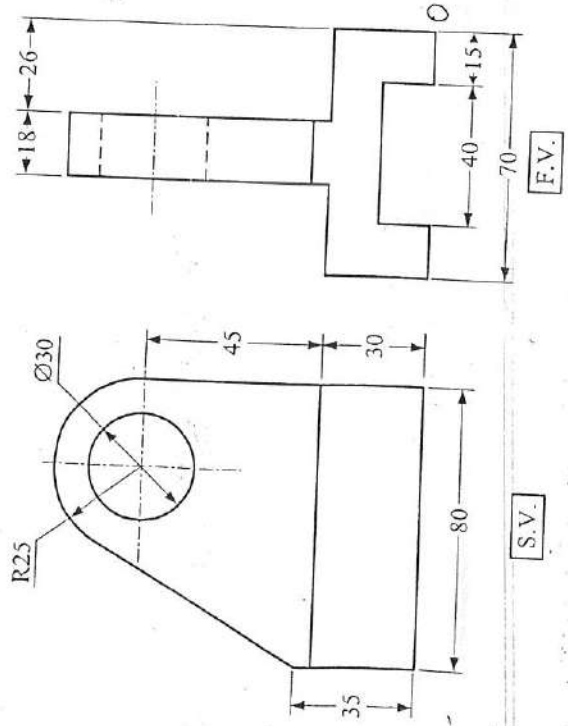
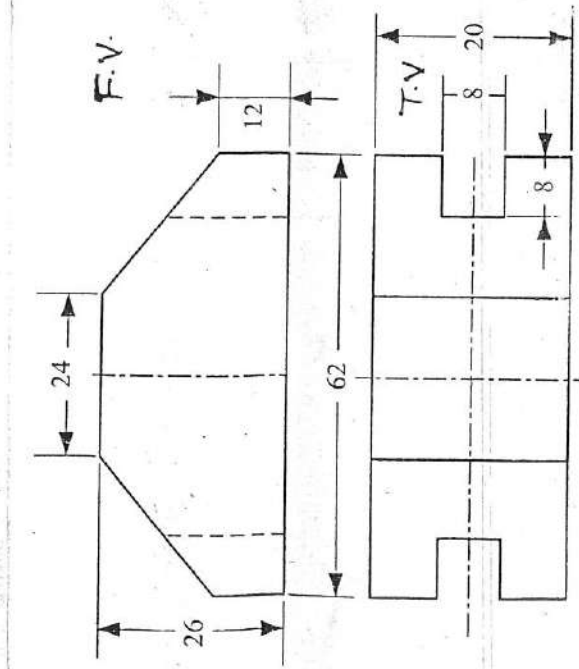
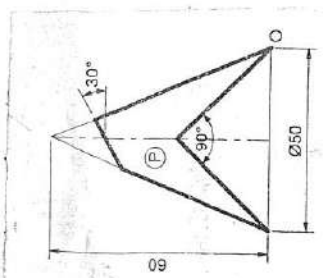
QN	S Q N	Question Text	R/ U/ A	Co CCF 108	Ma rks
Q.1		Attempt any ONE:			16
	a)	Fig. I shows a pictorial view of an C.I. bracket. Draw to scale full size, the following views by using first angle method of projection. Insert important dimensions. i) An elevation in the direction of X.----- 06 marks ii) Plan and ----- 06 marks iii) End view from left ----04 marks	U	1	
	b)	Fig. II shows pictorial view of an object. Draw following views i) Front view looking in direction X ---06 marks ii) Side view in the direction Y. ----06 marks. iii) Top view. ---4 marks. Insert suitable dimensions.	U	1	
Q.2		Attempt any ONE:			16
	a)	Fig. III shows isometric view of a machine component from following views. i) Sectional front view looking in direction X. ---08 marks (section A-A) ii) Sectional left hand side view (section B-B) – 08 marks	U	2	
	b)	Fig IV shows a pictorial view of an object. Draw to scale full size the following views, by using first angle method of projection. i) An elevation in the direction of arrow X .---06 marks ii) Plan and ---04 marks. iii) Sectional end view, section along A-A ---06 marks.	U	2	
Q.3		Draw proportionate free hand sketches for the following (any FOUR) i) Acme thread ii) Ring Nut. (2 views) iii) Castle Nut (2 views) iv) Lewis foundation bolt. v) Single rivetted (Double strap) butt joint. vi) Internal thread (2 views)	U	3	08

P.T.O 1/7

Q.4		Attempt any TWO :			08
	a)	Fig. 5 shows F.V. & S.V. Draw the missing view using first angle method.	U	4	
	b)	Using first angle method, draw the T.V. of an object shown in Fig.6.	U	4	
	c)	Fig.7 shows F.V. & S.V. of angle. Draw the missing view of the angle.	U	4	
Q.5		Attempt any ONE :			16
	a)	Fig. 8 shows F.V. and S.V. of an object. Draw isometric view of an object using natural scale.	A	5	
	b)	Fig. 9 shows F.V. & T.V. of an object. Draw isometric view of an object using natural scale.	A	5	
Q.6		Attempt any TWO			16
	a)	Develop the lateral surface of funnel as shown in Fig.11	A	6	
	b)	Fig. 12 shows a projections of a pentagonal prism with a partial hole as indicated. Draw the development of prism with hole in it.	A	6	
	c)	A right circular cone with base diameter 50mm and height 60mm is standing on its base on H.P. It is cut by a section plane as shown in Fig.10. Draw the development of the lateral surface 'p' of cone. Open the cone from 'O'.	A	5	



P.T.O. 417

S Q N	Question text	Cogni- tion Level	CO Code	Mark out of
	 Fig.8 Q-5 (a)			
	 Fig-9 Q-5 (b)			
	 Fig.10 Q-6 (c)			

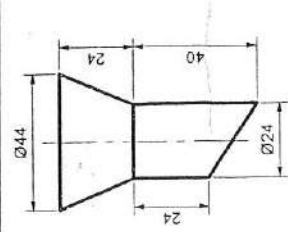


Fig-11 Q-6 (a)

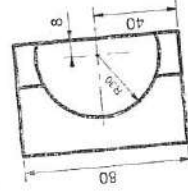


Fig-12 Q-6 (b)

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ODD TERM END EXAM NOV./DEC.-2018**EXAM SEAT NO.**

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LEVEL :- FIFTH**PROGRAM : MECHANICAL ENGINEERING****COURSE CODE :- MEE508/ME409****COURSE NAME :- REFRIGERATION & AIR CONDITIONING****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 30 / 11/ 2018****Instruction :-**

1) Answers of two sections must be written in separate section answer book provided.

2) Figure to the right indicate marks.

3) Illustrate your answers with sketches wherever necessary.

4) Use of non-programmable pocket calculator is permissible.

5) Mathematical and other tables shall be made available on request.

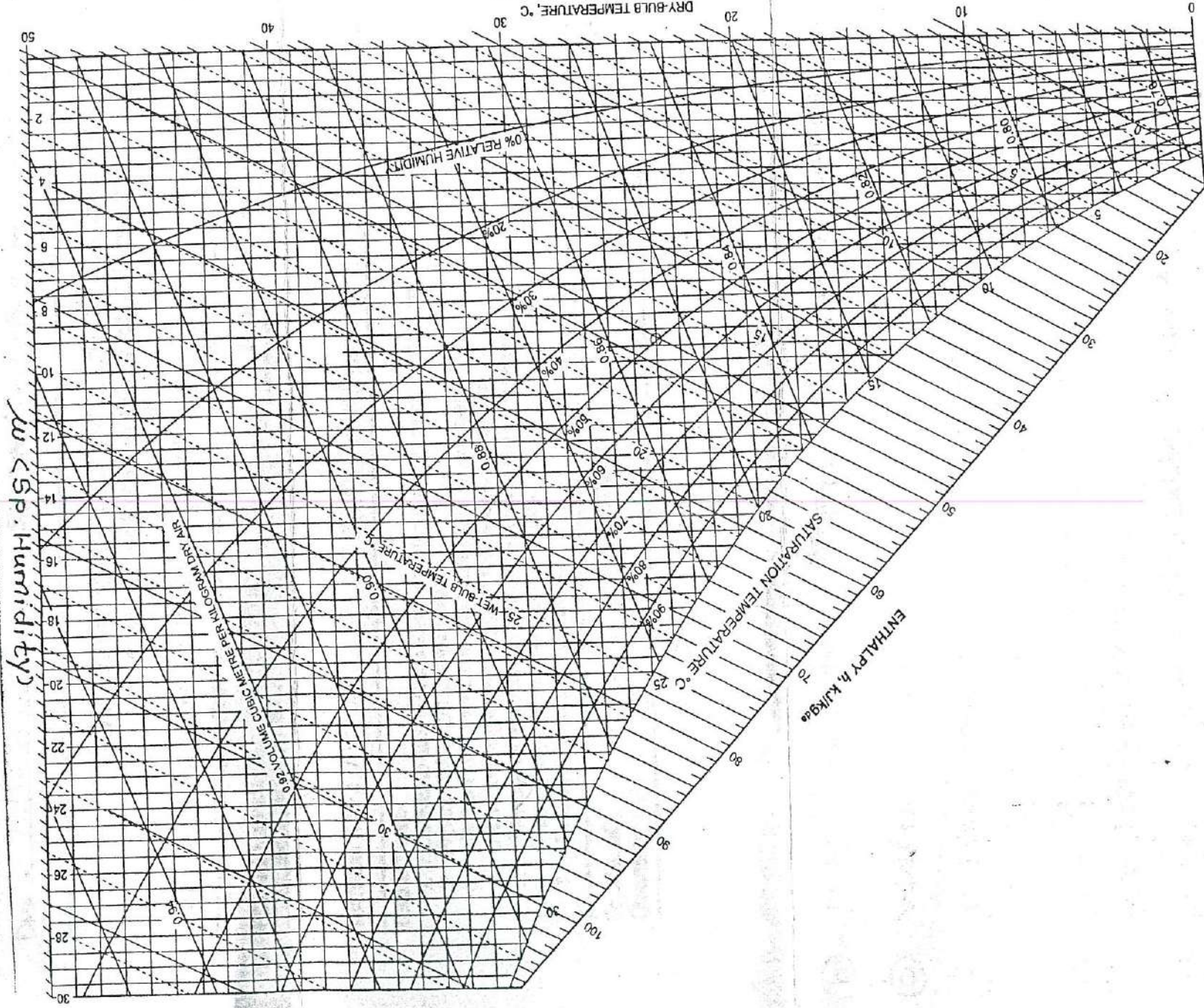
6) Assume additional suitable data necessary.

7) Use of Mobile is strictly prohibited.

QN		S	Section - I		Marks
		Q N			
Q.1			Attempt any FOUR :		08
	a)		Define Ton of refrigeration.		
	b)		Draw P-V and T-S diagram of reversed Carnot cycle.		
	c)		What is chiller?		
	d)		Give the nomenclature of C ₂ Cl ₂ F ₄ .		
	e)		State the functions of expansion device.		
	f)		What is heat pump?		16
Q.2			Attempt any FOUR :		
	a)		Explain refrigeration by expansion of air.		
	b)		Draw a neat sketch of thermostatic expansion valve.		
	c)		Explain with neat sketch (p-h diagram) the effect of discharge pressure of compressor on VCC.		
	d)		State any four desirable thermodynamic. properties of refrigerant.		
	e)		How compressors are classified?		16
	f)		State the necessity of air-craft cooling.		
Q.3			Attempt any TWO :		
	a)		Compare Air cooled and Water cooled condenser (At least 3 points)		
	b)		Explain with neat sketch, steam jet refrigeration. State advantages also.		
	c)		The temperature, limits of an ammonia refrigeration system are +25 ⁰ C & -10 ⁰ C. If the gas is dry at the end of compression, calculate C.O.P with no undercooling.		

P.T.O.

QN	S Q N	Section - II		Marks
Q.4		Attempt any FOUR :		08
	a)	State Dalton's Law of partial pressure.		
	b)	Define the term "Effective temperature".		
	c)	Write classification of A.C. systems.		
	d)	Define the terms i) Sensible heating and ii) Sensible cooling.		
	e)	List different types of outlets used in air distribution.		
	f)	Write any two desirable properties of insulating materials.		
Q.5		Attempt any FOUR :		16
	a)	Compare central and unitary air conditioning systems i) Capacities ii) Maintenance Accessibility iii) Application iv) Leak detection, charging and latent heat.		
	b)	List different types of ducts. Write various Losses in ducts.		
	c)	Write any two thermal and mechanical properties of an insulating material used in air conditioning system.		
	d)	Describe factors affecting human comfort.		
	e)	Define the term "Air conditioning". Write necessity of air conditioning.		
	f)	The atmospheric air at 30°C DBT & 75% relative humidity enters cooling coil at the rate of $200\text{m}^3/\text{min}$. The coil dew point temperature is 14°C and the By-pass factor of the coil is 0.1. Properties of air from Psychrometric chart are as under. i) Specific humidity of air entering cooling coil = 0.0202 kg/kg of dry air. ii) Specific humidity of air leaving cooling coil = 0.011 kg/kg of dry air. iii) Specific volume of air entering cooling coil = $0.884\text{ m}^3/\text{kg}$ of dry air. Determine 1) temperature of air leaving the coil. 2) Mass of air flowing through the coil. 3) Amount of water vapour removed per minute.		
Q.6		Attempt any TWO :		16
	a)	Air is dehumidified from an initial condition of 35°C and 80% RH to 28°C WBT & 15°C WBT. Determine i) Moisture Removed ii) Drop in enthalpy per kg of dry air. Show process on psychrometric chart.		
	b)	With neat sketch explain construction and working of window air conditioner.		
	c)	Define sensible heat gain and Latent heat gain. List its sources of heat transfer for calculating cooling load.		



