ME

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2018

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCF202/CEE202** COURSE NAME: **COMMUNICATION SKILLS**

MAX. MARKS: **40** TIME: **2 HRS.** DATE: **18/05/2018**

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

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QN	SQN	Question Text	RUA	CO CCF202	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Write roles and responsibilities of sender in communication.	U	1	
	b)	List the four examples of oral communication.	R	2	
	c)	Explain any two advantages of written communication.	U	3	
	d)	Define chronemics with suitable example.	R	4	
	e)	White board is the friend of teacher explain in short.	A	5	
	f)	Define telephonic interview.	R	6	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Explain the various uses of LCD projector.	U	5	
	b)	Explain the elements involved in a communication process.	U	1	
	c)	Write any four advantages and disadvantages of oral communication.	R	2	
	d)	Explain the role of body language in effective communication.	A	4	
	e)	State any four types of interview.	R	6	
	f)	Explain any four types of barriers that disturb smooth flow of communication.	U	1	
Q.3		Attempt any **TWO**			**(16)**
	a)	Explain the different types of communication.	R	1	
	b)	Write a letter of application along with your resume to modern Automobile factory Mumbai 400003 for the post of Junior engineer.	A	3	
	c)	An opinion poll was taken to find out how long the United Front Government would last. The following was the response. Full term =17% 2 to 3 years =16% 3 to 5 years =27% Don't know =40% Present the above information in the form a pie chart.	U	4	

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EVEN TERM END EXAM APR/MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL: **THREE** PROGRAM: **MECHANICAL ENGINEERING**

COURSE CODE: **MEF305/M205/ME205/MEE305** COURSE NAME: **THEORY OF ENGG. DESIGN**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **17/05/2018**

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

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QN	S. Q. N	Question Text	Cognition Level R/U/A	Co Code (ME F305)	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Define : i) Latral strain, ii) Poisson's ratio.	**E**	**1**	
	b)	Define : i) Resilience, ii) Proof Resilience.	**R**	**1**	
	c)	Differentiate between Gradually applied and suddenly applied loading.	**R**	**1**	
	d)	State the types of beams.	**R**	**2**	
	e)	Define moment of Inertia.	**R**	**3**	
	f)	Write the expression for MI of triangle about its base.	**R**	**3**	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Explain basic mechanical actions : i) Axial tension, ii) Flexure iii) Shear, iv) Torsion.	**U**	**1**	
	b)	For a given material the mechanical properties are modulus of Elasticity is 200GPa and modular of Rigidity is 80GPa. Calculate bulk modulus and Poisson's ratio.	**A**	**1**	
	c)	A bar of 12 mm diameter and 1 m in length is subjected to load of 8KN applied : i) Suddenly, ii) Gradualy. Calculate change in length in both cases. (Take E-120GPa)			
	d)	Calculate instatenous stress produced due to drop of load 5KN from 200 mm height on end of collar attached to 10mm dia bar of length 1.2m. (Take E=200 GPa)	**A**	**1**	
	e)	A cantilever beam of span 3.5m carries UVL 0 kn/m at its fixed end 10 KNm at its free end. Also point load of 18KN acts on midspan of beam. Draw SFD.	**A**	**2**	
	f)	For beam given in Q.2(e) Draw BMD.	**A**	**2**	

Q.3		Attempt any **TWO**			**(16)**
	a)	A rectangular bar of cross section 40mm x 80mm with length 250 mm. A compressive force of 200 KN acts in axial direction on its cross section. Calculate : i) Change of dimension in three directions, ii) Change in volume of bar. Take E=200 GPa and μ=0.25	**A**	**1**	
	b)	A simply supported beam of span 12m carries entire UDL of 6 KN/m along with anticlock wise couple of 120 KN/m at 2m from LHS and 50 KN & 20 KN point load at 2m & 6m from RHS respectively. Draw BMD & SFD and also find point for inflection if any.	**A**	**3**	
	c)	A cross section made up of symmetrical 'I' section about 'Y' axis with Top flange 200 mm x $\frac{10mm}{8mm\ x\ 250mm}$ calculate centroidal moment of Inertia about x and y axis. Also find polar moment of Inertia.	**A**	**3**	
Q.4		Attempt any **FOUR**			**(08)**
	a)	State flexural formula with meaning of each term.	**R**	**4**	
	b)	Define twisting moment state its S.I. unit.	**R**	**6**	
	c)	Draw shear stress distribution diagram for : i) Hollow rectangle ii) T section.	**U**	**4**	
	d)	A circular beam carries shear force 10 kn. Determine necessary diameter of beam if maximum shear stress induced is 1.5 N/mm^2.	**A**	**4**	
	e)	Define principal stress & plane.	**R**	**5**	
	f)	Differentiate between twisting moment & bending moment.	**U**	**6**	
Q.5		Attempt any **FOUR**			**(16)**
	a)	A short column has solid cross section in the form of equilateral triangle. Determine core of section for no tension condition.	**U**	**4**	
	b)	A beam 2.5 make long is simply supported & carries a point load 40 KN at the centre of beam, section of beam is 300 mm x 500 mm. Determine maximum bonding stresses at the mid span of the section.	**A**	**4**	
	c)	Draw the shear stress distribution for an equal angle section 100mm x 100 mm x 8 mm used as beam. The centroid of section is 28 mm from back of each leg. Ixx = 2 x 10^6 mm^4 & maximum shear force is 20 KN.	**A**	**4**	
	d)	Two wooden beams each of 90mm x 90mm are glued together to form a solid beam 90mm x 180mm. The solid beam is simply supported on a span 1.8 m. If the self weight of wood is 5500 N/m^3. Determine the greatest point load that can be applied at the centre of the beam if the permissible shear stress at the joint is 140 N/mm^2.	**U**	**4**	

	e)	The principal stresses at a point in a bar are 200 N/mm^2 tensile & 100 N/mm^2 compressive. Determine the resultant stress in magnitude & direction on a plan inclined at 60^0 to the axis of the major principal stress. Also determine the intensity of shear stress in the material at that point.	**A**	**5**	
	f)	A hollow aluminium shaft has an external diameter 100 mm & wall thickness of 25 mm. When the shaft is twisted, the angle of twist is 1.5^0 per meter. Determine the maximum shear stress produced & torque applied. Take $G=2.75 \times 10^4$ N/mm^2.	**A**	**6**	
Q.6		Attempt any **FOUR**			**(16)**
	a)	State any four assumptions in the theory of simple bending.	**R**	**4**	
	b)	A machine compenent of semicircular section 200 mm diameter acts as a simply supported beam of span 1.25 meter. It is placed with its base horizontal. If beam carries uniformly distributed load 100 KN/m on the whole span. Then determine the maximum bending stress induced.	**A**	**4**	
	c)	A piece of material is subjected to two perpendicular stresses 80 Mpa & 160 MPa both are tensile & shear stress 60 MPa. Determine principle stresses & its locations using Mohr's circle.	**A**	**5**	
	d)	The driving shaft of a truck has an outer diameter 75 mm & inner diameter 50mm, it runs at 2500 rpm. i) If shaft transmits 300 kw. What is maximum shear stress in shaft. ii) If permissible shear stress is 30 N/mm^2, what is maximum power that can be transmitted.	**A**	**6**	
	e)	A solid shaft of 200 mm diameter has same cross sectional area as that of hollow shaft of same material with inside diameter 150 mm. Determine the ratio of power transmitted by the two shafts at the same speed.	**A**	**6**	
	f)	A 800 mm long shaft with a diameter 80 mm carries a fly wheel weighing 4 KN at its midway. The shaft transmits 24 kw at the speed 240 rpm. Determine the principal stresses & maximum shear stress at the end of a vertical diameter in the plane near the flywheel. *****	**A**	**6**	

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEE508/ME409**

COURSE NAME :- **REFRIGERATION AND AIR CONDITIONING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **17 / 05/ 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	SQN	Section- I	Marks
Q.1		Attempt any **FOUR:**	**08**
	a)	What are the advantages of vortex tube refrigeration?	
	b)	Define refrigeration and show it on block diagram.	
	c)	State the effect of superheating at inlet on COP of refrigerator.	
	d)	Why Freon-12 can't be replaced with NH_3 in domestic refrigerator as refrigerant.	
	e)	Draw neat sketch of double pipe water cooled condenser.	
	f)	Define capillary tube and state principle of operation.	
Q.2		Attempt any **FOUR:**	**16**
	a)	Define C.O.P Unit of refrigeration and explain in brief the necessity of refrigeration.	
	b)	Draw a labeled sketch of steam jet refrigeration system and justify why it is not used below 0^0C.	
	c)	What are the major application areas of R.A.C.? And give two examples of each one.	
	d)	Draw flow diagram of Bell Coleman air refrigeration cycle and show it on P-V, T-S diagram.	
	e)	Draw neat labeled diagram of simple vapour absorption refrigeration system and give its application.	
	f)	Explain automatic expansion valve with neat sketch.	
Q.3		Attempt any **FOUR:**	**16**
	a)	Differentiate between physical and thermodynamic properties of refrigerants.	
	b)	Compare between vapour compressions and vapour absorption refrigeration system on four important points.	
	c)	Describe desirable properties of absorbents used in refrigeration system.	
	d)	Explain what is mean by high pressure and low pressure cutouts.	
	e)	Draw neat sketch of thermostatic expansion valve.	
	f)	Draw and sketch of hermetically sealed compressor and give its application.	

P.T.O.