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ODD TERM END EXAM NOV/DEC -2018**EXAM SEAT NO.**

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LEVEL: THIRD**PROGRAM: MECHANICAL ENGINEERING****COURSE CODE: MEF308/MEE308/ME208/M208 COURSE NAME: THEORY OF MACHINES AND MECHANISM****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 29/11/2018**

Instruction:-

- 1) Answers must be written in the 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	S	Question Text	R	CO	Mar ks
Q.1		Attempt any FOUR			(08)
	a)	Define lower pair & higher pair with one example of each.	A	1	
	b)	Identify the kinetic chain to which the following mechanisms belong. i) Withworth quick return mechanism. ii) Oldham's coupling. iii) Beam engine. iv) Oscillating cylinder engine.	U / A	1	
	c)	Define the terms angular velocity and angular acceleration.	R	2	
	d)	Sketch a pantograph and write its two applications.	U / A	2	
	e)	Define the terms related to cam i) Pressure angle ii) Lift or stroke.	A	3	
	f)	Why roller follower is preferred over a knife edge follower.	U / R	3	
Q.2		Attempt any FOUR			(16)
	a)	State the inversions of double slider crank chain and describe elliptical trammel with neat sketch.	U / R	1	
	b)	Explain with neat sketch the working of whitworth quick return mechanism.	U / R	1	
	c)	The dimension and configuration of the four bar mechanism, shown in fig.1 are as follows: $P_1A=300\text{mm}$; $P_2B=360\text{mm}$; $AB=360\text{mm}$ and $P_1P_2=600\text{mm}$. The angle $AP_1P_2=60^\circ$. The crank P_1A has an angular velocity of 10 rad/s and angular acceleration of 30 rad/s^2 , both clockwise. Determine angular velocity of line P_2B .	A	2	

P.T.O

	d)	The crank and connecting rod of a reciprocating engine are 200mm and 700mm respectively. The crank is rotating in clockwise direction are 120 rad/s. Find with the help of Klein's construction velocity & acceleration of the midpoint of the connecting rod, at the instant when the crank is at 30° to I.D.C (inner dead center)	A	2	
	e)	With neat labelled sketch explain peaucellier mechanism.	U / R	2	
	f)	Draw a neat labelled sketch of Davis steering gear and write the fundamental equation for correct steering.	U / R	2	
Q.3		Attempt any TWO			(16)
	a)	i) Explain with neat sketch working principle of "Oldham's coupling" ii) With neat sketch explain working of "Coupling rod of locomotive"	U / R	1	
	b)	In slider crank mechanism shown in fig.2, The crank CB=100mm and the connecting rod BA=300mm with center of gravity G, 100mm from B. In the position shown, the crankshaft has a speed of 75 rad/s and angular acceleration of 1200 rad/s^2 . Find i) velocity of G ii) acceleration of G & iii) angular acceleration of AB.	A	2	
	c)	A cam, with a minimum radius of 50mm, rotating clockwise at a uniform speed, is required to give a knife edge follower the motion as described below. i) To move outward through 40mm during 100° rotation of cam; ii) Dwell for next 80° ; iii) To return to its starting position during next 90° iv) To dwell for the rest period of cam revolution. Draw the profile of cam when the line of stroke of the follower is off-set by 15mm and displacement of the follower is to take place with uniform acceleration and uniform retardation.	A	3	
Q.4		Attempt any FOUR			(08)
	a)	Define slip and creep of belt	R	4	
	b)	Chain drive used in a motor cycle. State the reason.	U	4	
	c)	Define i) Pressure angle. ii) Circular pitch.	R	4	
	d)	State four applications of reverted gear train.	A	4	
	e)	Give brief classification of governors.	R	6	
	f)	Define clutch and give any two applications of it.	R	5	
Q.5		Attempt any FOUR			(16)
	a)	For flat belt prove that $\frac{T_1}{T_2} = e^{\mu\theta}$	U	4	
	b)	Explain with neat sketch epicyclic gear train.	U	4	
	c)	State advantages and disadvantages of gear over a flat belt drive.	R	4	
	d)	Explain with neat labeled sketch centrifugal clutch.	U	5	
	e)	A multiple clutch has 6 plates. It has to transmit 20KW of power at 600 rpm with its outer & inner radii as 12cm and 8 cm respectively; if $\mu=0.3$ find the maximum intensity of pressure between the discs assuming the condition of uniform wear.	A	5	

Q.6	Define :	i) Radius of rotation ii) Height of governor iii) Sleeve lift iv) Equilibrium speed. Attempt any FOUR	R	6	(16)
a)	A leather belt is 125mm wide and 6mm thick, transmits power from a pulley 750mm diameter, which runs at 500rpm. The angle of lap is 150° and $\mu=0.3$. The density of leather is 1 mg/m^3 and stress in belt is not to exceed 2.75 MPa. Find the maximum power that can be transmitted.	A	4		
b)	Explain with neat sketch power transmitting chains.	U	4		
c)	Differentiate between cycloidal and involute tooth profile.	U	4		
d)	A single plate clutch effective on both sides is required to transmit 25 KW at 3000rpm. Determine the outer and inner radii of frictional surface if the coefficient of friction is 0.255. The ratio of radii is 1.25 and max. pressure is not to exceed 0.1 N/mm^2 . Also determine the axial thrust to be provided by springs. Assume the theory of uniform wear.	A	5		
e)	Explain with neat sketch centrifugal Governor.	U	6		
f)	Draw a neat sketch of any one spring loaded governor. What is the use of the spring in the same and also give the applications of respective governor.	A	6		

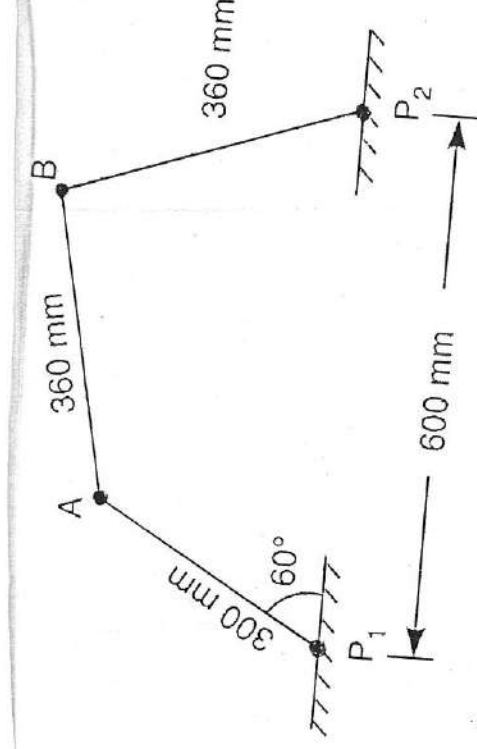


Fig-1

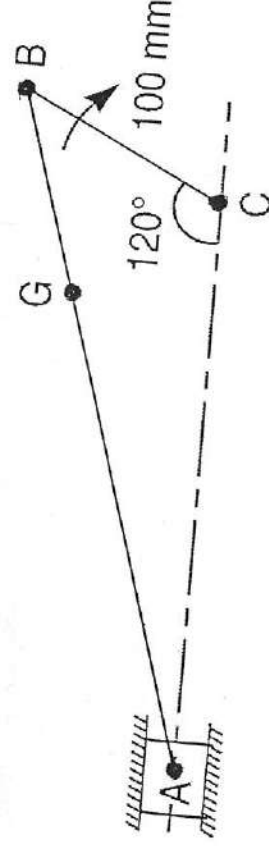


Fig-2 G.N. 3) b)

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ODD TERM END EXAM NOV/DEC -2018**EXAM SEAT NO.**

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LEVEL: THIRD**PROGRAM: MECHANICAL ENGINEERING****COURSE CODE: MEF310/ME210/MEE310****COURSE NAME: ENGINEERING METALLURGY AND METALS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 28/11/2018**

Instruction:-

- 1) Answers must be written in the 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

	S Q N	Question Text	R U A	CO MEF 310	Mar ks
Q.1		Attempt any FOUR			(08)
	a)	Define i) Body centered cubic structure ii) Atomic packing factor.	R	1	
	b)	Define i) Phase ii) Crystal system.	R	2	
	c)	State Gibb's phase rule.	R	2	
	d)	Define i) Ferrite ii) Austenite	R	1	
	e)	Name three allotropic forms of iron.	R	1	
	f)	State two advantages of steel over the family of cast irons.	U	1	
Q.2		Attempt any FOUR			(16)
	a)	Explain properties and applications of i) Zinc ii) Copper	U	1	
	b)	State the various imperfections in crystals and their effects on properties.	U	1	
	c)	Draw a schematics of cooling curve for pure metal and explain salient points.	A	2	
	d)	Differentiate between Eutectic transformation and Eutectoid transformation.	U	2	
	e)	Classify steels.	U	2	
	f)	State the factor affecting the properties of gray cast iron. State the conversion of gray cast iron to S.G. iron.	A	2	
Q.3		Attempt any FOUR			(16)
	a)	Obtain Atomic packing factor for body centered cubic (BCC) structure.	U	1	
	b)	Define space lattice. Draw a structure of point lattice.	U	1	
	c)	Draw schematic phase diagram for isomorphous system and label the phase on it.	A	2	
	d)	Draw iron-iron carbide equilibrium diagram and label the salient points.	U	1	
	e)	Explain effects of carbon content on properties of steel.	A	1	
	f)	Classify cast iron.	U	1	

P.T.O

Q.4	Attempt any FOUR			(08)
a)	Define harden ability and case depth.		R	3
b)	Define quenching. Enlist quenching media used in industries.		R	3
c)	Define heat treatment. State any four purpose of heat treatment.		R	4
d)	Give the advantages and limitations of Nylons.		R	4
e)	Give the application of copper alloy.		A	4
f)	State the major advantages of NDT.		U	5
Q.5	Attempt any FOUR			(16)
a)	Discuss in detail mechanism of martensitic transformation.		U	3
b)	With neat sketch explain TTT diagram for eutectoid steel.		U	3
c)	Give the properties and applications of nonmaterials and smart materials.		A	4
d)	Give the properties and applications of i) Bell metal ii) Cartridge brass.		A	4
e)	Explain magnetic particle test of non destructive testing with advantages and limitations.		U	5
f)	Explain the ultrasonic testing method of non-destructive testing with advantages and limitations.		U	5
Q.6	Attempt any TWO			(16)
a)	Explain hardening heat treatment with its purpose advantages and limitations.		U	3
b)	i) Differentiate between annealing and normalizing. ii) Give the properties and applications of 1) Shape memory alloy 2) Super alloy		A	4
c)	i) Enlist the different types of elastomers. Discuss any two elastomers with its properties and application. ii) Explain dye-penetrant test of non-destructive testing with its advantages, applications and limitations.		A	4
			A	5

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ODD TERM END EXAM NOV./DEC.-2018

EXAM SEAT NO.

LEVEL :- **FIFTH**

PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEE502**

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

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **28 / 11/ 2018**

Instruction :-

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

QN		S	Section-I		Marks
Q.1			Attempt any FOUR :		08
	a)		State the objectives of management.		
	b)		State advantages and disadvantages of Globalization.		
	c)		List different types of industrial ownership.		
	d)		Define planning and controlling.		
	e)		State the functions of top management.		
Q.2	f)		Define Human Resource Management.		16
			Attempt any FOUR :		
	a)		Differentiate between management and administration.		
	b)		State functions of lower and middle management.		
	c)		Explain the concept of team work.		
	d)		Give the objectives of management.		
Q.3	e)		Explain state of service industries in India.		16
	f)		Differentiate between manufacturing and service industries.		
			Attempt any FOUR :		
	a)		State the need of controlling function of management.		
	b)		Define motivation and state different methods of motivation.		
	c)		Explain the process of selection of employees.		
	d)		State different costs associated with accidents& explain.		
	e)		Explain different types of training.		
	f)		State the symptoms of bad housekeeping.		

P.T.O.

QN	SQN	Section- II	Marks
Q.4		Attempt any FOUR :	08
	a)	Enlist four objectives of materials management.	
	b)	What is financial management?	
	c)	How capital is collected for business?	
	d)	What are occupational hazards?	
	e)	Why safety codes are used?	
	f)	How workers participation is useful in management?	
Q.5		Attempt any TWO :	16
	a)	i) Explain functions of materials management. ii) What is supply chain management?	
	b)	i) Enlist four duties of material manager. ii) Explain fixed and working capital.	
	c)	i) Differentiate between over and under capitalization. ii) Suggest purchasing procedure for mass production of bicycle.	
Q.6		Attempt any TWO :	16
	a)	i) Enlist various provisions in ESI act. ii) Define accident and causes of accident.	
	b)	i) Define MPR & ERP. ii) Explain lean manufacturing.	
	c)	Draw network diagram and show critical path. Find out project duration.	

Activity	Predecessor	Expected time (Days)
A	-	8
B	A	18
C	B	07
D	C	12
E	D,G	22
F	H	16
G	C;F	04
H	A	20

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM ENDEXAM NOV./DEC-2018**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : COMMON****COURSE CODE :- MEF312/EEE311/EIF311/MEE312/R227/ETE311****COURSE NAME :- NON CONVENTIONAL ENERGY SOURCES****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 27/11 / 2018****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	S Q N	Question Text	R/ U/ A	CO MEF 312	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Enlist four non-conventional energy sources.	R	1	
	b)	Define i) Altitude angle ii) Zenith angle	R	1	
	c)	State four advantage of wind power.	R	2	
	d)	Classify wind energy conversion system.	R	2	
	e)	Define 'Gasification'.	U	3	
	f)	State the categories of biomass resources.	U	3	
Q.2		Attempt any FOUR :			16
	a)	Explain the need of alternative energy resources.	U	1	
	b)	Draw a neat sketch of 'pyranometer' and explain its working.	U	1	
	c)	Explain with neat sketch 'solar pond'.	U	1	
	d)	State the principle of solar photo-voltic conversion. Enlist any four applications of solar photo-voltic system.	U	1	
	e)	Draw block diagram showing basic components of wind energy conversion system.	U& R	2	
	f)	Draw a neat sketch of fixed dome type biogas plant and name its parts.	U	3	
Q.3		Attempt any FOUR :			16
	a)	State the advantages of concentrating collector over flat plate collector.	R	1	
	b)	Explain principle of working of 'solar flat plate collector'.	U	1	
	c)	Differentiate between conventional and non-conventional sources of energy.	U	1	
	d)	Draw neat labelled diagram of horizontal axis wind mill.	R& U	2	
	e)	Explain factors considered for selection of site of wind mill.	R	2	
	f)	Differentiate between biomass and 'conventional fuel'.	U	3	

P.T.O.

QN	S Q N	Question Text	R/ U/ A	CO MEF 312	Ma rks
Q.4		Attempt any FOUR :			08
	a)	State basic principle of Tidal Energy.	R	5	
	b)	Enlist components of tidal power plant.	R	5	
	c)	Explain principle of Geothermal energy.	U	5	
	d)	Classify SHP station (small Hydro Plant)	A	5	
	e)	Why ROI is important?	R	5	
	f)	Give four examples of waste heat recovery.	R	5	
Q.5		Attempt any FOUR :			16
	a)	Explain with neat sketch OTEC.	U	5	
	b)	Explain the principle of fuel cell with neat sketch.	U	5	
	c)	Explain future prospects of MHD.	U	5	
	d)	State components of SHP and enlist limitation.	U	5	
	e)	Write requirements of site selection are OTEC.	A	5	
	f)	Explain concept energy management.	R	5	
Q.6		Attempt any FOUR :			16
	a)	Write principle of fuel cell and state advantages of fuel cells.	U	5	
	b)	Explain the need of energy conservation.	U	5	
	c)	Explain MHD power generation in brief.	U	5	
	d)	Describe principle of energy conservation.	U	5	
	e)	Define term co-generation. State its application.	U	5	
	f)	Draw sum key diagram. Explain in brief.	U	5	

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ODD TERM END EXAM NOV./DEC.-2018

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LEVEL :- FOURTH**PROGRAM : MECHANICAL ENGINEERING****COURSE CODE :- MEE407/ME307****COURSE NAME :- METROLOGY****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 27 / 11/ 2018****Instruction :-**

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

QN		S	Section- I		Ma rks
Q.1		N	Attempt any FOUR :		08
	a)		Define i) Calibration ii) Traceability.		
	b)		List any four sources of error in mechanical measurement.		
	c)		State any four characteristics of good comparator.		
	d)		Define i) Fundamental deviation. ii) Upper deviation.		
	e)		Draw the sketch of 'basic shaft'.		
	f)		List any four instruments used for angular measurement.		
Q.2			Attempt any FOUR :		16
	a)		Explain the following terms used in metrology i) Repeatability ii) Reproducibility.		
	b)		Explain importance of metrology in industries.		
	c)		Differentiate between line standards and end standards.		
	d)		State and explain Taylor's principle of gauge design.		
	e)		What is meaning of $25H_5f_6$?		
	f)		Explain working of clinometers with the help of neat sketch.		
Q.3			Attempt any FOUR :		16
	a)		What are characteristics of measuring instruments on which selection of measuring instruments for particular measurement depends?		
	b)		Enlist the slips to be wrung for an overall dimension of 52.325mm using a set of m45 with the protection slips of 1mm each from both sides		

P.T.O.

	c)	Describe shaft basis system. Where it is used? Why?		
	d)	With the help of suitable example explain concept of multy gauging.		
	e)	How will you measure an angle of a taper plug with the help of sine bar? Explain.		
	f)	An angle of $98^{\circ}27'15''$ is to be set using angle gauge set of $[1^{\circ}3^{\circ}9^{\circ}27^{\circ}41^{\circ}]$ $[1^{\circ}3^{\circ}9^{\circ}27^{\circ}]$ $[3^{\circ}6^{\circ}18^{\circ}30^{\circ}]$ and a square block. Show arrangement with sketch.		
QN	S	Section- II	Ma	rks
Q.4		Attempt any FOUR :	08	
	a)	Write any two causes of progressive pitch error.		
	b)	Define the term 'Back lash' in gears. State necessity of Back lash in gears.		
	c)	Define the term 'Roundness'. List various methods of measurement of roundness.		
	d)	Enlist various types of errors in screw threads.		
	e)	Write the working principle of Stylus probe type surface texture measuring instruments.		
	f)	List the equipments required for alignment test.		
Q.5		Attempt any FOUR :	16	
	a)	Explain with sketch Rolling Gear Test for inspection of Gears.		
	b)	List various types of pitch errors. Explain with neat sketch Drunken error.		
	c)	Define the term calibration. Explain the necessity of calibration of measuring instrument.		
	d)	In the measurement of surface roughness heights of 18 successive peaks and valleys measured from a datum are as follows:- 24,44,27,49,39,27,45,26,41,25,42,43,26,28,47,29,46,28 the measurements were made over 18mm. Determine the CLA & RMS values of the rough surface.		
	e)	Explain squareness testing of an axis of rotation with given plane with suitable sketch.		
	f)	With neat sketch explain the symbols for designating surface finish on drawing.		
Q.6		Attempt any TWO :	16	
	a)	Explain with neat sketch measurement of Gear tooth thickness by gear tooth vernier.		
	b)	i) Define the term 'Lay'. State meaning of any four symbols used to indicate direction of lay. ii) Explain primary Texture and Secondary texture related to surface texture.		
	c)	Draw a neat sketch of tool maker's microscope. Label the parts and explain its working.		

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ODD TERM END EXAM NOV/DEC-2018**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : MECHANICAL ENGINEERING****COURSE CODE :- MEF306/ME206/MEE306****COURSE NAME :- MACHINE TOOLS****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 01/12/2018****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	S Q N	Question Text	R/ U/ A	Co MTF 304	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define Oblique cutting.	R	1	
	b)	Show basic elements of machining with sketch.	U	1	
	c)	Classify lathe machines with respect to duty.	R	2	
	d)	Define the term 'taper'. Enlist various types of tapers.	R	2	
	e)	Define 'trepanning' operation with sketch.	U	2	
	f)	Sketch a parallel shank and a taper shank twist drill.	U	1	
Q.2		Attempt any FOUR :			16
	a)	Material of work piece is cast iron. State the formation of chip. State the advantages of these chips.	A	1	
	b)	Define the term 'rake'. Enlist its advantages. Give general value of rake angle with respect to single point cutting tool.	A	1	
	c)	Sketch a single point cutting tool. Show various angles on it.	U	2	
	d)	Describe a tool with 8,10,6,6,10,2 signature in ASA system.	A	2	
	e)	Describe cutting parameters with respect to a lathe.	U	1	
	f)	Sketch all geared head stock. Describe it.	U	1	
Q.3		Attempt any FOUR :			16
	a)	Describe Taper turning operation by tail stock set over method.	U	1	
	b)	Sketch a radial drilling machine and label it. State its salient features.	U	1	
	c)	Differentiate between counter boring and counter sinking operation.	A	1	
	d)	Define the term cutting speed with respect to a drilling machine. State the factors affecting it.	U	1	
	e)	State the application of i) Spade drill ii) Core drill iii) Straight fluted drill.	A	1	
	f)	Show the following dimensions with sketch. i) Swing over bed -500mm ii) Swing over carriage - 480mm iii) Distance between centres – 1000mm iv) Length of bed – 1200mm	A	2	

P.T.O.

Q.4	Attempt any FOUR :			08
	a) State the advantages and applications of grinding.	R	1	
	b) Enlist the different parts of planning machine.	R	1	
	c) State the principle of Lapping process.	R	4	
	d) State the various broaches used in mechanical industry.	U	2	
	e) Define Broaching.	R	1	
	f) State the principle of slotting operation with sketch.	R	1	
Q.5	Attempt any FOUR :			16
	a) Differentiate between Trueing and dressing.	A	2	
	b) Describe grit, grade and structure of grinding wheel.	U	2	
	c) State the advantages and applications of Buffing and Polishing.	A	4	
	d) Discuss any two operations performed on slotting machine.	A	2	
	e) Describe the slotting mechanism with neat sketch.	U	1	
	f) Explain with neat sketch planer machine.	U	4	
Q.6	Attempt any TWO :			16
	a) State the specifications of grinding wheel with an example.	A	1	
	b) Explain the working and construction of Honning process with applications.	A	4	
	c) i) Draw a neat sketch of vertical broaching machine and describe it. ii) Differentiate between pull broaching and push broaching.	U A	2 2	

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ODD TERM END EXAM NOV./DEC-2018

EXAM SEAT NO.

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LEVEL :- THIRD

PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEF307/ME207/MEE307

COURSE NAME :- APPLIED ELECTRONICS

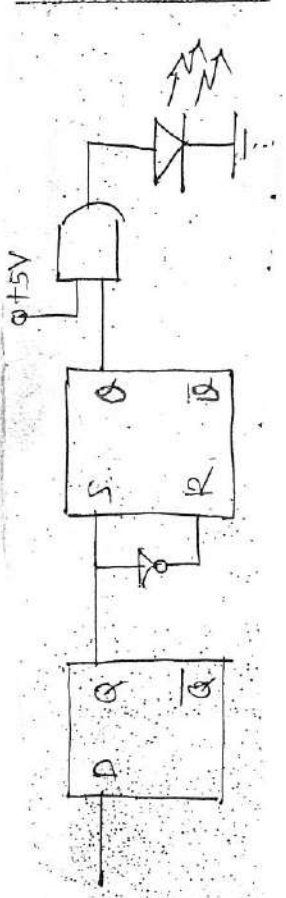
MAX. MARKS : 80 TIME : 3 HRS. DATE :- 30/ 11 / 2018

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	S Q N	Question Text	R/ U/ A	Co MEF 307	Ma rks
Q.1		Attempt any FOUR :			08
	a)	State any four applications of P-N junction diode.	A	1	
	b)	Draw circuit diagram of Bridge rectifier.	R	2	
	c)	Define the following terms i) Knee voltage ii) Break down voltage.	U	1	
	d)	Draw symbol of P-N junction diode and Zener diode.	R	1	
	e)	Explain need of filter in regulator. Give any two types of filter.	U	2	
	f)	Draw circuit diagram of 79XX regulator.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain Zener diode as a voltage regulator in load regulation.	U	3	
	b)	List types of filter. And explain C-L-C filter with waveform.	R	2	
	c)	Explain block diagram of regulated power supply.	U	3	
	d)	Draw and explain V-I characteristics on Zener diode.	R	1	
	e)	Differentiate between Half wave rectifier and Bridge rectifier. Any four points.	A	2	
	f)	Draw and explain common emitter configuration.	U	1	
Q.3		Attempt any FOUR :			16
	a)	Explain switch mode power supply.	U	3	
	b)	Explain operation of NPN transistor with neat diagram.	U	1	
	c)	Distinguish between common base and common collector configuration.	A	1	
	d)	Make use of diagram and waveform to explain centre tap rectifier.	A	2	
	e)	Explain off line UPS with suitable block diagram.	U	3	
	f)	Identify any four differences between inductor and C-L-C filter.	A	2	

P.T.O.

QN	S Q N	Question Text	R/ U/ A	Co SMF 307	Ma rks
Q.4		Attempt any FOUR :			08
	a)	List any four laws of Boolean algebra.	R	4	
	b)	State any four applications of multiplexers.	R	5	
	c)	List the different triggering methods in digital circuit.	R	6	
	d)	Convert the following binary number into its decimal equivalent (1011.01) ₂ = (---) ₁₀ .	A	4	
	e)	Convert the following expression into canonical SOP form $Y = (A \bar{B}) + (\bar{B} \bar{C})$	A	5	
	f)	State the applications of counter (any 4 points)	R	6	
Q.5		Attempt any FOUR :			16
	a)	Explain full subtractor using its truth table and logic diagram.	U	5	
	b)	Explain MOD -7 counters with circuit diagram.	U	6	
	c)	Draw circuit diagram of 4:1 multiplexer. Explain its working.	U	5	
	d)	Explain the working of J-K flip-flop with neat diagram.	U	6	
	e)	Implement following functions using K-map. i) $f(A,B,C) = \Sigma M(0,1,2,3) + d(4,5,7)$. ii) $f(A,B,C) = \Sigma M(0,2,4,6)$	A	5	
	f)	Solve the following i) $(1573)_{10} = ()_{16}$ ii) $(127.77)_8 = ()_{10}$.	A	4	
Q.6		Attempt any FOUR :			16
	a)	Study the given diagram, what should be logic level at D input to make ? i) LED ON ii) LED OFF iii) Justify your answer by giving step by step output of each stage.	A	6	
					
	b)	Compare multiplexer and demultiplexer (any 4 points)	U	5	
	c)	Draw a diagram and explain PIPO shift register.	U	6	
	d)	Simplify the following expression with Boolean laws. $\overline{A B C D} + \overline{A} \overline{B C} D + \overline{A B C D} + \overline{A B C D} = \overline{A B}$	A	5	
	e)	Draw the symbol, Boolean expression and truth table of EX-OR and NAND gate.	U	4	
	f)	Draw and explain 4-bit asynchronous up counter.	U	6	

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ODD TERM END EXAM NOV./DEC-2018**EXAM SEAT NO.**

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LEVEL :- FIFTH PROGRAM : MECHANICAL ENGINEERING**COURSE CODE :- MEF503/MEE504****COURSE NAME :- INDUSTRIAL ENGINEERING****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 14/12/2018****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	Section- I	R/ U/ A	Co MEF 503	Mar ks																								
Q.1		Attempt any FOUR :			08																								
	a)	Define Productivity	R	1																									
	b)	Classify production systems.	U	1																									
	c)	Define material Handling.	R	2																									
	d)	Define Machine capacity and Plant capacity.	R	2																									
	e)	State the functions of dispatching.	R	3																									
	f)	Define the term Routing.	R	3																									
Q.2		Attempt any FOUR :			16																								
	a)	Explain the importance of site selection with suitable example.	U	2																									
	b)	There are two industries manufacturing two types of plugs. The standard time per piece is 1.5 minutes. The output of two industries is 300 & 200 respectively per shift of 8 hours. What is productivity of each per shift of 8 hours? Also calculate the production of each per week (6 days) on basis of double shift.	A	1																									
	c)	Suggest and explain type of layout for the material and machineries are required to be placed in sequence.	A	2																									
	d)	Explain operation sheet.	U	3																									
	e)	Explain meaning of control. State its importance.	U	3																									
	f)	Find the optimal sequence and total min. elapsed time for seven jobs on machine M1 & M2.	U	3																									
		<table><tr><td>Job</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td></tr><tr><td>M/c M1</td><td>6</td><td>24</td><td>30</td><td>12</td><td>20</td><td>22</td><td>18</td></tr><tr><td>M/c M2</td><td>16</td><td>20</td><td>20</td><td>13</td><td>24</td><td>2</td><td>6</td></tr></table>	Job	A	B	C	D	E	F	G	M/c M1	6	24	30	12	20	22	18	M/c M2	16	20	20	13	24	2	6			
Job	A	B	C	D	E	F	G																						
M/c M1	6	24	30	12	20	22	18																						
M/c M2	16	20	20	13	24	2	6																						
Q.3		Attempt any FOUR :			16																								
	a)	Explain product layout with schematic diagram.	U	2																									
	b)	Prepare an operation sheet to produce a hexagonal nut having right hand thread.	A	3																									
	c)	Suggest and explain briefly any material handling system which uses driver less vehicle.	A	2																									

P.T.O.

d)	Explain Gantt chart used in production planning and control.	U	3																																				
e)	Explain the effect of tolerance and surface finish on process planning.	U	3																																				
f)	State symptoms of good plant layout.	R	2																																				
QN	Section- II	R/ U/ A	Co MEF 503	Mar ks																																			
Q.4	Attempt any FOUR :			08																																			
a)	Define Jig and fixture.	R	4																																				
b)	How inventory can be reduced?	U	5																																				
c)	Define i) Re-order point. ii) Safety Stock.	R	5																																				
d)	Classify various recording techniques.	U	6																																				
e)	Define standard time.	R	6																																				
f)	List 5'S and their meaning.	R	6																																				
Q.5	Attempt any FOUR :			16																																			
a)	Explain any four general principles of jigs and fixtures design.	U	4																																				
b)	Explain with neat sketch 3-2-1 principle.	U	4																																				
c)	Explain significance, construction and application of i) String diagram. ii) Flow diagram.	U	6																																				
d)	Draw two handed process chart for Assembly of Nut and Bolt.	A	6																																				
e)	Explain various types of elements with suitable example.	U	6																																				
f)	Explain Rapid prototyping and state its advantages.	U	6																																				
Q.6	Attempt any TWO :			16																																			
a)	i) Explain EOQ model with neat sketch. ii) ABC corporation has got a demand for particular part of 10,000 units per year. The cost per unit is Rs.2 and it costs Rs. 36 to place an order and to process the delivery. The inventory carrying cost is estimated at 9% average inventory investment. Determine Economic order quantity.	A																																					
b)	The elemental times for 4 cycles of an operation using stop watch are presented below. <table border="1" data-bbox="1744 373 2044 1323"> <thead> <tr> <th>Elements</th><th colspan="4">Cycle time (in minutes)</th></tr> <tr> <td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr> </thead> <tbody> <tr> <td>1</td><td>1.5</td><td>1.5</td><td>1.3</td><td>1.4</td></tr> <tr> <td>2</td><td>2.6</td><td>2.7</td><td>2.4</td><td>2.6</td></tr> <tr> <td>3</td><td>3.3</td><td>3.2</td><td>3.4</td><td>3.4</td></tr> <tr> <td>4</td><td>1.2</td><td>1.2</td><td>1.1</td><td>1.2</td></tr> <tr> <td>5</td><td>0.51</td><td>0.51</td><td>0.52</td><td>0.49</td></tr> </tbody> </table> Calculate standard time for the operation if i) Elements of 2 and 4 are machine elements. ii) Total allowances are 15% of the normal time. Also calculate number of jobs can be produced in 8 hours shift.	Elements	Cycle time (in minutes)					1	2	3	4	1	1.5	1.5	1.3	1.4	2	2.6	2.7	2.4	2.6	3	3.3	3.2	3.4	3.4	4	1.2	1.2	1.1	1.2	5	0.51	0.51	0.52	0.49	A	6	
Elements	Cycle time (in minutes)																																						
	1	2	3	4																																			
1	1.5	1.5	1.3	1.4																																			
2	2.6	2.7	2.4	2.6																																			
3	3.3	3.2	3.4	3.4																																			
4	1.2	1.2	1.1	1.2																																			
5	0.51	0.51	0.52	0.49																																			
c)	Explain the following concepts with suitable examples :- i) Poko Yoke. ii) Pull and push type manufacturing system.	A	6																																				

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ODD TERM END EXAM NOV./DEC-2018

EXAM SEAT NO.