QN	SQN	Section- II	Marks
Q.4		Attempt any **FOUR:**	**08**
	a)	Define DBT & WBT.	
	b)	State Dalton's law of partial pressure with neat sketch.	
	c)	Represent sensible heating with humidification on Psychometric chart.	
	d)	Write values of DBT and RH for human comfort.	
	e)	Define air conditioning with its controlling parameters.	
	f)	Write names of any four insulating materials used in air conditioning.	
Q.5		Attempt any **TWO:**	**16**
	a)	With the help of psychrometric chart find out the following if the air is at 28^0C DBT and 60% RH. i) DPT ii) WBT iii) Specific volume of air iv) enthalpy of air v) Specific humidity.	
	b)	Classify duct systems and explain with neat sketch any one of them.	
	c)	i) Write components of cooling load in air conditioning. ii) Classify air-conditioning systems.	
Q.6		Attempt any **TWO:**	**16**
	a)	Explain with neat and lebelled diagram summer air conditioning system.	
	b)	Air is dehumidified from an initial condition of 30^0C DBT and 80% RH to 25^0C DBT and 18^0C WBT. Find moisture removed and decrease in enthalpy per kg of dry air. Represent the above process on psychrometric chart, with valves.	
	c)	i) Differentiate between air conditioning and refrigeration. ii) Explain the following 1) Infiltration of air. 2) Occupant load.	

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEE509**

COURSE NAME :- **AUTOMOBILE ENGINEERING**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **17 / 05/ 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	SQN	Section- I	Marks
Q.1		Attempt any **FOUR:**	**08**
	a)	What are types of car layouts?	
	b)	Give classification of automobiles.	
	c)	What is tractive effort?	
	d)	What are functions of clutch?	
	e)	Define Toe in and Toe out.	
	f)	Define caster .	
Q.2		Attempt any **FOUR:**	**16**
	a)	Give importance of aerodynamic shape of car.	
	b)	Explain the necessity of gearbox in automobiles.	
	c)	Explain with sketch working of differential in four wheeler.	
	d)	Explain transfer case.	
	e)	Enlist various resistances encounter to automobiles.	
	f)	Explain working of clutch with figure any one.	
Q.3		Attempt any **FOUR:**	**16**
	a)	Differentiate between live axle and dead axle.	
	b)	State the requirement of steering mechanism.	
	c)	Explain constructions of re- circulated ball type steering gear box.	
	d)	Differentiate between hydraulic and pneumatic brakes.	
	e)	Explain construction and working of master cylinder.	
	f)	How the power brakes are classified?	

(P.T.O.)

QN	SQN	Section- II	Marks
Q.4		Attempt any **FOUR:**	**08**
	a)	Write any two functions of suspension system.	
	b)	Write advantages of tubeless tyre over tube tyre.	
	c)	Draw a neat sketch of Leaf spring and Label its parts.	
	d)	What is Battery Rating? List common battery ratings.	
	e)	List the factors affecting tyre life.	
	f)	Draw a neat circuit diagram of capacity discharge ignition system (CDI) and label the components.	
Q.5		Attempt any **FOUR:**	**16**
	a)	Explain necessity of suspension system in an automobile.	
	b)	Compare crossply tyres with radial ply tyre.	
	c)	Explain use of microprocessor in automobile control system.	
	d)	Draw a neat sketch of telescopic type of shock absorber and state its principle of working.	
	e)	Explain with neat sketch electronic ignition system.	
	f)	With neat sketch explain the working of water temperature gauge used in automobiles.	
Q.6		Attempt any **FOUR:**	**16**
	a)	Explain with neat sketch working of rigid axle suspension.	
	b)	Compare tubed tyres with tubeless tyres.	
	c)	Define the term "wheel alignments" and write the procedure of wheel alignment.	
	d)	Write advantages of CDI ignition system. (any four)	
	e)	Draw neat circuit diagram for charging of battery of automobile by alternator.	
	f)	Write in detail the color codes used for wiring the lighting system of an automobile.	

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **MEF304/ME204/MEE304**

COURSE NAME :- **MANUFACTURING PROCESSES**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **14/ 05 / 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	SQN	Question Text	R/U/A	Co MEF 304	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define 'Weld-ability'.	R	1	
	b)	Classify gas welding methods.	U	1	
	c)	Define the term 'punch'.	R	1	
	d)	Sketch a 'Gap press'.	R	1	
	e)	What is upset forging'?	R	4	
	f)	Define the term 'forgeability'.	U	2\4	
Q.2		Attempt any **FOUR:**			**16**
	a)	Describe MIG. welding process with sketch.	U	4	
	b)	Sketch spot welding set up. State its applications.	U	4	
	c)	Show oxidizing flame. State its details.	A	4	
	d)	Compare between soldering and brazing.	A	4	
	e)	Sketch a fly press. State its features.	U	1	
	f)	Compare between bending and drawing.	A	4	
Q.3		Attempt any **FOUR:**			**16**
	a)	Describe impact extraction with a neat sketch.	U	1	
	b)	Sketch various rolling mills used in rolling operation.	U	4	
	c)	Describe bending operation with respect to forging.	U	4	
	d)	What you know about forging dies?	U	1	
	e)	Enlist advantages and limitations of hot working.	R	1	
	f)	Define forging. Write about forgeable materials.	U	4	

(P.T.O.)

QN	SQN	Question Text	R/U/A	Co MEF 304	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Name any four types of patterns	R	1	
	b)	State the working principle of casting.	U	4	
	c)	What are the important properties of moulding sand?	U	4	
	d)	Enlist different tools used to manufacture the pattern.	R	1	
	e)	What is Core and Core prints?	R	1	
	f)	Define casting and pattern.	R	4	
Q.5		Attempt any **FOUR** :			**16**
	a)	List the various types of moulding sand and explain the important characteristics of any one type of moulding sand.	U	4	
	b)	State any four important properties of pasties.	R	1	
	c)	Explain colour coding system used in pattern making.	U	4	
	d)	Draw neat sketch showing various element of gating system and state the function of various element on it.	A	4	
	e)	State the types of gate. Explain anyone with neat sketch.	U	4	
	f)	Explain green sand moulding.	U	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain any two types of cores with neat sketch.	A	4	
	b)	Explain any four casting defects with their causes of formation	A	4	
	c)	Differentiate between hot chamber and cold chamber die casting.	A	4	
	d)	Explain pattern allowances	U	4	
	e)	Explain shell moulding with neat sketch.	U	4	
	f)	State the basis steps in making castings.	U	4	

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **CE/ME/EE/IE/IT/SM/MT/E&TC**

COURSE CODE :- **MEF312/EIF311/MTF408/R227/ MEE312/EEF311/IEE311/MG227/ETE311**

COURSE NAME :- **NON CONVENTIONAL ENERGY SOURCES**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **19/ 05 / 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	SQN	Question Text	R/U/A	CO MEF 312	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State the principle of wind energy conversion.	R	2	
	b)	What is the origin of biomass energy?	U	3	
	c)	State the limitations of wind energy conversion system.	R	2	
	d)	Define non-renewable source of energy and give two examples.	A	1	
	e)	Define power Coefficient.	R	2	
	f)	Define i) Hour angle. Ii) Zenith angle.	R	1	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain with neat sketch principle of operation of solar pond.	R	1	
	b)	What are the prospectus of alternate energy sources?	U	1	
	c)	State the advantages of anaerobic digestion.	R	3	
	d)	Explain the working of pyranometer.	R-A	1	
	e)	Explain with neat sketch principle of solar photovoltaic conversion.	U	1	
	f)	Explain the features of safety systems of wind turbines.	R	2	
Q.3		Attempt any **TWO:**			**16**
	a)	How wind energy systems (WEC) are classified? Also state advantages WEC.	R	2	
	b)	Explain with neat sketch Pragati Biogas plant.	R	3	
	c)	Explain various types of concentrating collectors.	R	1	

P.T.O.

QN	SQN	Question Text	R/U/A	CO IEF 310	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State the basic principle of ocean thermal energy conversion.	R	4	
	b)	State two advantages and limitations of tidal power generation.	R	4	
	c)	Define geothermal energy.	R	4	
	d)	Classify small hydroelectric power plant.	U	4	
	e)	State the significance of cogeneration in industrial sector.	R	5	
	f)	List two objectives of energy management.	R	5	
Q.5		Attempt any **FOUR** :			**16**
	a)	Draw schematic of open cycle OTEC power plant and explain it.	U	4	
	b)	Explain operation of single basin arrangement of tidal power plant with sketch.	U	4	
	c)	Draw schematic of Geothermal energy power plant and explain its working.	U	4	
	d)	Explain arrangement of small hydro power station with neat sketch.	U	4	
	e)	Explain principle of MHD generation with sketch.	U	4	
	f)	Draw neat sketch of hydrox fuel cell and state its working.	U	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	State and explain advantages, limitation and applications of fuel cell.	U	4	
	b)	Energy Audit is the key feature for improving productivity in industrial sector. Justify.	A	5	
	c)	Draw Sankey diagram and explain its significance in energy conservation.	U	5	
	d)	Define Energy Management. Identify various energy conservation oppurtunities in various fields.	A	5	
	e)	Explain the terms simple payback period and return on investment.	U	5	
	f)	Utilization of waste heat leads to conservation. Justify.	A	5	

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEE410/ME309**

COURSE NAME :- **MECH. MEASUREMENT AND MECHATRONIC**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **18 / 05/ 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	SQN	**Section- I**	Marks
Q.1		Attempt any **FOUR:**	**08**
	a)	Define resolution and sensitivity.	
	b)	State advantages of potentiometer.	
	c)	Give any two metal alloys used for strain gauge sensing element.	
	d)	Write advantages of Ultrasonic Flow Meter.	
	e)	Define frequency and pitch related to sound.	
	f)	State advantages and disadvantages of eddy current dynamometer.	
Q.2		Attempt any **FOUR:**	**16**
	a)	Explain Threshold and Resolution.	
	b)	Compare the terms 'Accuracy' and 'Precision'.	
	c)	Draw a neat sketch of Linear potentiometer for displacement measurement. Explain working.	
	d)	How can you measure shaft speed without making physical contact with the shaft? Explain any one method with neat labelled sketch.	
	e)	Explain working of a load cell with a neat sketch.	
	f)	State the unit of humidity. Explain working of 'Hair hygrometer'	
Q.3		Attempt any **FOUR:**	**16**
	a)	State and explain any two static characteristics of measuring system.	
	b)	Explain Zero, First and Second order instruments.	
	c)	What are different types of strain gauges? Explain any one of them in detail.	
	d)	Give advantages, disadvantages and applications of 'Liquid in glass thermometer'.	
	e)	Explain hydraulic dynamometer with a neat sketch.	
	f)	State the need of liquid level measurement and state any four devices used for liquid level measurement.	