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LEVEL :- **THIRD**

PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEF309/ME209/MEE309**

COURSE NAME :- **ELECTRICAL TECHNOLOGY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **13/12/2018**

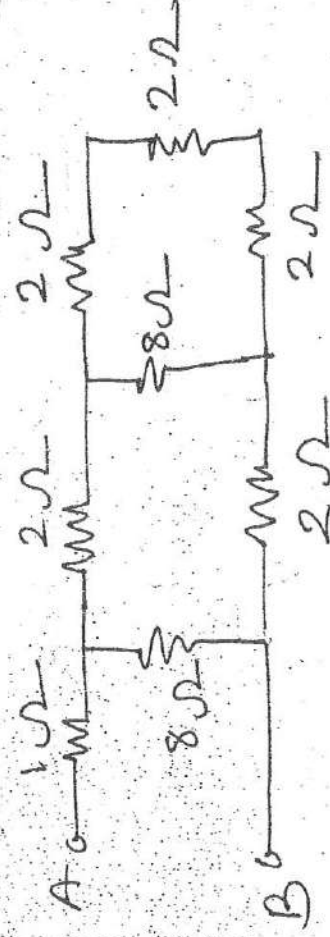
Instruction :-

- 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	S Q N	Question Text	R/ U/ A	Co MEF 309	Ma rks
Q.1		Attempt any FOUR :			08
	a)	State Ohm's Law.	R	1	
	b)	State Salient feature of series resistive circuit.	U	1	
	c)	Classify measuring instruments.	U	2	
	d)	Define the terms related to AC circuit. i) Frequency ii) Cycle.	R	2	
	e)	What do you understand by balanced load?	U	3	
	f)	State the line and phase relationship of voltage and current in a delta connected load.	R	3	
Q.2		Attempt any FOUR :			16
	a)	State and explain Kirchoff's Laws.	U	1	
	b)	Define the terms and give their SI units i) Electric work ii) Electric power.	R	1	
	c)	Compare Star network with delta network.	A	3	
	d)	Explain Faraday's Laws of electromagnetic induction.	U	2	
	e)	Explain series R-L-C circuit with the help of circuit diagram and phasor diagram.	U	2	
	f)	Explain purely inductive AC circuit with the help of circuit diagram and phasor diagram.	A	2	
Q.3		Attempt any FOUR :			16
	a)	Define Reactance and impedance and state their units.	R	2	
	b)	Draw symbol and state the use of voltmeter and wattmeter.	R	2	
	c)	Explain generation of three phase voltage in brief.	U	3	
	d)	With neat sketch explain plate earthing.	U	3	
	e)	Compare series circuits and parallel circuits.	A	1	
	f)	Calculate the value of equivalent resistance of the combination shown in below figure.			

P.T.O.

Q.4	Attempt any FOUR :			08
	a) State working principle of D.C. motor.	R	6	
	b) Classify A.C. motor (single phase and three phase)	R	7	
	c) State any two applications of inductance furnace.	R	5	
	d) Define transformer.	R	4	
	e) Define illumination and state its unit.	U	5	
	f) State two applications of slipring induction motor.	U	7	
Q.5	Attempt any FOUR :			16
	a) Define i) Regulation of a Transformer ii) Efficiency of a transformer.	R	4	
	b) State advantage of electric heating.	U	5	
	c) Explain working principle, construction of servo motor.	U	6	
	d) Draw neat sketch of Star-Delta starter used for 3 phase induction motor.	U	7	
	e) Explain in brief induction furnace with help of schematic diagram.	U	5	
	f) Draw connection diagram and explain working of single phase universal motor.	A	7	
Q.6	Attempt any TWO :			16
	a) Explain in brief voltage and current ratios of an ideal transformer.	U	4	
	b) With help of neat sketch explain resistance heating, state its advantages and applications.	U	5	
	c) Draw and explain. i) Short shunt D.C. compound motor. ii) Long-shunt D.C. compound motor.	U	6	



Q.N. 3 (f)

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(An Autonomous Institute of Govt. of Maharashtra)

ODD TERM END EXAM NOV/DEC -2018

EXAM SEAT NO.

LEVEL: FIRST

PROGRAM: COMMON

COURSE CODE: CCF105/CCE105/X104/R107/0107 COURSE NAME: BASIC MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 19/12/2018

Instruction:-

- 1) Answers must be written in the 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	S	Question Text	R	CO	CCF	Marks
2.1		Attempt any FOUR			A 105	(08)
	a)	Define n^{th} order determinant.	R	1		
	b)	Resolve into partial fraction $\frac{1}{x^2 - x}$	A	2		
	c)	Define improper fraction with suitable example.	R	2		
	d)	If $A = \begin{bmatrix} 1 & 2 \\ -3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 5 \\ 1 & -3 \end{bmatrix}$ find $3A + B$	U	3		
	e)	If $A = \begin{bmatrix} 5 & 4 \\ 4 & 3 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 4 \\ 4 & -5 \end{bmatrix}$ verify that $AB = BA$	U	3		
	f)	Expand using Binominal theorem $\left(\frac{x^2}{2} - \frac{2}{x^2}\right)^4$	A	4		
Q.2		Attempt any FOUR				(16)
	a)	Solve by Cramer's rule $3x + 3y - z = 11$, $2x - y + 2z = 9$, $4x + 3y + 2z = 25$	A	1		
	b)	Solve by Cramer's rule $\frac{1}{p} + \frac{3}{q} = 4$ and $\frac{-2}{p} + \frac{4}{q} = 5$	A	1		
	c)	If $A = \begin{bmatrix} 1 & 2 \\ -2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$, $C = \begin{bmatrix} -3 & 1 \\ 2 & 0 \end{bmatrix}$ verify that $A(B+C) = AB+BC$	U	3		
	d)	If $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$ Find A^{-1} by using Adjoint method.	A	3		
	e)	Resolve into partial fraction $\frac{x+3}{(x^2-1)(x+5)}$	A	2		
	f)	Resolve into partial fraction $\frac{x^3+x}{(x^2-9)}$	A	2		

P.T.O

Q.3	Attempt any FOUR			(16)
a)	Resolve into partial fraction $\frac{x^2}{(x+1)(x-2)^2}$	A	2	
b)	Solve the simultaneous equations by using matrix inversion method. $x+3y+3z=12, x+4y+4z=15, x+3y+4z=13$	A	3	
c)	If $A = \begin{bmatrix} 1 & -3 \\ 2 & -1 \end{bmatrix}_{2 \times 2}$ and $B = \begin{bmatrix} 1 & 0 & 1 \\ 2 & -1 & 3 \end{bmatrix}_{2 \times 3}$ verify that $(AB)^T = B^T A^T$	U	3	
d)	If $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 3 & -5 \\ -1 & 2 \end{bmatrix}$ show that $AB = BA = I$	U	3	
e)	Prove that $(\sqrt{2}+1)^8 - (\sqrt{2}-1)^8 = 82$	U	4	
f)	Expand using Binomial theorem $\left(x - \frac{1}{x}\right)^6$	A	4	
Q.4	Attempt any FOUR			(08)
a)	Express the following angles in radian measures. i) 30° ii) -135°	R	5	
b)	Prove that $\cos(\pi + \theta) = -\cos \theta$	U	6	
c)	Using compound angle formula find $\sin(75^\circ)$	R	6	
d)	If $\sin \alpha = 0.4$ find $\sin(3\alpha)$	R	7	
e)	Express as product : $\cos 4\theta + \cos 8\theta$	R	8	
f)	Find the principal value of $\cos\left[\frac{\pi}{2} - \sin^{-1}\left(\frac{1}{\sqrt{2}}\right)\right]$	R	9	
Q.5	Attempt any FOUR			(16)
a)	Prove that $\frac{\cos \theta}{1 - \sin \theta} + \frac{1 - \sin \theta}{\cos \theta} = 2 \sec \theta$	A	5	
b)	Prove that $\cos(A+B) = \cos A \cos B - \sin A \sin B$	A	6	
c)	If $\tan(A+B) = \frac{3}{4}$ and $\tan(A-B) = \frac{77}{36}$ then find $\tan(2A)$	A	6	
d)	Prove that $\sqrt{2 + \sqrt{2 + 2 \cos 4\theta}} = 2 \cos \theta$	A	7	
e)	Show that $\tan 3A - \tan 2A - \tan A = \tan 3A \tan 2A \tan A$	A	7	
f)	Show that $\cos 35^\circ + \cos 85^\circ + \cos 155^\circ = 0$	A	8	
Q.6	Attempt any FOUR			(16)
a)	Show that $(\cos A - \cos B)^2 + (\sin A - \sin B)^2 = 4 \sin^2\left(\frac{A-B}{2}\right)$	A	7	
b)	Prove that $\frac{\sin A + 2 \sin 2A + \sin 3A}{\cos A + 2 \cos 2A + \cos 3A} = \tan 2A$	A	8	
c)	Show that $\sin 10^\circ \cdot \sin 30^\circ \cdot \sin 50^\circ \cdot \sin 70^\circ = \frac{1}{16}$	A	8	
d)	Show that $\tan^{-1}\left(\frac{3}{4}\right) + \tan^{-1}\left(\frac{3}{5}\right) - \tan^{-1}\left(\frac{8}{19}\right) = \frac{\pi}{4}$	A	9	
e)	Prove that $\tan^{-1}(x) - \tan^{-1}(y) = \tan^{-1}\left(\frac{x-y}{1+xy}\right)$, if $x > 0, y > 0$	A	9	
f)	Show that $\sin^{-1}\left(\frac{3}{5}\right) + \cos^{-1}\left(\frac{12}{13}\right) = \sin^{-1}\left(\frac{56}{65}\right)$	U	9	

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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ODD TERM END EXAM NOV/DEC -2018**EXAM SEAT NO.**

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LEVEL: FOURTH**PROGRAM: MECHANICAL ENGINEERING****COURSE CODE: MEF410/ME309/MEE410 COURSE NAME: MECHANICAL MEASUREMENT & MECHATRONICS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 17/12/2018****Instruction:-**

- 1) Answer to two sections must be written in separate section answer book provided
- 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	S	Question Text	R	CO	Mar
Q.1	Q		U	MEF	ks
	N		A	410	
Section -I					
		Attempt any FOUR			(08)
	a)	Draw block diagram of first and zero order instruments.	R	1	
	b)	Identify the need of static characteristics and dynamic characteristics of instruments in different situation.	A	1	
	c)	A 0 to 100 V voltmeter has 200 scale division which can be read to ½ division. Determine the resolution of the voltmeter in volt.	A	1	
	d)	Select suitable material for bimetallic thermometer and Justify.	A	2	
	e)	Classify various strain gauges. Define gauge factor of strain gauge.	U	2	
	f)	State working principle of electrodynamic microphone.	R	3	
		Attempt any FOUR			(16)
	a)	Distinguish between threshold and resolution of instrument.	U	1	
	b)	Explain the following terms of instruments i) Speed of response ii) Fidelity.	U	1	
	c)	Identify suitable device to measure precise rotary angular displacement and explain its working.	A	2	
	d)	Draw block diagram of generalized measurement system and explain its functional elements.	U	1	
	e)	Choose suitable temperature measuring device to measure temperature inside the furnace. State its working principle with neat sketch.	A	2	
	f)	State and explain working principle of stroboscope for speed measurement.	U	2	
		Attempt any FOUR			(16)
	a)	Identify any eight criteria for essential requirement of good strain gauge.	A	2	
	b)	State various contact type electrical tachometer and explain any one of them with neat sketch.	U	2	
	c)	State and explain working principle of carbon microphone with neat sketch.	U	3	

P.T.O

d)	Draw neat labelled sketch of absorption hygrometer. State its working principle.	R	3	
e)	Identify specific application of ultrasonic flow meter with neat labelled sketch.	A	3	
f)	Explain working principle of strain gauge transmission dynamometer with neat sketch.	U	3	

Section-II

Q.4	Attempt any FOUR			(08)
a)	Construct a circuit diagram to demonstrate working of an electromagnetic relay.	A	6	
b)	Define the term PLC.	R	4	
c)	Enlist any two criteria for selection of PLC.	R	4	
d)	A particular system is used to acquire data from various sensors and then feed this data to a computer system for further processing. Draw block diagram of such a system.	A	5	
e)	Select a suitable motor to drive a conveyor belt which requires stopping at fixed positions for fixed time. Justify your selection.	A	6	
f)	Draw the block diagram of successive approximations type analogue to digital converter.	R	5	
Q.5	Attempt any FOUR			(16)
a)	Explain data loggers.	U	5	
b)	Construct the pin configuration of 8051 microcontroller.	A	4	
c)	Explain the working of any two hydraulic system components. Also the block diagram of hydraulic system.	U	6	
d)	Explain the working of Flash Analog to Digital converter, with sketch.	U	5	
e)	Differentiate between Microprocessor and Microcontroller (four points)	U	4	
f)	Draw the architecture of 8051 microcontroller.	R	4	
Q.6	Attempt any FOUR			(16)
a)	Explain the working of variable frequency drive with circuit diagram.	U	6	
b)	Draw a neat labeled sketch of a Gear type hydraulic motor.	R	6	
c)	Draw internal architecture of microprocessor.	R	4	
d)	Enlist any four points to be considered while selecting a motor.	R	6	
e)	Explain any four forms of memory unit.	U	4	
f)	Draw a neat labeled diagram of a D.C motor.	R	6	

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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ODD TERM END EXAM NOV/DEC -2018**EXAM SEAT NO.**

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LEVEL: FIRST**PROGRAM: COMMON****COURSE CODE: CCF110/CCE110/X111/R112 COURSE NAME: APPLIED MECHANICS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 15/12/2018****Instruction:-**

- 1) Answers must be written in the 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.
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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 **CO**>Course outcome

QN	S	Q	N	Question Text	R	CO	CCF	Marks
					U	A	110	(08)
				Attempt any FOUR				
	a)			Differentiate between mass & weight.	U		1	
	b)			State the principle of transmissibility of force.	R		1	
	c)			State the Varignon's theorem of moments & its use.	R		2	
	d)			State Lami's theorem & Draw a sketch to explain it with mathematical expression.	R		2	
	e)			State graphical conditions of equilibrium of force system.	R		2	
	f)			Define coefficient of friction.	R		2	
Q.2				Attempt any FOUR				(16)
	a)			A man of mass 50 kg is standing on a roof having an inclination of 25° to the horizontal. Determine the components of his weight along the roof & normal to the roof.	A		2	
	b)			Determine the angle between two equal forces 'p' if their resultant is also equal to p.	U		2	
	c)			Six forces are acting along the lines joining toward the centre of a hexagon. Determine the equilibrant force which keep this hexagon in equilibrium. Refer fig.no.1.	A		2	
	d)			A thread of load carrying capacity 102.2N. is used to hold a sphere of weight 100N, against a smooth, wall, radius of sphere is 100 mm & length of the thread is 200 mm. But it is found that thread fails By calculation find why thread fail. Refer fig.No.3.	U		2	
	e)			ABCD is weightless rod under the action of four forces as shown in figure no.2. Calculate the resultant & locate the position of resultant with respect to point 'A'. Use graphical method.	U		3	
	f)			A body of weight 400N is placed on an inclined plane at an angle 15° to the horizontal. If the coefficient of friction is 0.14. Find the value of force to be applied parallel to the plane to just to move the body up the plane.	A		2	
Q.3				Attempt any FOUR				(16)
	a)			A concurrent force system is as shown in figure no.4. Determine resultant of the given force system & also position from horizontal axis. Use graphical method.	U		3	
	b)			A beam ABC is hinged at A & placed on roller at B. The distance between two support AB is 5m & the overhang BC is 1 m. The beam carries a u.d.l of 2 KN/m over its entire length ABC & a point load of 5 KN is acting at C. Calculate support reaction using analytical method.				

P.T.O

c)	A simply supported beam of span 4 m is loaded with an u.d.l of 5 KN/m for 2 m from left end support & a point load of 30KN at 1 m from right end. Determine support reactions using graphical method.			
d)	A wooden block is resting on a rough inclined plane whose inclination to the horizontal plane is 10° . The push force 2 N is acting parallel to the inclined plane. The block is just moving down the plane. If coefficient of friction between block & plane is 0.32 estimate the weight of the block.	A	2	
e)	A loader of weight 800 N of length 4.5 m is rest against a smooth wall & rough floor. The coefficient of friction between loader & floor is 0.33 will loader stand in 60° positions with respect to the floor.	A	2	
f)	i) Explain polygon law of forces with a neat sketch ii) Calculate coefficient of friction if angle of repose is 30°	A A	3 2	
Q.4	Attempt any FOUR			(08)
a)	State the centroid of semicircle of radius R.	R	4	
b)	Define centroid and center of gravity.	R	4	
c)	State Newton's first law of motion.	R	5	
d)	State the equation of rectilinear motion & meaning of each.	R	5	
e)	Calculate angular velocity of a shaft rotating at 130 rpm.	A	5	
f)	State the law of conservation of energy.	R	5	
Q.5	Attempt any FOUR			(16)
a)	Determine the centroid of T-section with respect to bottom having flange 120 x 10 mm and web 20 x 150 mm.	A	4	
b)	Locate center of gravity of frustum of solid circular cone as shown in fig. Refer fig.no.5. w.r.t to bottom.	A	4	
c)	A body starts from rest with a constant acceleration of 0.5 m/s^2 after what time its velocity be 2.5 m/s & How much distance it will be travelled during this time?	A	5	
d)	A body falling freely under gravity passes two points 9 m apart vertically in 0.2 sec. Find from what height above the upper point did it start to fall?	A	5	
e)	The shaft of motor rotates at 1000 rpm at a particular instant in 10 sec. The speed uniformly decreases to 400 rpm. Find angular retardation.	A	5	
f)	A wheel 800 mm diameter starts from rest and accelerates uniformly. After 24 sec, it attains angular velocity of 120 rad/sec. Find the angular acceleration and total angle turned trough.	A	5	
Q.6	Attempt any FOUR			(16)
a)	How many litres of water can be lifted in 20 min to a height of 30 m by means of a pump of 100 KW?	A	5	
b)	A bollet weighing 3 N leaves the barrel of a ripple with muzzle velocity of 1000 m/s. If the length barrel in 800 mm, Find the impulse and impulsive force.	A	5	
c)	Draw the nature of following graphs for a lifting machine. i) Load vs Effort ii) Load vs Ideal effort iii) Load vs Mechanical Advantages iv) Load vs Effort lost in friction	U	6	
d)	Calculate efficiency of a machine to lift a load of 1000 N, if the velocity ratio of the machine is 25 and law of machine is $p = (0.01W + 5) \text{ N}$.	A	6	
e)	Calculate the effort required to lift a load of 3 KN. If the machine can lift a load of 1 KN by an effort of 56 N. and 2 KN load by an effort of 96 N.	A	6	
f)	In a differential axle & wheel, the diameter of effort wheel is 400 mm and the diameter of bigger axle is 100 mm and smaller axle is 80 mm. If an effort of 50 N can lift a load of 1500 N, find velocity ratio and efficiency of the machine.	A	6	

Figure No. 1

(Q.2) c)

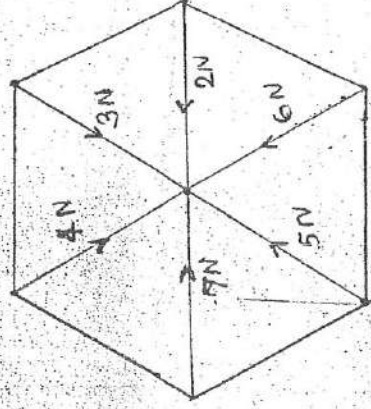


Figure No. 2

(Q.2) e)

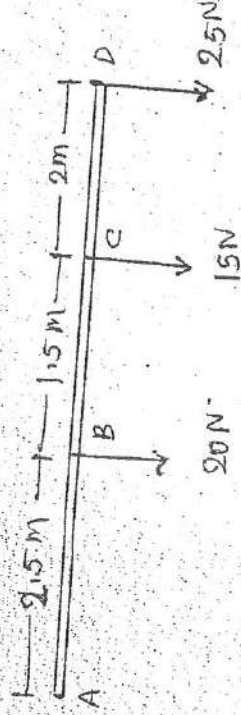
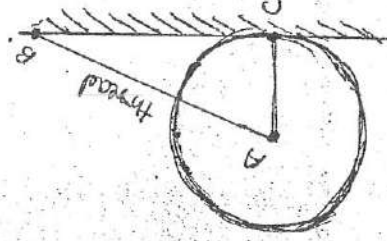


Fig No. 3

(Q.2) d)

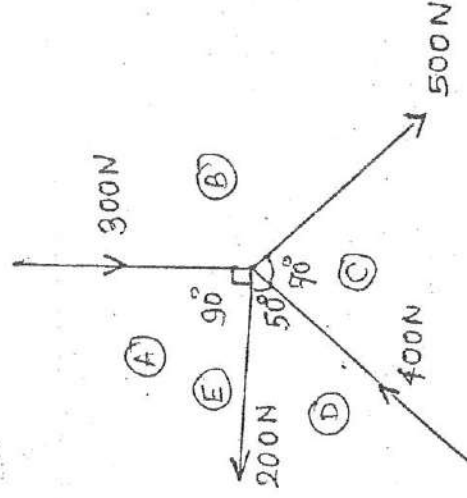


$$AB = 200 \text{ mm}$$

$$AC = 100 \text{ mm}$$

Fig No. 4

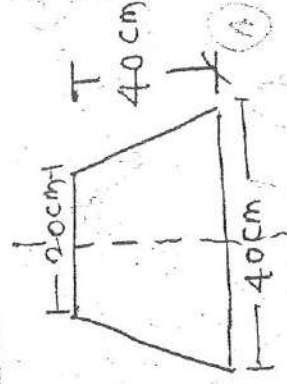
(Q.3) a)



Refer Bowls notations given in figure.

Fig. No. 5

Q.5 (b)



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ODD TERM END EXAM NOV/DEC-2018**EXAM SEAT NO.**

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LEVEL :- FOURTH PROGRAM : MECHANICAL ENGINEERING
COURSE CODE :- MEF401/ME301**COURSE NAME :- POWER ENGINEERING****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 04/12/2018****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 Q N	Section- I	R/ U/ A	Co MEF 401	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Enlist any four emissions of the petrol engine.	R	1	
	b)	State the materials used for following components. i) Piston ring ii) Crank shaft.	R	1	
	c)	Define BSFC. State is unit.	U	1	
	d)	Show the variation of torque with speed on performance curve.	U	3	
	e)	Define i) Compression Ratio. ii) Piston speed.	R	1	
	f)	State the objectives of super-charging.	R	1	
Q.2		Attempt any FOUR :			16
	a)	Draw a valve timing diagram for four stroke petrol engine.	U	2	
	b)	Write any four additives and their advantages used for IC engine.	R	2	
	c)	Represent dual cycle on P-V & T-S diagram.	U	1	
	d)	Explain the norms of pollution control in India.	R	1	
	e)	Explain with neat sketch magneto ignition system.	R	2	
	f)	Explain how motoring test is conducted in IC engine.	U	3	
Q.3		Attempt any TWO :			16
	a)	i) Derive an equation for air standard efficiency of Otto cycle. ii) A single cylinder, two stroke cycle engine has $P_{mi}= 550\text{KPa}$. $T=628\text{ N-m}$, $N=360\text{ rpm}$, $d=21\text{cm}$, $L=28\text{cm}$, $m_f=8.16\text{kg/h}$ $C.V. = 42700\text{KJ/kg}$. Calculate: 1) Mechanical efficiency 2) Brake thermal efficiency. 3) BSFC.	A	1	
			A	4	

P.T.O.

	b)	Following observations are recorded during a trial on 4-stroke cycle diesel engine Fuel supplied = 0.1 kg/min C.V. of fuel = 45000KJ/kg BP = 37KW Mass of cooling water = 10kg/min. Rise in temperature of cooling water = 30°C. Air supplied = 5 kg/min Ambient temperature = 30°C. Temperature of exhaust gas = 200°C Sp. Heat of exhaust gas = 1 KJ/kg K Sp. Heat of water = 4.2 KJ/kg K Draw heat balance sheet on minute basis.	A	3	
	c)	An air standard diesel cycle has compression ratio of 14. The pressure at the beginning of the compression stroke is 1 bar and the temperature is 27°C. The maximum temperature is 2500°C. Determine thermal efficiency.	A	4	
QN	S Q N	Section- II	R/ U/ A	Co MEF 401	Mar ks
Q.4		Attempt any FOUR :			08
	a)	Define isothermal efficiency of compressor.	R	5	
	b)	Draw P-V & T-S diagram for single stage reciprocating compressor	U	5	
	c)	State the advantages of Ram Jet.	R	5	
	d)	State Dalton's law of partial pressure.	R	6	
	e)	Define unit of Refrigeration.	R	6	
	f)	Draw labeled conceptual lien sketch of Refrigerator and Heat pump.	U	6	
Q.5		Attempt any FOUR :			16
	a)	A compressor draws 42.5m ³ of air per minute into the compressor at a pressure of 1.05bar. It is compressed polytropically ($PV^{1.3} = C$) to a pressure of 4.2 bar before being delivered to a receiver. Assuming mechanical efficiency 80%. Find i) Indicated power ii) Shaft power.	A	5	
	b)	Draw a neat sketch of vane compressor and label the different parts. Also draw its P-V diagram.	U	5	
	c)	Explain working of turbojet with neat sketch.	U	5	
	d)	Draw a line diagram of vapour compression system and state function of its each part.	U	6	
	e)	Define specific humidity. Derive its expression stating meaning of each term.	R	6	
	f)	Represent subcooled vapour compression cycle on T-S and P-h diagram and state its each processes. What is the effect of subcooling?	U	6	

Q.6	Attempt any TWO:			16
a)	The following observations are recorded during trial on a two stage single acting reciprocating air compressor FAD= $6\text{m}^3/\text{min}$. Atmosphere pressure and temperature are 1 bar and 27°C . Delivery pressure = 40bars, speed= 400rpm; intermediate pressure = 6 bar; temperature at inlet to second stage = 27°C ; law of compression $PV^{1.3} = \text{C}$; mechanical efficiency = 80% ; stroke of LP = diameter of LP Calculate i) Power required ii) cylinder dimensions of LP cylinder.	A	5	
b)	Explain any two methods for improvement of thermal efficiency of Gas turbine,	R	5	
c)	With neat sketch explain working of window air conditioner.	U	6	

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

ODD TERM END EXAM NOV/DEC -2018**EXAM SEAT NO.**

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LEVEL: FIFTH**PROGRAM: MECHANICAL ENGINEERING****COURSE CODE: MEE510/ME411****COURSE NAME: Industrial Hydraulics & Pneumatic.****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 04/12/2018****Instruction:-**

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

		Marks
Q.1	Attempt any FOUR	(08)
	a) State any four desirable properties of Hydraulic oil.	
	b) Why only positive displacement pumps are used in Hydraulic systems ?	
	c) What is the function of pressure relief valve in a Hydraulic circuit. Draw symbol of it.	
	d) Define viscosity index.	
	e) Draw symbol of 4/2 lever operated spring return direction control valve.	
	f) State any four industrial applications of Hydraulic system.	
Q.2	Attempt any FOUR	(16)
	a) Draw general layout of Hydraulic system. Name the different elements used in Hydraulic system.	
	b) Explain with neat sketch Gear pump.	
	c) Explain with neat sketch pilot operated pressure relief valve.	
	d) Explain with neat sketch Double acting cylinder.	
	e) State functions of accumulator. Sketch any one type of accumulator.	
	f) Draw neat sketch of bleed of circuit.	
Q.3	Attempt any FOUR	(16)
	a) State advantages and limitations of Hydraulic system.	
	b) Explain Selection of Hydraulic systems for machine.	
	c) What are the functions of seals. Enlist various types of seals.	
	d) Explain with neat sketch telescopic cylinder. Draw symbol.	
	e) Draw neat sketch of 'Meter out' Hydraulic circuit.	
	f) Draw neat sketch of Hydraulic circuit for milling machine.	
Q.4	Attempt any FOUR	(08)
	a) Draw a symbol of 2/2 DC valve (spool type).	

(P.T.O.)

	b)	Classify air compressors.		
	c)	Enlist basic components of pneumatic systems.		
	d)	What are the advantages of pneumatic system over hydraulic system.		
	e)	What are the safety measures to be considered while operating with pneumatic system.		
	f)	Enlist different types of fittings in pneumatic system.		
Q.5		Attempt any FOUR		(16)
	a)	Sketch and explain "Time Delay Circuit".		
	b)	Compare pneumatic motors with electric motors.		
	c)	Explain the FRL unit with neat sketch. Write functions of each part.		
	d)	With help of Block diagram, sketch the layout of pneumatic system ? Explain the functions of main components.		
	e)	Explain any one type of rotary compressor with labelled diagram.		
	f)	Draw and explain sequencing circuit		
Q.6		Attempt any FOUR		(16)
	a)	i) What is the use of hose pipe in pneumatic system ? ii) Explain the importance of dryer as a air preparation element.		
	b)	Explain shuttle valve with neat sketch.		
	c)	Compare pneumatic system with hydraulic system.		
	d)	Write a note on "Selection and proper care of seals".		
	e)	Explain the maintenance need of pneumatic system.		
	f)	Explain the working & application of Diaphragm type pressure regulating valve with neat sketch.		