P.T.O.

QN	SQN	Section- II	Marks
Q.4		Attempt any **FOUR:**	**08**
	a)	What is a basic difference between microprocessor and microcontroller?	
	b)	Draw a neat labelled sketch of Data logger system.	
	c)	Draw a neat labelled sketch of 4/2 directional control valve. (spool type)	
	d)	Draw a neat labelled sketch of stepper motor.	
	e)	What is electromagnetic principles?	
	f)	What is pressure Relief valve?	
Q.5		Attempt any **TWO:**	**16**
	a)	What are the different types of register within the microprocessor? Explain all register in detail.	
	b)	Draw a neat labelled sketch of i) General internal architecture of a microprocessor. ii) Block diagram of a microcontroller. iii) Architecture 8051 microcontroller.	
	c)	What is programmable logic controller? Draw a basic block diagram of programmable logic controller(PLC) & explain it in detail.	
Q.6		Attempt any **TWO:**	**16**
	a)	Draw a general layout of pneumatic system. State the function of each part of pneumatic system and give its advantages and disadvantages.	
	b)	Explain the following Hydraulic actuators i) Linear single rod single acting. ii) Linear single rod double acting. iii) Linear double rod double acting. iv) Rotary actuators.	
	c)	Explain construction and working of following with neat sketch i) Successive Approximation A/D convertor. ii) A/D flash converter.	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **MEF308/M208/ME208//MEE308**

COURSE NAME :- **THEORY OF MACHINE AND MECHANISM**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **16/ 05 / 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	SQN	Question Text	R/U/A	Co MEF 308	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define the terms kinematic link and kinematic pair.	R	1	
	b)	Write any four applications of cam & follower.	R	1	
	c)	Differentiate between a mechanism and a machine.	R	1	
	d)	Write any two applications of pantograph.	A	2	
	e)	Differentiate between Davis and Ackerman's steering gear mechanism.	U& R	2	
	f)	Define Rubbing velocity of pin joint.	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain completely constrained motion and successfully constrained motion with suitable example.	U & R	1	
	b)	With neat labelled sketch explain Beam engine mechanism.	U & R	1	
	c)	In a four bar chain ABCD, AD is fixed and is 150mm long. The crank AB is 40mm long and rotates of 120 r.p.m. clockwise as shown in fig. I. while the link CD=80cm oscillates about D. BC & AD are of equal length . Find the angular velocity of line CD.	A	2	mm link
	d)	In a slider crank mechanism, the length of crank OP and connecting rod PQ are 125mm and 500mm respectively. The crank rotates at 600 r.p.m. in clockwise. Find angular velocity of PQ when crank makes on angle of 45^0 to I.D.C. by Klein's construction method.	A	2	
	e)	Explain with neat labelled sketch Hart's mechanism.	A	2	
	f)	State the different types of follower on the basis of i) Surface in contact ii) Motion of follower. iii) Path of motion of follower.	U & R	3	
Q.3		Attempt any **TWO:**			**16**
	a)	i) Explain different types of kinematic pairs giving example for each one of them. ii) Sketch and Describe scotch yoke mechanism in detail.	U & R	1	

(P.T.O.)

	b)	In the mechanism, as shown in fig. II, the crank OA rotates at 20 rpm anticlockwise and gives motion to the sliding blocks B and D. The dimensions of the various links are OA= 300mm; AB= 1200MM; BC==CD=450mm. Determine acceleration of slider D and angular acceleration of CD.	A	2	
	c)	A cam with 30mm as minimum diameter is rotating clockwise at a uniform speed of 1200 r.p.m. and has to give the following motion to a roller follower 10mm in diameter. 1) Follower to complete outward stroke of 25mm during 120^0 of cam rotation with equal uniform acceleration and retardation. 2) Follower to dwell for 60^0 of cam rotation. 3) Follower to return to its initial position during 90^0 of cam Rotation with equal uniform acceleration and retardation. 4) Follower to dwell for the remaining 90^0 of cam rotation. Draw the cam profile if the axis of the roller follower passes through the axis of cam.	A	3	
Q.4		Attempt any **FOUR:**			**08**
	a)	State law of gearing.	R	4	
	b)	Define slip in belt.	R	4	
	c)	Write expression for length of cross-belt and explain each term.	R	4	
	d)	Define i) Pitch circle diameter and ii) Module	R	4	
	e)	Write functions of clutch.	U	5	
	f)	Define sensitivity of governor	R	6	
Q.5		Attempt any **FOUR** :			**16**
	a)	A pulley rotating at 50m/s transmits 40kw. The safe pull in belt is 400N/cm width of belt and angle of lap is 170^0. If $\mu = 0.24$, find the width of belt.	A	4	
	b)	State 8 factors upon which selection of belt drive depends.	U	4	
	c)	Explain epicyclic gear train with a neat lebelled sketch.	R	4	
	d)	In a compound gear train the driving gears have 20 & 30 teeth resp. If the driven gears have 50 & 60 teeth and driving shaft is rotating in clockwise direction at 400 rpm, determine speed and direction of rotation of driven shaft.	A	4	
	e)	A multiple clutch has 3 pairs of contact surfaces. The outer and inner radii of contact surfaces are 100mm and 50mm, respective the maximum axial spring force is limited to 1KN. If $\mu = 0.35$ and assuming uniform wear, find power transmitted by clutch at 1500rpm.	A	5	
	f)	Explain with neat sketch working of Harthung governor. Hartnell	R	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Compare open belt drive and cross belt drive.	R	4	
	b)	A pulley is driven by a flat belt running at a speed of 600m/min. if $\mu = 0.3$ & angle of lap is 160^0, and maximum tension on belt is 700N, find the power transmitted by the belt.	A	4	
	c)	Explain compound gear train with a neat sketch.	U	4	
	d)	Explain single plate clutch with a neat sketch.	U	5	
	e)	What is the function of governor? Where it is located?	U	6	
	f)	Classify the different types of governor.	R	6	

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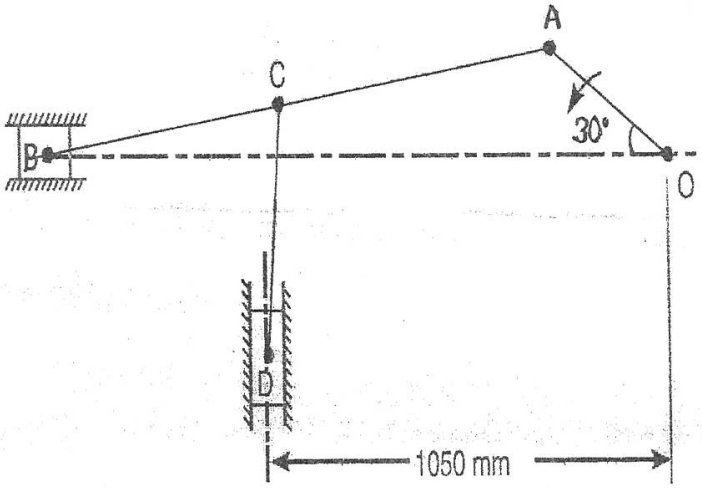
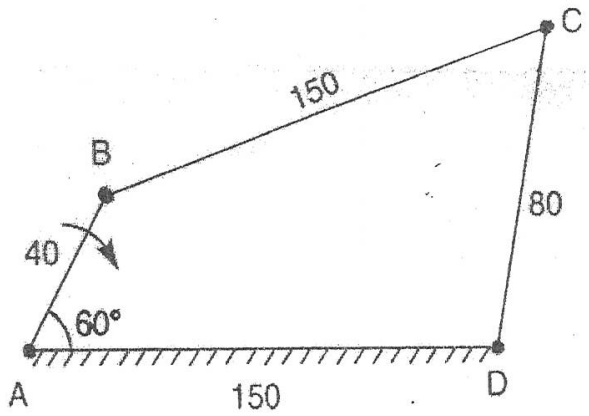


Q. 3) b) Fig. II



Q. 2) c) Fig. I

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEE406/M306**

COURSE NAME :- **HYDRAULIC MACHINERY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **15 / 05/ 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	SQN	Section- I	Marks
Q.1		Attempt any **FOUR:**	**08**
	a)	Define viscosity and surface tension. State their units in S.I. system.	
	b)	Calculate specific weight of a liquid whose one litre quantity weight 7N.	
	c)	Calculate the pressure due to a column of 0.3m of water.	
	d)	Enlist any four pressure measuring instruments.	
	e)	Define Laminar flow and turbulent flow.	
	f)	State Bernoulli's theorem.	
Q.2		Attempt any **FOUR:**	**16**
	a)	Determine total pressure and centre of pressure on a Rectangular plate 1m wide and 3m deep when its upper edge is horizontal and coincides with water surface.	
	b)	A pipe contains an oil of specific graving 0.8. A differential manometer connected at the two points A and B of the pipe shows a difference in Mercury level as 20cm. find the difference of pressures at the two points.	
	c)	State laws of fluid friction for laminar flow and turbulent flow.	
	d)	A pipe through which water is flowing is having diameters 20cm and 10cm at section 1 and 2 respectively. The velocity of water at section 1 is given as 5 m/s. Find the velocity of flow at section 2 and find discharge also.	
	e)	Enlist the various reasons for the minor energy losses in flow through pipes along with formulas to calculate them (any four)	
	f)	Define absolute pressure, gauge pressure and vacuum pressure. Show their relationship on a chart.	
Q.3		Attempt any **FOUR:**	**16**
	a)	Define surface tension and capillarity. State the reasons of capillary rise and fall.	
	b)	Derive an equation for simple 'U' tube manometer.	
	c)	A horizontal venturimeter is used to measure discharge through pipe carrying water. The inlet and throat diameters of venturimeter are 30 cm and 15cm respectively. The differential manometer connected to inlet and throat shows a difference of 20cm of mercury. Determine the rate of flow take Cd= 0.98.	
	d)	Explain how pitot can used to measure velocity of flow.	
	e)	Find head loss due to friction in pipe of dia. 50cm, length 100m through water is flowing at velocity of 5m/s. take f=0.0025 on Darcy's formula.	
	f)	Explain Hydraulic gradient line and total energy line with neat sketch.	