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM NOV./DEC-2018**EXAM SEAT NO.**

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LEVEL :- FOURTH PROGRAM : MECHANICAL ENGINEERING**COURSE CODE :- MEF403/MEE403****COURSE NAME :- ADVANCE MACHINING PROCESSES****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 10/12/2018****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 Q N	Section - I		R/ U/ A	Co MEF 403	Mar ks
Q.1		Attempt any TWO :				08
	a)	How milling machines are classified?		R	1	
	b)	Differentiate between End milling and face milling operation.		U	1	
	c)	Explain disadvantages of EDM process.		R	4	
Q.2		Attempt any FOUR :				16
	a)	What are the different methods of indexing? Explain direct indexing method.		A	2	
	b)	What is straddle milling? When it is used?		U	1	
	c)	Explain the working of gear shaping process.		A	2	
	d)	Describe the limitations of gear hobbing method.		U	2	
	e)	Explain the characteristics of dielectric fluid used in EDM process.		U	4	
	f)	Describe Wirecut EDM process with neat sketch.		U	4	
Q.3		Attempt any FOUR :				16
	a)	Explain the characteristics of plain milling cutter.		U	1	
	b)	Explain any four work holding devices		U	1	
	c)	Explain with suitable example, simple indexing method.		A	2	
	d)	Explain gear grinding with neat sketch.		A	2	
	e)	Explain applications of LBM		U	4	
	f)	Explain with neat sketch, working of EBM.		U	4	

P.T.O

Section- II					Mar ks
QN	S Q N		R/ U/ A	Co MEF 403	
Q.4		Attempt any FOUR :			08
	a)	Define CNC part program.	R	4	
	b)	State the meaning of following codes used in CNC. i) G28 ii) M06	U	4	
	c)	Define 'Dry run and JOG Mode' in CNC.	R	4	
	d)	State the classification of CNC machine.	R	4	
	e)	Give one example of absolute co-ordinate system.	A	4	
	f)	Explain Housekeeping.	R	5	
Q.5		Attempt any FOUR :			16
	a)	Describe the maintenance practice for coupling and Gear.	A	5	
	b)	Explain the concept Total Preventative Maintenance(TPM)	U	5	
	c)	Enlist the safety procedure to be followed while using CNC machines.	U	5	
	d)	Explain the concept of 'Repair complexity' in maintenance with example. OR Describe "Axis identification in CNC".	U U	5 4	
	e)	With suitable example, explain incremental co-ordinate system used in CNC.	U	4	
	f)	Explain any four parts in CNC construction with sketch.	U	4	
Q.6		Attempt any TWO :			16
	a)	Explain in detail:- i) Open loop control system. Closed loop control system in CNC.	A	4	
	b)	Prepare a part program to machine the workpiece show in Fig. 1 on CNC Lathe Machine. Assume suitable data for programming.	R	5	
	c)	Classify in detail 'Types of maintenance'. Explain preventive maintenance process. State advantages and limitations.	U	5	

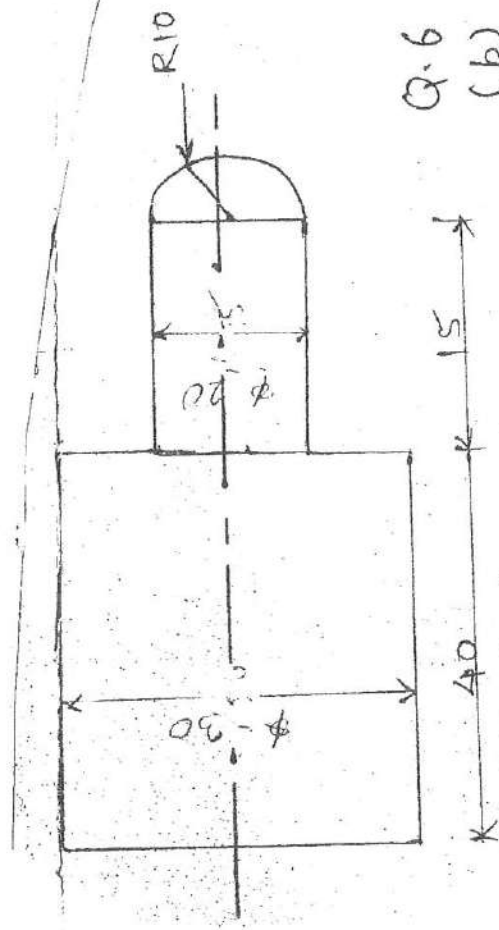


Fig. 1

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

ODD TERM END EXAM NOV/DEC -2018**EXAM SEAT NO.**

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LEVEL: THIRD**PROGRAM: MECHANICAL ENGINEERING****COURSE CODE: MEF302/ME202/MEE302****COURSE NAME: Thermal Engineering.****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 03/12/2018****Instruction:-**

- 1) Answers must be written in the 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

QN	S. Q. N	Question Text	Cognition Level R/U/A	Co Code MEF 302	Marks
Q.1		Attempt any FOUR			(08)
	a)	Define the thermodynamic property “Temperature” ? List the temperature measuring devices ?	U	1	
	b)	Illustrate path function of any thermodynamic process ?	U	1	
	c)	Define specific enthalpy ? Give its units ?	R	1	
	d)	Define extensive property and give its examples.	R	1	
	e)	Illustrate heat engine with lable ? Give its efficiency equation ?	U	2	
	f)	State Newton’s law of cooling ?	U	3	
Q.2		Attempt any FOUR			(16)
	a)	Compare clearly between the following giving examples ? i) Closed and open system. ii) Heat and work.	U	1	
	b)	Explain the concept of “Thermodynamic equations” ?	U	1	
	c)	Explain first law of thermodynamics for closed system undergoing a cycle ?	U	2	
	d)	A centrifugal air compressor receives air at 100 kPa, and 300 k and it discharges air at 400 KPa and 500 k. The velocity of air leaving the compressor is 100 m/s. Neglecting the relelocity at the entry of the compressor, determine the power required to drive the compressor for a mass flow rate of 15 kg/s ? Take $c_p = 1 \text{ KJ/kgK}$ and assume there is no heat transfer from the compressor to the surroundings ?	A	2	

P.T.O.

	e)	Draw the following ideal gas processes on P-V and T-S planes ? i) Adiabatic compression process. ii) Isothermal compression process.	R	1	
	f)	A vessel of 0.03m^3 capacity contain gas at 350 KN/M^2 pressure and 85°C temperature ? Determine the mass of gas in the vessel. If the pressure of this gas is increased to $1.05 \times 10^6\text{ N/M}^2$ while the volume remains constant, what will be the temperature of gas ? Take $R=290\text{ J/kgK}$ for the gas.	A	2	
Q.3		Attempt any TWO			(16)
	a)	Show that Kelvin plank and clausious statements of second law of thermodynamics are equivalent ?	R	2	
	b)	One kg of air at a pressure of 14 bar occupies 0.6m^3 and from this condition if expands to 1.4 bar according to law $PV^{1.25}=C$. Find – i) Change in internal energy. ii) Work done by air. Assume $C_p=1.005\text{ KJ/Kgk}$ and $C_v=0.718\text{ kJ/kgk}$.	A	2	
	c)	A refrigerator wall is constructed with two metallic plates 2 mm thick with 5 cm of glass wool insulation between them. Find the heat transfer per m^2 of air if inner and outer surface temperatures are -10°C and 40°C . Assume thermal conductivity of metallic plates and glass wool are 50 W/MK and 0.1 W/MK respectively ?	A	3	
Q.4		Attempt any FOUR			(08)
	a)	Define the terms : i) Dry steam, ii) Superheated steam.	R	4	
	b)	What is function of steam boiler ? State its two applications.	A	5	
	c)	What is nozzle ? State its continuity equation with meaning of every parameter.	R/U	6	
	d)	Classify the steam turbine according to : i) Principle of action of steam, ii) Direction of steam flow.	U	6	
	e)	State two functions of steam condenser.	R	7	
	f)	State Dalton's law of partial pressure.	R	7	

Q.5	Attempt any FOUR		(16)
a)	Sketch Rankine cycle on P-V and T-S diagram.	U	4
b)	Define following terms : i) Sensible heat, ii) Latent heat, iii) Specific volume, iv) Dryness fraction.	R	4
c)	Differentiate between boiler mountings and accessories (any four points)	U	3
d)	Explain pressure compounding with neat sketch.	U	6
e)	What is regenerative feed heating ?	R	6
f)	Compare jet and surface condensers (any four points)	U	7
Q.6	Attempt any TWO		(16)
a)	Determine the quantity of heat required to generate 5 kg of steam at a pressure of 8 bar absolute from water at a temperature of 40°C : i) When the dryness fraction = 0.98. ii) When the steam is dry saturated. iii) When steam is superheated at constant pressure to 300°C . Assume mean specific heat for superheated steam to be $2.1 \text{ KJ/kg}^{\circ}\text{K}$.	A	4
b)	i) Sketch and explain working of Loeffler Boiler. ii) Why boiler draught is necessary ? Explain natural boiler draught.	R U	5 5
c)	i) Differentiate between impulse and reaction turbine. ii) Differentiate between natural draught and forced draught cooling tower (any four points).	U	7

GOVERNMENT POLYTECHNIC, KOLHAPUR - 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM NOV./DEC-2018

EXAM SEAT NO.

LEVEL :- FOURTH

PROGRAM : MECHANICAL ENGINEERING

COURSE CODE :- MEF402/M302/ME302/MEE402

COURSE NAME MACHINE DESIGN

MAX. MARKS : 80 TIME : 3 HRS. DATE :- 06/12/2018

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	Section-I	R/ U/ A	Co MEF 402	Mar ks
Q.1		Attempt any FOUR:			08
	a)	Define standardization.	R	1	
	b)	State the advantage of preferred numbers.	R	1	
	c)	Give the meaning of following designations of steel. i) Fe320 ii) 40Cr4	U	1	
	d)	Write the use of taper provided on cotter.	U	2	
	e)	List down different forms of threads.	R	3	
	f)	What are the factors that cause over-hauling of the screw?	U	3	
Q.2		Attempt any FOUR:			16
	a)	Describe the logical steps in the procedure of designing machine elements.	A	1	
	b)	Define factor of safety. State any four factors to be considered while selecting the factor of safety.	U	1	
	c)	A mild steel rod of 12mm diameter was tested for tensile strength with the gauge length of 60mm. Following observations were recorded. Final length=80mm, Final diameter=7mm, Yield load=3.4KN and ultimate load = 6.1KN. Calculate: 1 yield stress 2. Ultimate tensile stress	A	2	
	d)	Explain maximum principal stress theory of failure.	U	2	
	e)	Compare square and trapezoidal threads (any four points)	R	3	
	f)	A bolt is subjected to an axial shock load so that the maximum applied load equals to 10KN. Assuming an allowable tensile stress of 50N/mm^2 . Determine the size of bolt, using fine threads, neglect stress concentration. It is desired to increase the shock absorbing capacity of the above bolt. Determine the diameter of the bolt required to be drilled in the bolt of uniform strength.	A	3	
Q.3		Attempt any TWO:			16
	a)	Design a knuckle joint to connect the valve and eccentric rods of the steam engine. The maximum pull on the joints is 8000N. Explain with the help of neat sketches the different ways of failure of the joint Take: $F_t = 70\text{N/mm}^2$, $F_c = 150\text{N/mm}^2$, $F_s = 45\text{N/mm}^2$, $F_{\text{bearing}} = 45\text{N/mm}^2$.	U	3	

P.T.O.

	b)	Following data is given for a machinist's clamp 1) Type of thread = single start square. 2) Nominal diameter = 20mm 3) Pitch 5mm 4) Collar friction radius = 8mm The coefficient of friction at the threads and the collar is 0.15. The operator exerts a force of 50N on the handle at a distance of 150mm from the axis of the screw. Determine the maximum clamping force that can be developed.	A	3	
N	c)	Explain the term 'Bolt of uniform strength'. Describe two methods to obtain bolt of uniform strength.	R/ U/ A	Co MEF 402	Mar ks
Q.4		Section- II Attempt any FOUR :			08
	a)	Represent completely reversed stress on stress time curve.	U	4	
	b)	In a rigid coupling having six bolts transmits 425N.m torque. Bolt circle diameter is 250mm. Calculate force on each bolt.	A	4	
	c)	Write the four applications of springs.	R	5	
	d)	Two helical compression springs are connected in parallel. The spring rate is 40 N/mm and 60N/mm. The deflection of spring is 50mm. Calculate the force acting on spring.	A	5	
	e)	Define i) Diametral pitch ii) Addendum for a spur gear teeth.	R	5	
	f)	Give any two advantages of 20° pressure angle system.	U	5	
Q.5		Attempt any FOUR :			16
	a)	Describe rotating beam fatigue machine and represent on S-N diagram.	U	4	
	b)	The 35KW power at 400 rpm is transmitted by 60mm dia. shaft. The cross section of rectangle key is 28 X 20mm. the key is made of material with yield strength 300 N/mm ² and factor of safety is 3. Determine the length of key.	A	4	
	c)	A hollow shaft having $\frac{d_i}{d_o} = 0.5$ and angle of twist is 2° for 800mm length. A shaft transmits 45KW power at 700 rpm. A modulus of rigidity for shaft material is 84,000N/mm ² . Calculate inner diameter 'di' and outer diameter 'do' of shaft.	A	4	
	d)	Derive a deflection equation for helical compression spring.	U	5	
	e)	List any four advantages of gear drive compared with chain drive or belt drive.	R	5	
	f)	Write the basic procedure for selection of bearing from manufacturers catalogue.	U	5	
Q.6		Attempt any TWO :			16
	a)	A section of commercial shafting 4m long between bearing carries 2000N weight pulley at its midpoint. The pulley is keyed to shaft and receives 25kw at 300 rpm. The belt drive is horizontal and sum of belt tension is 6000N. Assume $K_b = K_t = 1.5$. The permissible shear stress is 40N/mm ² . Calculate shaft diameter.	A	4	

P.T.O.

b)	A railway truck having 600kg mass is moving with 3 m/sec velocity and dashes against a bumper consisting of two helical spring of spring index '6'. The spring get compressed by 200mm. the spring material has allowable shear stress of 450N/mm^2 and modulus of rigidity is $85,000\text{ N/mm}^2$. Calculate i) Wire diameter ii) Mean coil diameter iii) Number of active turns iv) Total number of turns. (assume square and ground end.) v) total length vi) Pitch of spring.	A	5	
c)	i) A 20 teeth pinion rotates at 1800 rpm and transmit 5KW power to 60 teeth gear. The teeth has a module of 3mm and face width as 12mm. (Assume $Y=0.254$) 1) Tangential force acting on gear having 20° pressure angle 2) Bending stress into the teeth. ii) A Radial load bearing carries a load of 5KN rotating at 1500rpm and life of bearing is 8000 hrs. Calculate dynamic load of bearing.	A	5	04

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

ODD TERM END EXAM NOV/DEC -2018

EXAM SEAT NO.

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LEVEL: **THIRD**

PROGRAM: CE/ME /MT

COURSE CODE: CEF301/MEF301/1201/C201/CEE301/2201/ME201/MEE301/MT201/MG201/MTE301

COURSE NAME: **APPLIED MATHEMATICS**

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **03/12/2018**

Instruction:-

- 1) Answers must be written in the 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	S Q N	Question Text	R U A	CO CEF 301	Marks
Q.1		Attempt any FOUR			(08)
	a)	Define Indefinite integration.	R	1	
	b)	Show that $\int 3^x 2^x dx = \frac{6^x}{\log 6} + c$	U	1	
	c)	Show that $\int_2^3 \frac{dx}{3x-2} = \frac{1}{3} \log 4$	U	1	
	d)	State integration by parts rule.	R	1	
	e)	Evaluate $\int_0^{\pi/2} \sin x \cos x dx$	A	1	
	f)	Find the area under the curve $y = x^3$ from $x=1$ to $x=3$	A	1	
Q.2		Attempt any FOUR			(16)
	a)	Evaluate $\int \frac{dx}{5-4\cos x}$	A	1	
	b)	Evaluate $\int x \sin^{-1} x dx$	A	1	
	c)	Evaluate $\int_3^5 \frac{\sqrt{8-x}}{\sqrt{x}+\sqrt{8-x}} dx$	A	1	
	d)	Evaluate $\int \frac{x+2}{\sqrt{x^2+5x+6}} dx$	A	1	
	e)	Evaluate $\int_0^{\pi/4} \log(1+\tan x) dx$	A	1	
	f)	Find the area bounded by the curve $y^2=2x$ and the line $x-y=4$	A	1	
Q.3		Attempt any FOUR			(16)
	a)	Show that $\int \frac{dx}{4\cos^2 x + 9\sin^2 x} = \frac{1}{6} \tan^{-1} \left(\frac{3 \tan x}{2} \right) + c$	U	1	
	b)	Show that $\int \frac{(x-1)e^x}{x^2 \cos^2(e^x/x)} dx = \tan \left(\frac{e^x}{x} \right) + c$	U	1	
	c)	Evaluate $\int \frac{\tan x \sec^2 x}{(4+\tan x)(9+\tan x)} dx$	A	1	
	d)	Evaluate $\int_1^e \log x dx$	A	1	

P.T.O.

	e)	Find the R.M.S value of current $I = 10 \sin 80\pi t$ over a complete period.	A	1																		
	f)	Find Mean value of $y = x^2 - x - 12$ between the points where it cuts the x axis.	A	1																		
Q.4		Attempt any FOUR		(08)																		
	a)	Define order and degree of a D.E.	R	2																		
	b)	State the type of the D.E. $(3x^2 + 6xy^2)dx + (6x^2y + 4y^2)dy = 0$ Justify.	R	2																		
	c)	What is the Integrating factor of a D.E. $\cos^2 x \frac{dy}{dx} + y = \tan x$	U	2																		
	d)	The C.V for a series is 40 and S.D is 8. Find the mean.	R	3																		
	e)	Two series X and Y have means 30 and 40 and S.D 10 and 15 respectively. Which series has more variability?	U	3																		
	f)	If A and B are two events such that $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{7}{12}$ find $P(A' \cap B')$	R	4																		
Q.5		Attempt any FOUR		(16)																		
	a)	Show that the solution of D.E $y \frac{dy}{dx} - \frac{4x}{3} - \frac{y^2}{3x} = 0$ is $x^2 = c(4x^2 - 2y^2)^3$	U	2																		
	b)	Solve $\frac{dy}{dx} = \frac{\sin x + x \cos x}{y(1 + 2 \log y)}$	A	2																		
	c)	Solve $(1 + e^{\frac{x}{y}})dx + e^{\frac{x}{y}}(1 - \frac{x}{y})dy = 0$	A	2																		
	d)	Solve $\frac{dy}{dx} + y \cot x = x$	A	2																		
	e)	Solve $\sec^2 x \tan y dx + \sec^2 y \tan x dy = 0$	A	2																		
	f)	The mean and the S.D of 100 observations were 40 and 5.1 as calculated by a student. But he took 50 instead of 40 for one observation. Calculate correct mean and correct S.D.	U	3																		
Q.6		Attempt any FOUR		(16)																		
	a)	Show that the mean deviation from the mean for the following data is 10.54	U	3																		
		<table><tr><td>Wight in kg</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td></tr><tr><td>No. of persons</td><td>4</td><td>6</td><td>10</td><td>18</td><td>9</td><td>3</td></tr></table>	Wight in kg	10-20	20-30	30-40	40-50	50-60	60-70	No. of persons	4	6	10	18	9	3						
Wight in kg	10-20	20-30	30-40	40-50	50-60	60-70																
No. of persons	4	6	10	18	9	3																
	b)	Calculate mean and S.D for the following data:	A	3																		
		<table><tr><td>C.I</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td></tr><tr><td>Frequency</td><td>14</td><td>23</td><td>27</td><td>21</td><td>15</td></tr></table>	C.I	0-10	10-20	20-30	30-40	40-50	Frequency	14	23	27	21	15								
C.I	0-10	10-20	20-30	30-40	40-50																	
Frequency	14	23	27	21	15																	
	c)	Find S.D and C.V for the data given below.	A	3																		
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f_i	07	10	16	24	21	16	06															
	d)	Find S.D by using step deviations method for the following data	A	3																		
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No. of deaths in Town	5	3	2	6	5	13	16	30														
	e)	From 20 tickets marked 1 to 20, one ticket is drawn at random. Show that the probability is 9/20 if it is marked with multiple of 3 or 5.	U	4																		
	f)	A problem is given to three students A, B and C whose chances of solving it are $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{4}$ respectively. What is the probability that the problem will be solved?	A	4																		

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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ODD TERM END EXAM NOV/DEC -2018

EXAM SEAT NO.

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LEVEL: **THIRD**

PROGRAM: CE/ME /MT

COURSE CODE: CEF301/MEF301/1201/C201/CEE301/2201/ME201/MEE301/MT201/MG201/MTE301

COURSE NAME: APPLIED MATHEMATICS

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **03/12/2018**

Instruction:-

- 1) Answers must be written in the 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	S Q N	Question Text	R U A	CO CEF A 301	Marks
Q.1		Attempt any FOUR			(08)
	a)	Define Indefinite integration.	R	1	
	b)	Show that $\int 3^x 2^x dx = \frac{6^x}{\log 6} + c$	U	1	
	c)	Show that $\int \frac{dx}{3x-2} = \frac{1}{3} \log 4$	U	1	
	d)	State integration by parts rule.	R	1	
	e)	Evaluate $\int_0^{\pi/2} \sin x \cos x dx$	A	1	
	f)	Find the area under the curve $y = x^3$ from $x=1$ to $x=3$	A	1	(16)
Q.2		Attempt any FOUR			
	a)	Evaluate $\int \frac{dx}{5-4\cos x}$	A	1	
	b)	Evaluate $\int x \sin^{-1} x dx$	A	1	
	c)	Evaluate $\int_3^5 \frac{\sqrt{8-x}}{\sqrt{x} + \sqrt{8-x}} dx$	A	1	
	d)	Evaluate $\int \frac{x+2}{\sqrt{x^2+5x+6}} dx$	A	1	
	e)	Evaluate $\int_0^{\pi/4} \log(1+\tan x) dx$	A	1	
	f)	Find the area bounded by the curve $y^2=2x$ and the line $x-y=4$	A	1	(16)
Q.3		Attempt any FOUR			
	a)	Show that $\int \frac{dx}{4\cos^2 x + 9\sin^2 x} = \frac{1}{6} \tan^{-1} \left(\frac{3 \tan x}{2} \right) + c$	U	1	
	b)	Show that $\int \frac{(x-1)e^x}{x^2 \cos^2(e^x/x)} dx = \tan \left(\frac{e^x}{x} \right) + c$	U	1	
	c)	Evaluate $\int \frac{\tan x \sec^2 x}{(4+\tan x)(9+\tan x)} dx$	A	1	
	d)	Evaluate $\int_1^e \log x dx$	A	1	

P.T.O.

e)	Find the R.M.S. value of current $I = 10 \sin 80\pi t$ over a complete period.	A	1																		
f)	Find Mean value of $y = x^2 - x - 12$ between the points where it cuts the x axis.	A	1																		
Q.4																					
a)	Attempt any FOUR		(08)																		
a)	Define order and degree of a D.E.	R	2																		
b)	State the type of the D.E. $(3x^2 + 6xy^2)dx + (6x^2y + 4y^3)dy = 0$ Justify.	R	2																		
c)	What is the Integrating factor of a D.E. $\cos^2 x \frac{dy}{dx} + y = \tan x$	U	2																		
d)	The C.V for a series is 40 and S.D is 8. Find the mean.	R	3																		
e)	Two series X and Y have means 30 and 40 and S.D 10 and 15 respectively. Which series has more variability?	U	3																		
f)	If A and B are two events such that $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{7}{12}$ find $P(A' \cap B')$	R	4																		
Q.5																					
a)	Attempt any FOUR		(16)																		
a)	Show that the solution of D.E $y \frac{dy}{dx} - \frac{4x}{3} - \frac{y^2}{3x} = 0$ is $x^2 = c(4x^2 - 2y^2)^3$	U	2																		
b)	Solve $\frac{dy}{dx} = \frac{\sin x + x \cos x}{y(1 + 2 \log y)}$	A	2																		
c)	Solve $(1 + e^{\frac{x}{y}})dx + e^{\frac{x}{y}}(1 - \frac{x}{y})dy = 0$	A	2																		
d)	Solve $\frac{dy}{dx} + y \cot x = x$	A	2																		
e)	Solve $\sec^2 x \tan y dx + \sec^2 y \tan x dy = 0$	A	2																		
f)	The mean and the S.D of 100 observations were 40 and 5.1 as calculated by a student. But he took 50 instead of 40 for one observation. Calculate correct mean and correct S.D.	U	3																		
Q.6																					
a)	Attempt any FOUR		(16)																		
a)	Show that the mean deviation from the mean for the following data is 10.54																				
	<table><tr><td>Wight in kg</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td></tr><tr><td>No. of persons</td><td>4</td><td>6</td><td>10</td><td>18</td><td>9</td><td>3</td></tr></table>	Wight in kg	10-20	20-30	30-40	40-50	50-60	60-70	No. of persons	4	6	10	18	9	3	U	3				
Wight in kg	10-20	20-30	30-40	40-50	50-60	60-70															
No. of persons	4	6	10	18	9	3															
b)	Calculate mean and S.D for the following data:	A	3																		
	<table><tr><td>C.I</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td></tr><tr><td>Frequency</td><td>14</td><td>23</td><td>27</td><td>21</td><td>15</td></tr></table>	C.I	0-10	10-20	20-30	30-40	40-50	Frequency	14	23	27	21	15								
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e)	From 20 tickets marked 1 to 20, one ticket is drawn at random. Show that the probability is $\frac{9}{20}$ if it is marked with multiple of 3 or 5.	U	4																		
f)	A problem is given to three students A, B and C whose chances of solving it are $\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{4}$ respectively. What is the probability that the problem will be solved?	A	4																		

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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ODD TERM END EXAM NOV/DEC -2018**EXAM SEAT NO.**

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LEVEL: THIRD**PROGRAM: MECHANICAL ENGINEERING****COURSE CODE: MEF304/ME204/MEE304 COURSE NAME: MANUFACTURING PROCESS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 07/12/2018****Instruction:-**

- 1) Answers must be written in the 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

S	Q	Question Text	R	CO	Mar ks
Q.1		Attempt any FOUR			(08)
	a)	List desired properties of good wax pattern material.	R	4	
	b)	State main characteristics of a good core sand.	U	3	
	c)	State advantages of die casting.	U	4	
	d)	Explain the function of core print.	R	2	
	e)	State the applications of cold chamber die casting and hot chamber die casting.	A	4	
	f)	Distinguish between baking sand and facing sand.	A	1	
Q.2		Attempt any FOUR			(16)
	a)	Explain hot chamber die casting with neat sketch.	U	4	
	b)	Explain about induction furnace in detail.	A	1	
	c)	Explain zones of cupola in detail.	U	1	
	d)	State the desirable properties of a moulding sand from stand point of sound casting.	R	3	
	e)	State the specific applications for the following pattern materials. i) Wood ii) Plastic iii) Metal iv) Rubber	A	2	
	f)	Draw neat sketches of the following core prints i) Vertical core print ii) Horizontal core print iii) Tail core print iv) Side core print	R	3	
P.T.O					

Q.3	Attempt any FOUR			(16)
a)	State and explain the casting principle.	R	4	
b)	Differentiate between cold shut and mis-run with reference to the causes and method of prevention.	A	4	
c)	Explain colour coding for pattern and core boxes.	R	2	
d)	Explain shell moulding in detail with neat sketch	A	3	
e)	Differentiate between single piece pattern and split pattern.	A	2	
f)	State the steps of making green sand mould and draw neat sketch of a completed green sand mould and label the various important parts.	R	3	
Q.4	Attempt any FOUR			(08)
a)	Define 'pressure welding'.	R	1	
b)	Classify resistance welding methods.	U	1	
c)	Define the term 'die'	R	1	
d)	Sketch an 'Adjustable bed press'	U	1	
e)	Enlist different types of hammers used in press forging.	R	4	
f)	State the material used for forging die.	R	4	
Q.5	Attempt any FOUR			(16)
a)	Describe TIG welding process with sketch.	U	4	
b)	Sketch seam welding set up. State its applications.	U	4	
c)	Sketch carburising flame. Show its details.	U	4	
d)	Write about gas welding techniques.	U	1	
e)	Sketch a die set and show the details.	U	1	
f)	Compare between punching and blanking operation.	A	4	
Q.6	Attempt any FOUR			(16)
a)	Compare between hot rolling and cold rolling.	A	4	
b)	Differentiate between indirect and direct extrusion.	A	4	
c)	Describe upsetting operation with sketch.	U	1	
d)	Describe drop forging with sketch.	U	1	
e)	Describe direct extrusion with sketch.	U	1	
f)	Write about grain flow in forged plate.	R	1	

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ODD TERM END EXAM NOV/DEC -2018

EXAM SEAT NO.