(P.T.O.)

QN	SQN	Section- II	Marks
Q.4		Attempt any **FOUR:**	**08**
	a)	What is cavitation in turbines?	
	b)	What are the components of pelton wheel?	
	c)	State the advantages of Francis turbine over a pelton wheel.	
	d)	Explain the concept of negative slip.	
	e)	State the advantage of air vessels.	
	f)	Define i) Manometric Efficiency ii) Overall efficiency of a pump.	
Q.5		Attempt any **FOUR:**	**16**
	a)	Explain the operational difficulties commonly experienced in centrifugal pumps and their remedies.	
	b)	State the functions of a draft tube and explain with neat sketch 'Moody Spreading draft tube'.	
	c)	Draw a general layout of hydroelectric power plant.	
	d)	Define for turbine i) Hydraulic Efficiency ii) Volumetric efficiency.	
	e)	A nozzle 5cm diameter delivers a stream of water at 20m/s perpendicular to a flat plate. Find the force on the plate, the workdone and the efficiency of jet when i) A flat data is stationery and ii) A flat plate moves away from a jet of 5 m/s.	
	f)	A jet of water 100mm diameter and having a velocity if 15m/s impinges at the centre of a hemispherical vane. The linear velocity of vane is 5m/s in the direction of jet. Find the force exerted on the vane & the percentage of the force change if the jet impinges on a series of vanes attached to the circumference of a wheel.	
Q.6		Attempt any **TWO:**	**16**
	a)	A Francis turbine works on 450 rpm under a head of 120m. Its diameter at the inlet is 1.2m and the flow area is $0.4m^2$. The angles made by absolute and relative velocities at inlet are 20^0 & 60^0respectively, with tangential velocity. Determine. i) the volume flow rate ii) The power developed and iii) The hydraulic efficiency.	
	b)	The centrifugal pump has to discharge water at the rate of 100 lit/min through pipes of diameter 75mm. the total length of suction pipe & delivery pipe is 20m and elevation difference between water level sump and that in overhead tank is 23m. The minor losses are 20% that of major losses. Find power required for the pump. Take f=0.028, efficiency of pump=90%	
	c)	Explain with neat sketch construction and working of reciprocating pump. Also describe why it is called as positive displacement pump.	

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEE403**

COURSE NAME :- **ADVANCED MACHINING PROCESSES**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **03 / 05/ 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	SQN	**Section- I**	Marks
Q.1		Attempt any **TWO:**	**08**
	a)	State the specifications of column and Knee type universal milling machine.	
	b)	Describe in-line transfer machine with neat sketch.	
	c)	State the advantages and limitations of EBM.	
Q.2		Attempt any **FOUR:**	**16**
	a)	Explain working principle of Electro Discharge Machine with neat sketch.	
	b)	State the applications of LBM.	
	c)	Describe advantages and limitations of Transfer machines.	
	d)	Describe Gang Milling Operation with neat sketch.	
	e)	State the advantages of gear hobbing (any eight)	
	f)	Describe two types of gear shaping processes with neat sketch.	
Q.3		Attempt any **TWO:**	**16**
	a)	i) How mill you classify milling machines? ii) Explain T-slot milling operation with neat sketch.	04 04
	b)	i) What is the indexing? What are the different methods of indexing? ii) Index 87 divisions by compound indexing with compound indexing procedure.	04 04
	c)	i) Explain construction of ECM with suitable sketch. ii) State the applications of ECM.	04 04

P.T.O.

QN	SQN	Section- II	Marks
Q.4		Attempt any **FOUR:**	**08**
	a)	Sketch basic components of NC system.	
	b)	Define CNC.	
	c)	Define the term feedback. State its types.	
	d)	What is GO2? Write a block for it.	
	e)	Define the term maintenance.	
	f)	What is housekeeping?	
Q.5		Attempt any **FOUR:**	**16**
	a)	Sketch a horizontal machining centre and describe its principal parts.	
	b)	Enlist advantage and limitation of CNC.	
	c)	Describe open loop and closed loop CNC system with a neat sketch.	
	d)	Differentiate between absolute and incremental coordinate system.	
	e)	Describe threading canned cycle.	
	f)	What is a subroutine? Give suitable example.	
Q.6		Attempt any **FOUR:**	**16**
	a)	Describe DO loop with an example.	
	b)	Describe various programming formats.	
	c)	Describe various types of maintenance.	
	d)	While basic maintenance practice for coupling.	
	e)	Write about TPM.	
	f)	State the need for maintenance and maintenance record.	

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **CE/ME/SM/MT**

COURSE CODE :- **CCF101/0104/X102/CCE101**

COURSE NAME :- **ENGINEERING PHYSICS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **02/ 05 / 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	SQN	Question Text	R/U/A	Code **CCF101**	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define specific volume and give its S.I. unit.	R	1	
	b)	State the effect of temperature and impurity on surface Tension.	U	1	
	c)	State Stoke's Law of viscosity and give formula for viscous force.	R	1	
	d)	Define surface tension & give its unit.	R	1	
	e)	Define i) Nano scale. ii) Nano material.	R	3	
	f)	State any two applications of nano technology in the field of environment.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Define Young's modulus, Bulk modulus and rigidity modulus. Also give the relation between them.	R	1	
	b)	Define i) Viscosity ii) coefficient of viscosity iii) Velocity gradient iv) Terminal velocity.	R	1	
	c)	Explain the molecular theory of surface tension.	U	1	
	d)	Define i) Amplitude ii) Period iii) Frequency and iv) Phase of SHM.	R	2	
	e)	Mention any four applications of nanotechnology in the field of electronics.	U	3	
	f)	A weight exerts a force of 120 N on a steel wire of cross-sectional area 0.02 cm^2. Find the extention produced, if the length of the wire is 5m and Y=2 $X10^{13}$ N/m^2.	A	1	
Q.3		Attempt any **FOUR:**			**16**
	a)	Derive an expression for surface tension using capillary rise method.	A	1	
	b)	Mention any four characteristics of transverse wave.	U	2	
	c)	Explain significance of angle of contact.	U	2	
	d)	State any four applications of elasticity.	U	1	
	e)	Define free and forced oscillations. Give one example of each.	R	2	
	f)	Mention any four applications of viscosity.	U	1	

P.T.O.

QN	SQN	Question Text	R/U/A	Code CCF101	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	A current of 1.2 A flows through a resistance having P.D. of 24V. Calculate the resistance .	A	4	
	b)	State Snell's law of refraction.	R	4	
	c)	State any two applications of X-rays.	R	5	
	d)	Define echo and reverberation.	R	6	
	e)	Obtain SI unit of specific resistance.	A	4	
	f)	Define ultrasonic waves.	R	6	
Q.5		Attempt any **FOUR** :			**16**
	a)	Explain Planck's Hypothesis.	U	5	
	b)	Derive Prism formula.	A	4	
	c)	Derive expression for equivalent resistance when number of resistances are connected in series.	A	4	
	d)	Derive Einstein's photoelectric equation.	A	5	
	e)	State four properties of laser.	R	5	
	f)	Explain how ultrasonic wave is produced by using piezoelectric effect method.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain spontaneous emission.	U	5	
	b)	Define dispersion and dispersive power. Write formulas for dispersive power and mention each term in it.	R	4	
	c)	Explain production of X-rays by using Coolidge tube.	U	5	
	d)	Explain construction of Wheatstone network.	U	4	
	e)	State any four applications of photoelectric cell.	R	5	
	f)	A hall of volume 5000 m^3 has reverberation time of 2 sec. The absorbing surface in the hall is 3320m^2. Determine coefficient of absorption.	A	6	

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EVEN TERM END EXAM APRIL/MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL: **FOURTH** PROGRAM: **MECHANICAL**

COURSE CODE: **MEE401** COURSE NAME: **POWER ENGINEERING**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/05/2018**

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)	How liquid cooling systems are classified?	
	b)	What is the effect of CO in environment?	
	c)	State the materials used for: i) Cylinder ii) Piston Ring	
	d)	What is pour point depressor? Give one examples.	
	e)	Define compression Ratio.	
	f)	Draw a performance curve showing variation in brake power & bsfc with respect to engine speed.	
Q.2		Attempt any **FOUR**	**(16)**
	a)	Define i) Volumetric Efficiency ii) BSFC iii) Relative Efficiency iv) Indicated power	
	b)	What is supercharging? Why it is necessary?	
	c)	Compare: Battery & Magneto ignition system.	
	d)	Explain the stages if combustion in SI engine.	
	e)	Draw a valve timing diagram of four stroke SI engine.	
	f)	Explain with neat sketch 3 way catalytic convertor.	
Q.3		Attempt any **TWO**	**(16)**
	a)	i) Draw a neat sketch of NDIR. ii) Draw P-V & T-S diagram of Rankine cycle.	
	b)	A two stroke diesel engine was motored when meter reading was 1.5 KW for 1 hr & following observations were recorded. i) Brake Torque :120Nm ii) rpm = 600 iii) fuel used :2.5kg iv) calorific value 40.3 MJ/kg v) cooling water used 818 kg vi) Rise in cooling water temp t =10 ^{0}C vii) exhaust gas temp t =345^{0}C viii) room temp t=25^{0}C ix) A:F ratio =32:1 Take C_{pg}=1.05KJ/kg & C_{pw}=4.2 KJ/kg Determine ; i) Brake power & Indicated power ii)Mechanical efficiency iii) Draw up heat balance sheet on minute basis.	

P.T.O.

	c)	The compression ratio of an engine working on an Otto cycle is 8. The initial condition is 1 bar & 373K. The max^{m} pressure if a cycle is 50 bars. Determine volume, pressure & temperature at all salient points & also find the ratio of (Qr/Qs) on the basis of one kg of air.	
		Section – II	**Marks**
Q.4		Attempt any **FOUR**	**(08)**
	a)	Define isothermal efficiency of reciprocating compressor?	
	b)	What do you meant by flooded rotary compressor?	
	c)	Draw P-V and T-S diagram neglecting clearance for two stage reciprocating compressor?	
	d)	State the desirable properties of propellants?	
	e)	Represent the basic cycle for const pressure gas turbine on P-V and T-S diagram.	
	f)	A singe stage single acting air compressor is belt driven from an electric motor at 400 rpm. The cylinder diameter is 15cm and stroke 17.5cm. Find theoretical volume of air sucked per second?	
Q.5		Attempt any **FOUR**	**(16)**
	a)	Briefly explain with sketch the working of axial flow compressor?	
	b)	Show the effect of increase of compression in a single stage reciprocating compressor on P-V diagram and give is significance.	
	c)	With line diagram explain working of closed cycle gas turbine.	
	d)	Explain the working principle of Ramjet with sketch?	
	e)	Compare open cycle and closed cycle gas turbine?	
	f)	A single stage single acting reciprocating air compressor has cylinder bore 200mm and stroke 300mm. it receives air at 1 bar and 20^{0}C. The final pressure is 7 bars. It follows the compression by law $PV^{1.25}$=C. Calculate the power required to drive the compressor if the piston speed is 100 m/min. Neglect the effect of clearance?	
Q.6		Attempt any **TWO**	**(16)**
	a)	Explain with neat sketch construction and working of roots blower?	
	b)	Explain with neat sketch the working of constant volume gas turbine plant?	
	c)	What is the necessity of multi stage compression? Explain the working of two stage reciprocating compressor with intercooler?	

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEE407**

COURSE NAME :- **METROLOGY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **04 / 05/ 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	SQN	**Section- I**	Marks
Q.1		Attempt any **FOUR:**	**08**
	a)	Write the precautions to be taken while using a measuring instrument.	
	b)	Define the term 'Metrology'. List various categories of metrology.	
	c)	State any two advantages of wavelength standard.	
	d)	Define comparator. List various types of comparators.	
	e)	List any four instruments used for angular measurement.	
	f)	Define the terms i) Tolerance ii) Fit.	
Q.2		Attempt any **FOUR:**	**16**
	a)	Define 'Inspection'. Explain its need in industries.	
	b)	Differentiate between Hole basis system and shaft basis system.	
	c)	Compare lien standard with end standard.	
	d)	With neat sketch explain working of universal bevel protector.	
	e)	Build a dimension of 92.357 mm by using two protection slips of 2.5mm size by using slip gauge set. Use slip Gauge set M-87 or M-45	
	f)	Explain the factors affecting the accuracy of the measuring instruments.	
Q.3		Attempt any **FOUR:**	**16**
	a)	Write any four requirements of good comparator.	
	b)	Build angle of $31^0 30' 24''$ by using standard angle gauge as $[1^0, 3^0, 9^0, 27^0, 41^0]$, [1 , 3 , 9 ,27], [3 , 6 , 18 , 30] Sketch arrangement with minimum number of gauges.	
	c)	Define 'Error' in measurement. List various sources of error. (any four)	
	d)	Differentiate between precision and accuracy.	
	e)	Explain Taylor's principle of gauge design.	
	f)	Explain why sine bar is not preferred for measuring angle more than 45^0.	

P.T.O.

QN	SQN	Section- II	Marks
Q.4		Attempt any **FOUR:**	**08**
	a)	Define i) Pitch ii) Lead of thread.	
	b)	State limitations of gear rolling test.	
	c)	Define Backlash and runout related to gear.	
	d)	Define i) Primary texture ii) Secondary texture.	
	e)	State sources of lays for following types i) angular lay ii) Parallel lay.	
	f)	Define i) Roundness ii) Squareness.	
Q.5		Attempt any **FOUR:**	**16**
	a)	Explain drunken thread error.	
	b)	Explain two wire method to measure effective diameter of screw.	
	c)	State and explain any four types of errors in gears.	
	d)	Explain working principle of stylus probe type instruments.	
	e)	Describe the set-up to check parallelism of lathe axis with lathe bed.	
	f)	What is calibration? Explain importance of calibration of measuring instruments.	
Q.6		Attempt any **FOUR:**	**16**
	a)	How major diameter of screw is measured using floating carriage?	
	b)	Describe with neat sketch the use of gear tooth vernier caliper to measure the cordal thickness.	
	c)	Explain the constant cord method for measuring tooth thickness.	
	d)	How surface finish is represented on drawing?	
	e)	In the measurement of surface roughness height of successive 10 Peaks and troughs are 33, 25, 30, 19, 22, 27, 29, 20, 18, 32 microns. It is obtained for 10mm length. Find CLA and RMS values.	
	f)	Write the procedure for calibration of vernier caliper.	

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2018

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **MEF302** COURSE NAME: **THERMAL ENGINEERING**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **03/05/2018**

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	SQN	Question Text	R U A	Co MEF 302	Marks
Q.1		Attempt any **FOUR**			(08)
	a)	Define radiation & give one example.	U	3	
	b)	Define i) State iii) Pure Substance.	R		
	c)	What is flow work?	U	2	
	d)	Define closed system & give one example.	R		
	e)	State ideal gas equation & give meaning of each term involved in it.	R	2	
	f)	State Newton's Law of cooling.	R	3	
Q.2		Attempt any **FOUR**			(16)
	a)	Explain the concept of black body and gray body.	U	3	
	b)	Explain Zeroth Law of thermodynamics.	R	2	
	c)	Distinguish between heat and work.	R	1	
	d)	What are intensive and extensive properties? Give examples.	R	1	
	e)	Explain the concept of perpetual motion machine of second kind.	U	2	
	f)	Represent following processes on P-V & T-S diagrams i) Isentropic process ii) Isobaric process.	A	2	
Q.3		Attempt any **TWO**			(16)
	a)	One kg of air at 115 KPa and 15^0C is compressed adiabatically to a volume of 0.1m^3. Calculate final temperature and pressure of air. Also find work transfer and change in internal energy in the system.	A	2	
	b)	A horizontal steam nozzle is supplied with steam at 14 bar. The velocity at inlet is V_1=1700m/min, Vs_1=0.1408 m^3/kg and u_1=600KJ/kg and the values at the exit are P_2=2 bar, Vs_2=0.8856 m^3/kg and u_2=578 KJ/kg. Calculate the exit velocity from the nozzle assuming heat transfer negligible.	A	2	
	c)	Define heat exchanger. How heat exchangers are classified?	R	3	

P.T.O

<table>
<tr><td>Q.4</td><td></td><td>Attempt any FOUR</td><td></td><td></td><td>(08)</td></tr>
<tr><td></td><td>a)</td><td>Define sensible heat of water.</td><td>R</td><td>4</td><td></td></tr>
<tr><td></td><td>b)</td><td>State the use of blow off clock.</td><td>R</td><td>5</td><td></td></tr>
<tr><td></td><td>c)</td><td>Define the term “Boiler mounting”.</td><td>R</td><td>5</td><td></td></tr>
<tr><td></td><td>d)</td><td>List any two advantages of fire tube boiler?</td><td>R</td><td>5</td><td></td></tr>
<tr><td></td><td>e)</td><td>State the objectives of providing draught in boiler.</td><td>R</td><td>5</td><td></td></tr>
<tr><td></td><td>f)</td><td>State the function of steam condenser.</td><td>R</td><td>6</td><td></td></tr>
<tr><td>Q.5</td><td></td><td>Attempt any FOUR</td><td></td><td></td><td>(16)</td></tr>
<tr><td></td><td>a)</td><td>Explain Rankine cycle used for vapour power cycle.</td><td>U</td><td>4</td><td></td></tr>
<tr><td></td><td>b)</td><td>With lablled h-s diagram explain in brief formation of steam.</td><td>U</td><td>5</td><td></td></tr>
<tr><td></td><td>c)</td><td>Draw a labelled sketch of air preheater.</td><td>R</td><td>5</td><td></td></tr>
<tr><td></td><td>d)</td><td>Classify the steam boilers.</td><td>U</td><td>5</td><td></td></tr>
<tr><td></td><td>e)</td><td>Differentiate between impulse and reaction turbines?</td><td>U</td><td>6</td><td></td></tr>
<tr><td></td><td>f)</td><td>With neat sketch state the principle of operation of impulse turbine.</td><td>R</td><td>6</td><td></td></tr>
<tr><td>Q.6</td><td></td><td>Attempt any TWO</td><td></td><td></td><td>(16)</td></tr>
<tr><td></td><td>a)</td><td>Find the change in entropy of 1kg of steam at 7.5 bar pressure and 85 % dry when heated at constant pressure to temperature 282^{0}C. Assume C_P=2.1 KJ/kgk. Using following property table.
<table>
<tr><td>Ab. pressure</td><td>Temperature</td><td colspan="3">Entropy KJ/kgk</td></tr>
<tr><td>P bar</td><td>T ^{0}C</td><td>S_f</td><td>S_{fg}</td><td>S_g</td></tr>
<tr><td>7.5</td><td>167.25</td><td>2.0325</td><td>4.6619</td><td>6.6771</td></tr>
</table></td><td>A</td><td>4</td><td></td></tr>
<tr><td></td><td>b)</td><td>Explain with neat sketch pressure velocity componding.</td><td>U</td><td>6</td><td></td></tr>
<tr><td></td><td>c)</td><td>Explain with neat sketch packed type forced draught type cooling tower.</td><td>U</td><td>7</td><td></td></tr>
<tr><td></td><td></td><td>**********</td><td></td><td></td><td></td></tr>
</table>