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LEVEL: **THIRD**

PROGRAM: **MECHANICAL ENGINEERING**

COURSE CODE: **MEF303/MEE303**

COURSE NAME: **MACHINE DRAWING**

MAX. MARKS: **80**

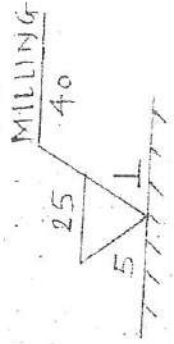
TIME: **3 HRS.**

DATE: **05/12/2018**

Instruction:-

- 1) Answers must be written in the 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.
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- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application

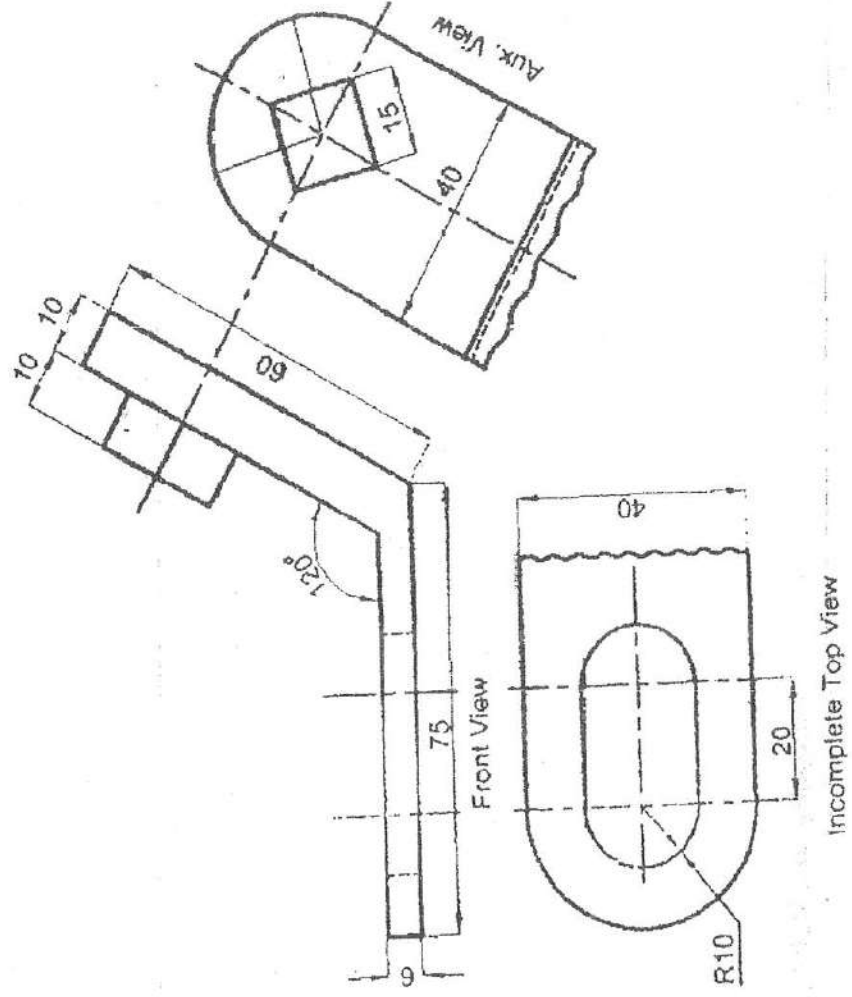
QN	S. Q. N	Question Text	Cognition Level R/U/A	Co Code MEF 303	Marks
Q.1		Attempt any TWO			(08)
	a)	Draw conventional representation of following : i) Leather, ii) External screw threads.	R	2	
	b)	The shaft size is given as $\text{Ø}40^{+0.02}_{-0.04}$ mm & hole size is given as $\text{Ø}40^{+0.02}_{-0.04}$ mm. Determine the type of fit between them.	U	4	
	c)	A square prism side of base 40mm, height 75mm is kept on H.P. on its base with its rectangular faces equally inclined to V.P.. It is penetrated by a horizontal square prism of side of base 30mm, axis length 75mm such that the axis of two prisms bisects each other at right angles. The two rectangular faces of horizontal prism are equally inclined to H.P. & axis is parallel to both H.P. & V.P.. Draw the projection of solids showing lines of intersection.	A	3	
Q.2		Attempt any TWO			(16)
	a)	Figure (1) shows F.V., incomplete T.V. & auxiliary view of an object. Redraw the given views and complete the T.V.	U	1	
	b)	i) Draw the symbols for the following : i) Straightness, ii) Position, iii) Cylindricity, iv) Profile of any line ii) Write down the meaning of symbol at 'X' in the figure shown below.	R	4	
			U	4	

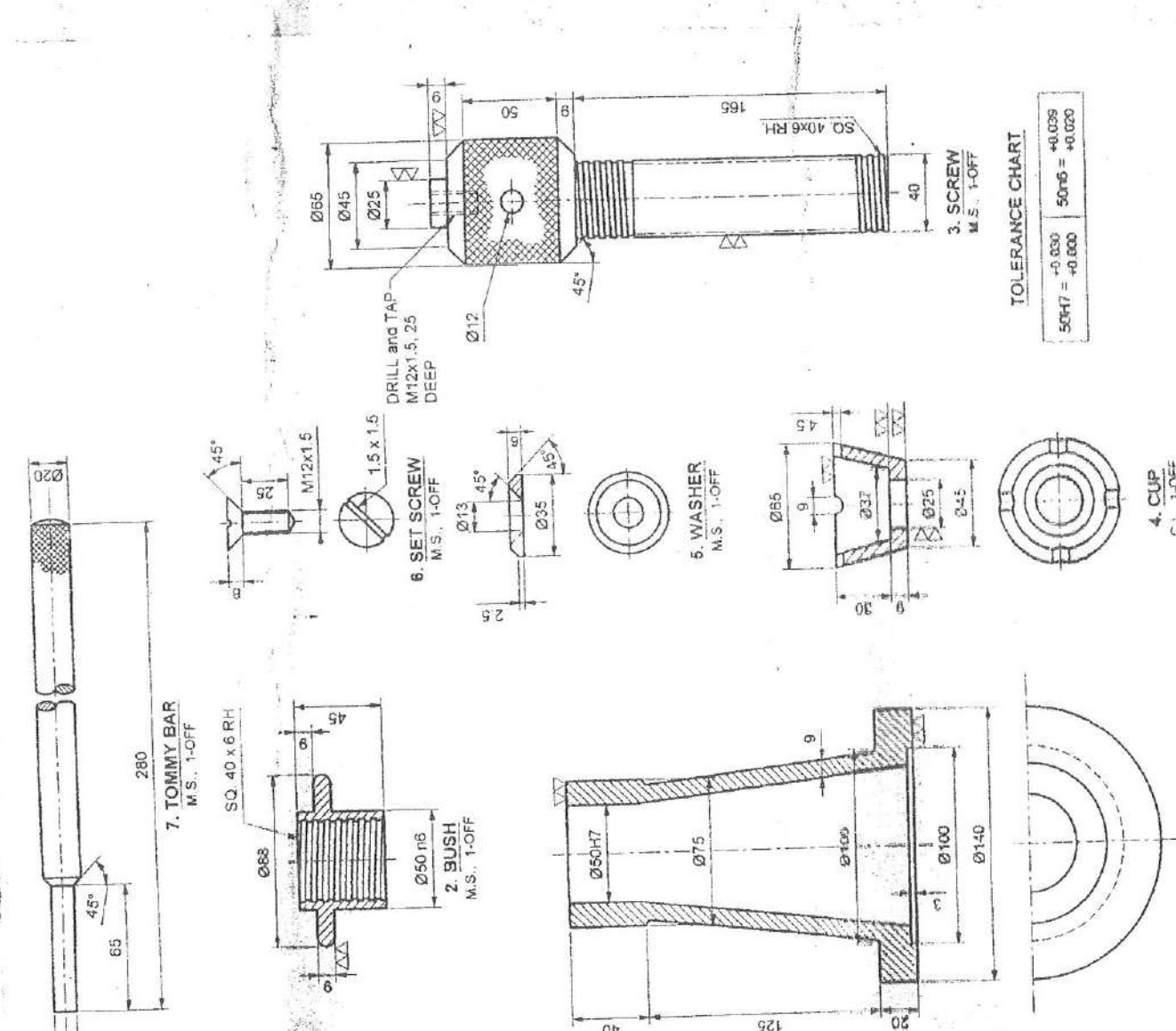
	c)	A vertical cylinder of $\phi 60\text{mm}$ is penetrated by another cylinder of same size. The axis of penetrating cylinder is parallel to both H.P. & V.P. & is 10mm away from the axis of vertical cylinder. Draw the projections of two cylinders showing curves of intersection. Assume length of vertical cylinder as 90mm & horizontal cylinder as 100mm.	A	3	
Q.3		Attempt any TWO.			(16)
	a)	Draw the conventional representation of the following : i) Splined shaft, ii) Gate valve, iii) Bevel Gear, iv) Conical helical compressim spring of wire of circular cross section.	R	2	
	b)	i) State the meaning of the symbol shown below, 	U	4	
		ii) Represent the welding drawing of two shafts with equal diameter, welded end-to-end by means of square butt weld with convex counter site.	U	4	
	c)	A cone of base diameter 70mm & axis height 65 mm is kept on H.P. on its base. It is penetrated by a cylinder having 35mm diameter, the axis of which is parallel to V.P. and 20 mm above the base of cone. Axis of cylinder is 5mm in front of axis of cone. Draw the projections of the solids showing curves of intersection.	A	3	
Q.4		Fig.(2) shows the details of screw jack. Assemble the parts and draw the following views : i) Sectional front view (12 marks) ii) Top view (04 marks) iii) Prepare bill of material (04 marks)	U	5	(20)
Q.5		Attempt any One			(20)
	a)	Fig. (3) Shows the assembly of tailstock. Draw the following details. i) Body sectional F.V. (08 marks) ii) Barrel (04 marks) iii) Hand wheel (Two view) (04 marks) iv) Spindle Bearing (Two view) (04 marks)	U	5	

	b) Fig. (4) shows the assembly of drill jig. Draw the following details showing appropriate dimensional & geometrical tolerances etc. if required : i) Stem – sectional front view (06 marks) ii) Jig plate – sect. F.V. & T.V. (06 marks) iii) Base plate (04 marks) iv) Prepare bill of material (04 marks)	U	5
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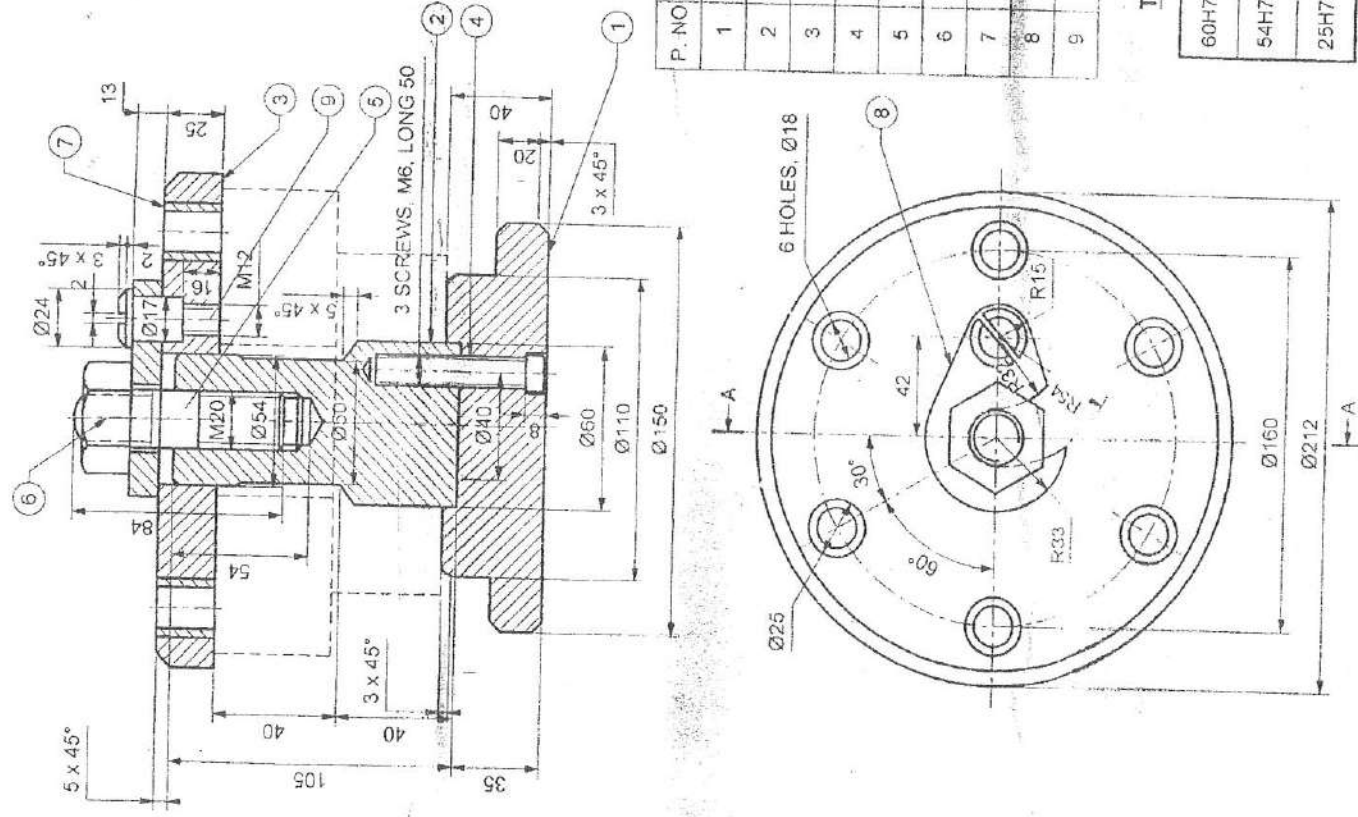
Machine Drawing Set No. 1

Que. No. 2) a) Fig. 1.



Q-4	Question text	Cognition Level R/U/A	CO Code	Marks out of		
	 1. BODY C.I., 1-OFF 2. BUSH M.S., 1-OFF 3. SCREW M.S., 1-OFF 4. CUP C.I., 1-OFF 5. WASHER M.S., 1-OFF 6. SET SCREW M.S., 1-OFF 7. TOMMY BAR M.S., 1-OFF DRILL and TAP M12x1.5, 25 DEEP TOLERANCE CHART <table border="1"> <tr> <td>50H7 = +0.030 +0.000</td> <td>50h6 = +0.039 +0.020</td> </tr> </table>	50H7 = +0.030 +0.000	50h6 = +0.039 +0.020			
50H7 = +0.030 +0.000	50h6 = +0.039 +0.020					

Q-4 - Fig. (2) details of screw Jack



PART LIST

P. NO	PART NAME	MAT	QTY
1	BASE PLATE	C.I.	1
2	STEM	M.S.	1
3	JIG PLATE	C.I.	1
4	SCREW	M.S.	3
5	STUD	M.S.	1
6	NUT	M.S.	1
7	BUSH (JIG)	STEEL	6
8	WASHER	M.S.	1
9	SCREW	M.S.	1

TOLERANCE CHART

60H7 = +0.030 +0.000	60f7 = -0.030 -0.049
54H7 = +0.030 +0.000	54f7 = -0.030 -0.049
25H7 = +0.021 +0.000	25n6 = +0.028 +0.015

Q-5 (b) Fig. 4 Assembly of 'Drill Jig'.