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **MEF307/M207/MEE307**

COURSE NAME :- **APPLIED ELECTRONICS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **11/ 05 / 2018**

Instruction :-

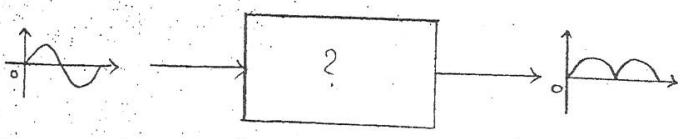
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention 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	SQN	Question Text	R/U/A	Co ME F307	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Give any two applications of zener regulator.	A	3	
	b)	Define i) Intrinsic semiconductor. Ii) Extrinsic semiconductor.	U	1	
	c)	Draw circuit diagram of full wave center tapped rectifier.	R	2	
	d)	List the names of regulator IC's.	R	3	
	e)	BJT is 'Bipolar Junction Transistor'. Justify answer.	U	1	
	f)	Identify the block name and write it. Ref. fig 1(f)	A	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw block diagram of SMPS and explain.	R	3	
	b)	Compare C filter and L filter.	U	2	
	c)	Give any four applications of zener diode.	A	1	
	d)	Explain n type extrinsic semiconductor with suitable diagram.	U	1	
	e)	Draw the circuit diagram of half wave rectifier. Explain operation with waveforms.	R	2	
	f)	Label the circuit and write name for it. Ref. fig 2(f)	A	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw and explain V-I characteristics of zener diode.	A	1	
	b)	Draw circuit diagram of L-type filter and draw output wave form for voltage and current.	A	1	
	c)	Explain the concept of line regulation with circuit diagram and characteristics.	U	3	
	d)	Compare LC filter and Π filter (any four points)	U	2	
	e)	Explain with block diagram off line UPS.	U	3	
	f)	Label the circuit and write name for it. Ref. fig 3(f)	A	2	

(P.T.O.)

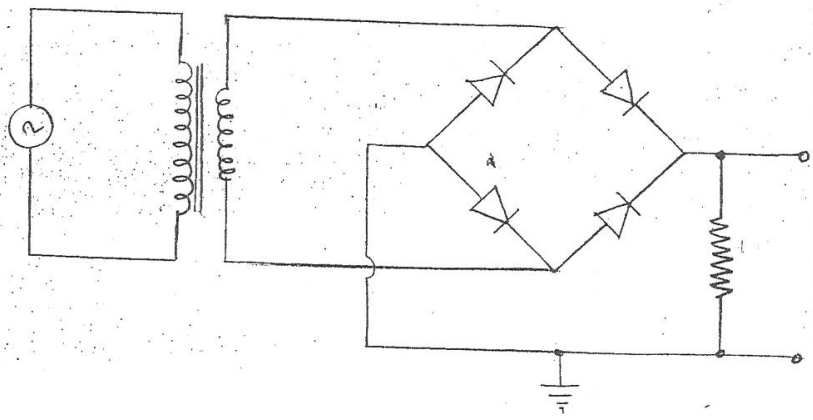
QN	SQN	Question Text	R/U/A	Co MEF 307	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define latch.	R	6	
	b)	State the need of multiplexer.	R	7	
	c)	List any two applications of register.	R	6	
	d)	Convert the following binary number into its decimal equivalent $(1011.01)_2 = (\ )_{10}$.	A	4	
	e)	What is race around condition in level triggered J-K flip-flop?	U	6	
	f)	Draw symbol and truth table of AND gate.	R	4	
Q.5		Attempt any **FOUR** :			**16**
	a)	Draw and explain half adder.	U	5	
	b)	For 3 bit SISO shift register, draw the output waveform for positive edge trigger clock with input as 10110.	R	7	
	c)	Draw a logical circuit diagram of 1:4 demultiplexer and give its truth table.	A	6	
	d)	Solve the following expression using K-map i) $F(A,B,C) = \Sigma m(0,1,2,3) + d(4,5,7)$ ii) $F(A,B,C) = \Sigma m(0,1,4,6,7)$	A	5	
	e)	Draw and working of clocked S-R flip-flop using NAND gate.	U	6	
	f)	State and explain De-Morgan's theorem..	U	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Solve the following i) $(ABC.DE)_{16} = (\ )_2$. ii) $(263.32)_8 = (\ )_{10}$. iii) $(11011.011)_2 = (\ )_{10}$. iv) $(375)_{10} = (\ )_8$	U	4	
	b)	Compare multiplexer and demultiplexer. (any four points)	U	5	
	c)	Explain 3-bit up (Asynchronous) counter.	U	6	
	d)	Simply following using Boolean algebra i) $Y = A\,B\,\overline{C} + \overline{A}\,\overline{B}\,\overline{C} + ABC + + \overline{A}\,\overline{B}\,C + \overline{A}\,B\,C$ ii) $F = A\,B\,C + BC + + A$	U	6	
	e)	Show in symbolic notation, Boolean equation and truth table for i) EX-NOR gate ii) OR gate.	U	4	
	f)	Compare counter and shift register (any Four point)	A	6	

Q.1 (B)



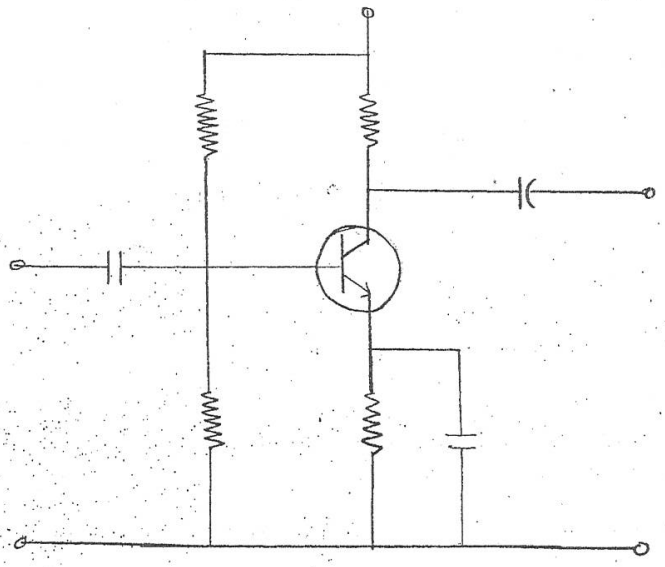
A | MEF307 02 | 2

Q.2 (B)



A | MEF307 04 | 2

Q.3 (B)



A | MEF307 04 | 1

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EVEN TERM END EXAM APR/MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL: **IV** PROGRAM: **METALLURGICAL ENGINEERING**

COURSE CODE: **MTE406** COURSE NAME: **POWDER METALLURGY**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **08/05/2018**

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) Write application of Powder Metallurgy. (Any Two)

b) Which metal or alloy suitable for production of Powder by Reduction method.

c) Write name of types Density of Metal Powder.

d) How Powder particle size influence the properties.

e) Write down name of Mecanical Mechanical Method of Powder Production.

f) What process do you recommend for the production of iron Powder for making filters ?

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

a) Explain specific characteristics of Powder manufactured ~~by each method~~ & application to various metal & alloys. (Any four)

b) Write principles & scope of Powder Metallurgy.

c) Explain Milling method of Powder production.

d) Explain 'Hall flow meter'.

e) Explain Atomization method with suitable example.

f) Write any four characteristics of Powder conditioning process.

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

a) Explain size, shape, distribution of metal Powder.

b) Explain method to determine tap density of Powder.

c) Write steps followed in powder manufacturing process.

d) Explain shotting method with example.

e) Explain 'physical method' of powder manufacturing method.

f) Define compressibility & it's measurements.

(P.T.O.)

Section – II

Marks

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

a) Define sinterability & compactibility.

b) What is open porosity & close porosity of sintered parts.

c) Which magnets materials are produced by powder metallurgy ?

d) What are the cemented carbides ?

e) What is powder extrusion ?

f) List various presses used for powder compaction.

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

a) Enlist the various sintering atmospheres used in sintering furnace. Explain any one in details.

b) Explain floating die compaction with neat sketches.

c) Write manufacturing of friction material by powder metallurgy process.

d) What is mean by isostatic compaction ? Why it is more advantageous ?

e) Explain vacuum sintering.

f) What are the factors considered while selection of sintering furnace ?

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

a) State the various types of pressure shaping techniques with heat & explain any one.

b) Explain self lubricated Bearing manufacturing process.

c) Explain the sintering furnace with pre-requisites & construction with zones.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APR/MAY -2018

EXAM SEAT NO. | | | - | | | |

LEVEL: **III** PROGRAM: **MECHANICAL ENGINEERING**

COURSE CODE: **MEF303/MEE303** COURSE NAME: **MACHINE DRAWING**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **08/05/2018**

Instruction:-

1) Answer must be written in the main answer book and supplements if needed.
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

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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) Semi-elliptic leaf spring with eyelets. ii) Zinc - 0.025, - 0.047, +0.022	**R**	**2**	
	b)	The shaft size is Ø9 mm & hole is Ø9 mm. Determine the type of fit between them.	**A**	**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 shows partial auxiliary view, incomplete front view & top view. Complete the front view with the help of given views. **(Refer fig. No.1)**	**U**	**1**	
	b)	1) Draw the symbols for the following. i) Single bevel butt weld. ii) Fillet weld 2) Write down the meaning of symbols at 'x' & 'y' **(Refer fig. No.2)**	**U**	**4**	
	c)	A vertical cylinder of 75mm diameter & 100mm length of axis is resting on its base on H.P. It is penetrated by a horizontal square prism of 40mm side of base and 95mm axis length, the axis of which is parallel to V.P. & bisects the axis of cylinder while its faces are equally inclined with H.P. Draw projection of both the solids showing curves of intersection.	**A**	**3**	

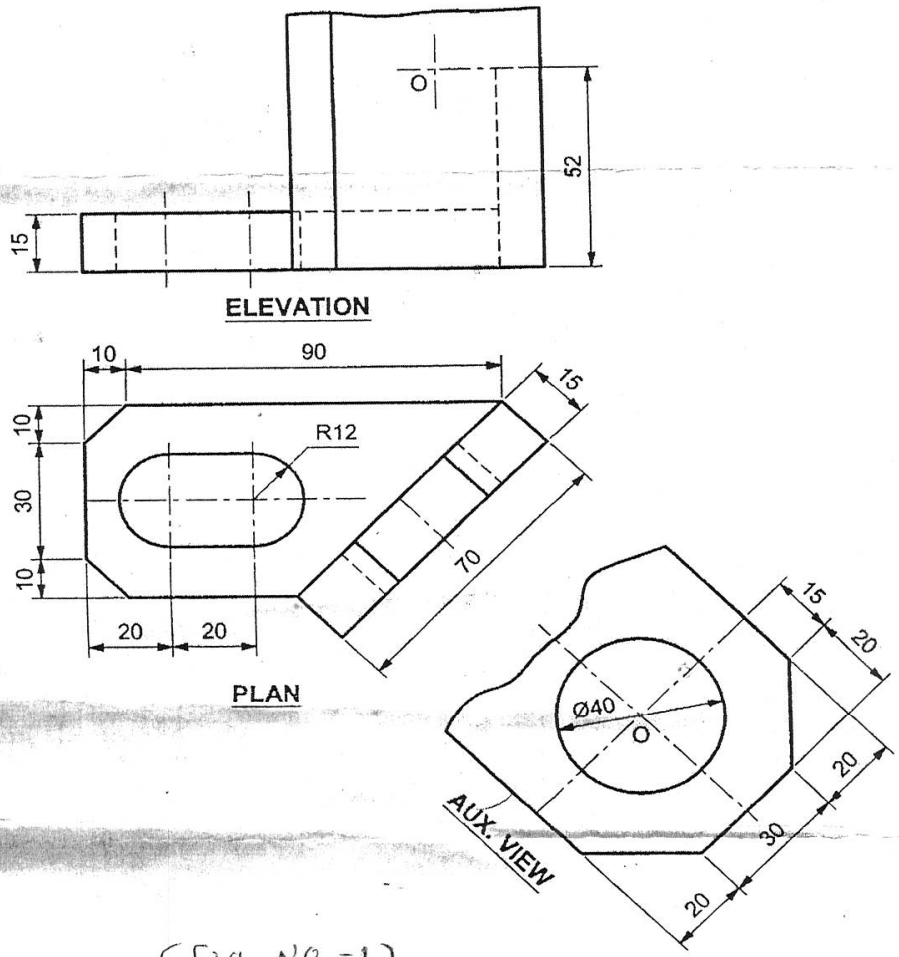
CP.T.03

Q.3		Attempt any **TWO**			**(16)**
	a)	Draw conventional representation of following. i) Serrated shaft. ii) Globe valve iii) Rack & pinion iv) Counter sunk.	**R**	**2**	
	b)	1) State the meaning of symbol given in **fig. No.3** 2) Two mild steel plates of 8mm thickness are to be welded to have a lap joint by a fillet weld of leg length 8mm. Represent the weld on drawing with proper symbols.	**U**	**4**	
	c)	A cane of base diameter 70mm & axis height 65mm is kept on H.P. on its base. It is penetrated by a horizontal cylinder of diameter 35mm with its axis parallel to V.P. & intersecting the axis of cone at a distance of 20mm above the base of the cone. Draw the projections of solids showing curves of intersection.	**A**	**3**	
Q.4		**Refer fig. No.4** shows assembly of drilling jig. Draw the detail drawing of the following. i) Base plate – sectional F.V. & T.V. ii) Jig plate - Sectional F.V. & T.V. iii) Latch washer - sectional F.V. & T.V. iv) Stem - sectional F.V. only	**A**	**4**	**(20)**
Q.5		Attempt any **ONE**			**(20)**
	a)	**Fig. no.5(a)** shows the details of screw jack. Draw the assembly of screw jack. i) Sectional F.V. ii) Top view iii) Prepare bill of material	**A**	**5**	
	b)	**Fig no.5(b).** Shows the details of Lathe tool post. Draw assembly of sectional front view & Top view. Prepare bill of Materials. *****	**A**	**5**	

Machine Drawing Set 2

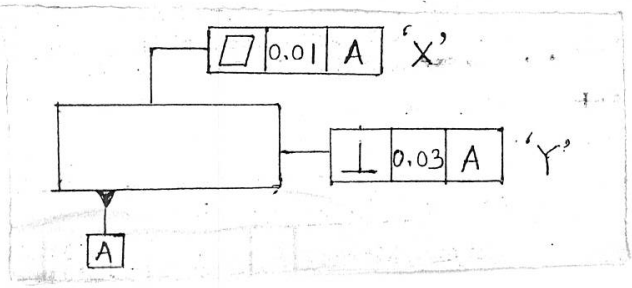
Que. No. 2) (a)

1)



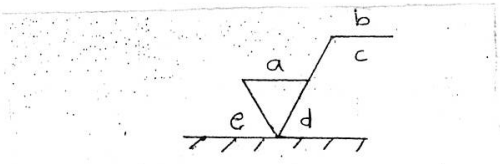
(Fig. NO.-1)

Que NO.2 (b) (2)



(Fig. NO.-2)

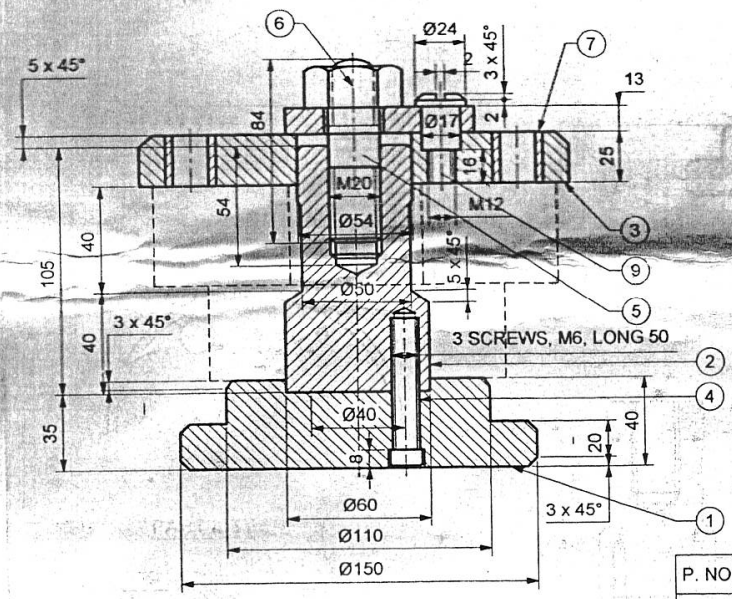
Que NO.3 (b) (1)

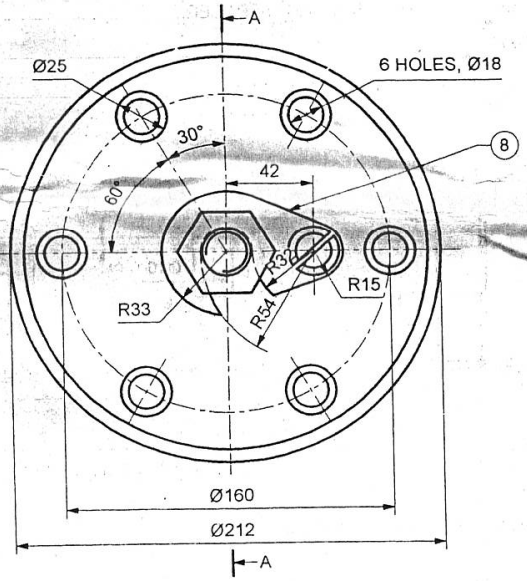


(Fig. No.-3)

[P.T.O]

3/6





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 = $^{+0.028}_{+0.015}$

Fig. No. (4)

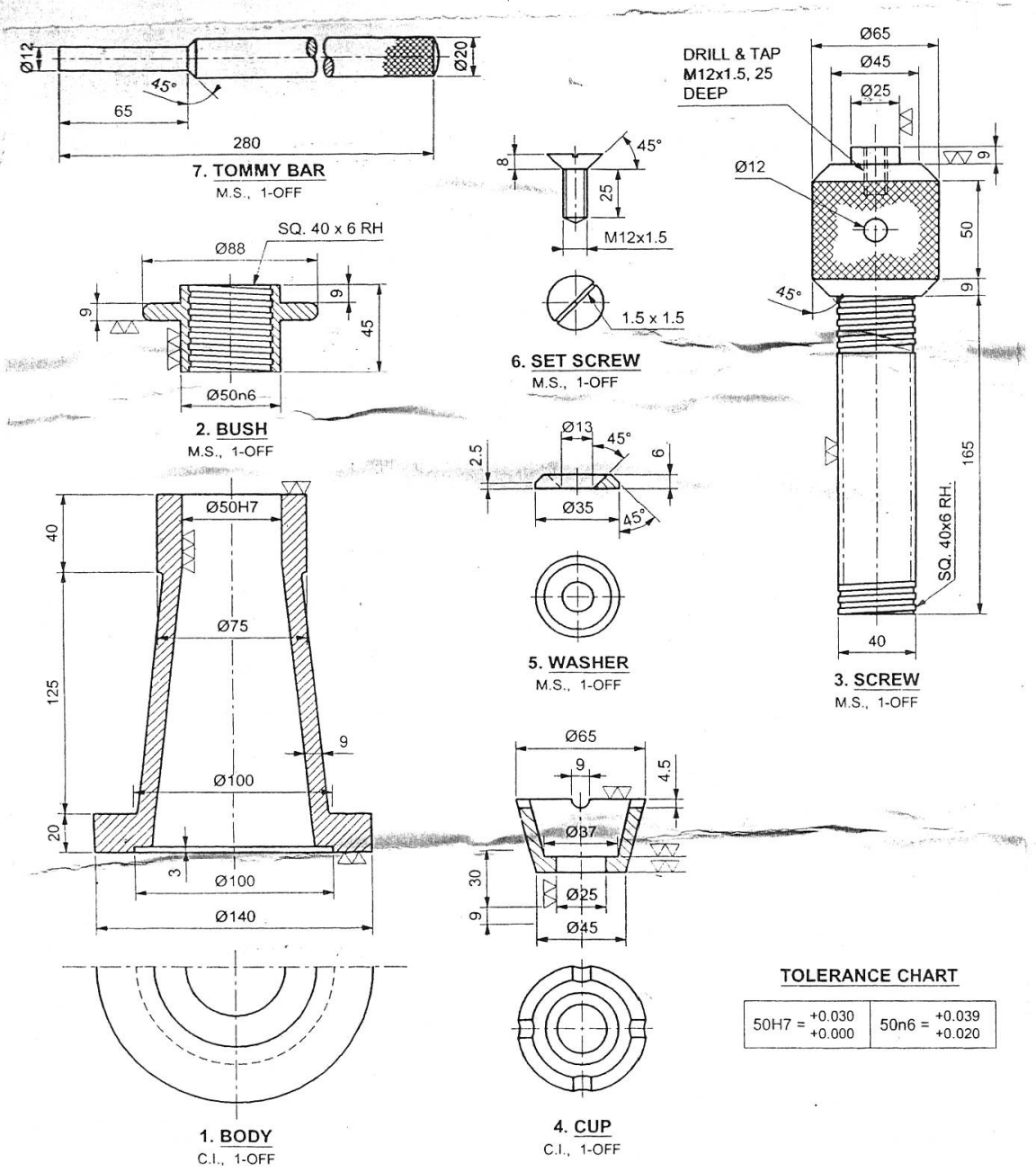
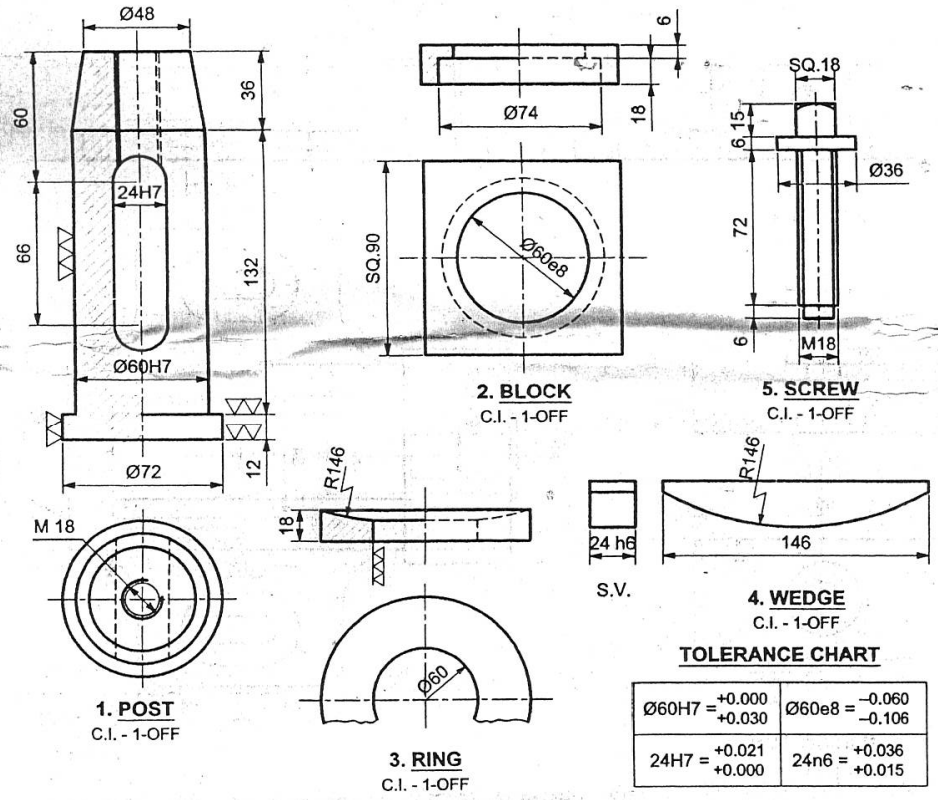

Ø12
Ø20
45°
65
280
7. TOMMY BAR
M.S., 1-OFF
SQ. 40 x 6 RH
Ø88
9
45
Ø50n6
2. BUSH
M.S., 1-OFF
Ø50H7
40
Ø75
125
9
Ø100
20
3
Ø100
Ø140
1. BODY
C.I., 1-OFF
8
45°
25
M12x1.5
1.5 x 1.5
6. SET SCREW
M.S., 1-OFF
Ø13
45°
2.5
6
Ø35
45°
5. WASHER
M.S., 1-OFF
Ø65
9
4.5
Ø37
30
Ø25
9
Ø45
4. CUP
C.I., 1-OFF
DRILL & TAP
M12x1.5, 25
DEEP
Ø65
Ø45
Ø25
9
Ø12
50
9
45°
165
SQ. 40x6 RH.
40
3. SCREW
M.S., 1-OFF
TOLERANCE CHART
50H7 = +0.030 +0.000
50n6 = +0.039 +0.020

Fig. No. 5 (a)



TOLERANCE CHART

Ø60H7 = $^{+0.000}_{+0.030}$	Ø60e8 = $^{-0.060}_{-0.106}$
24H7 = $^{+0.021}_{+0.000}$	24n6 = $^{+0.036}_{+0.015}$

Fig.No.5(b).

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **MEF306/MEE306**

COURSE NAME :- **MACHINE TOOLS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **07/ 05 / 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	SQN	Question Text	R/U/A	CO MEF306	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Enlist the different types of lathe m/c.	R	1	
	b)	Draw a neat sketch of Taper Turning operation on lathe.	R	2	
	c)	State the different types of chips formed in maching operation	R	1	
	d)	Define cutting fluid. List any two cutting fluids.	R	1	
	e)	Define "feed for drill".	R	2	
	f)	State the classification of drilling machines.	R	1	
Q.2		Attempt any **FOUR:**			**16**
	a)	State different types of cutting tool materials. Explain any one with its properties.	U	1	
	b)	Explain with neat sketch the different elements of single point cutting tool.	U	1	
	c)	Differentiate between 3Jaw and 4 jaw chuck.	A	2	
	d)	Explain following operations on lathe i) Parting off ii) Drilling.	A	2	
	e)	Discuss the different cutting parameters related to drilling machine.	A	2	
	f)	Draw a neat sketch of radial drilling machine.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	How does cutting fluid improve the tool life?	A	1	
	b)	Explain the following terms related to cutting tool. i) Rake angle ii) Lip angle.	I	1	
	c)	Draw a schematic diagram showing different basic parts of lathe machine.	U	1	
	d)	What is mandrel? List out the different types of mandrel.	U	2	
	e)	Explain with sketch any two operations on drilling machine.	A	2	
	f)	Explain in brief twist drill Nomenclature.	U	2	

P.T.O.

Q. N	S Q N	Question Text	R/ U/ A	Co 306 MEF	Ma rks
Q.4		Attempt any **FOUR:**			**08**
	a)	State the principle of shaper.	R	1	
	b)	How will you specify a planer?	U	1	
	c)	Define pull broaching.	R	1	
	d)	Write about broach material.	R	4	
	e)	Define 'Grinding'.	R	4	
	f)	What is polishing?	R	4	
Q.5		Attempt any **FOUR** :			**16**
	a)	Sketch a slotter and label it.	U	1	
	b)	Compare between slotter and planer	A	2	
	c)	Describe operations performed on shaper.	U	2	
	d)	Compare between pull broach and push broach.	A	2	
	e)	Sketch a continuous broaching machine. Enlist its advantages.	U	2	
	f)	Compare between centre type and centreless grinder.	A	2	
Q.6		Attempt any **FOUR:**			**16**
	a)	Φ 200 x Φ 30 x 20 x W C 150 J COB17 is marked on the grinding wheel. Explain.	A	1	
	b)	State the principle of internal centreless grinder with sketch.	U	2	
	c)	How will you manufacture a grinding wheel?	U	2	
	d)	Describe honing process in brief.	U	4	
	e)	Define 'Lapping'. Write about lapping tool and machines.	U	4	
	f)	Compare between superfinishing and honing operation.	U	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **MECHANICAL ENGINEERING**

COURSE CODE: **CCF108/CCE108** COURSE NAME: **ENGINEERING DRAWING -II**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **24/05/2018**

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

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QN	SQN	Question Text	RUA	CO CCF108	Marks
Q.1		Attempt any **ONE**			**(16)**
	a)	A pictorial of a C.I BRACKET is shown in fig. (I). Draw to scale full size, the following views. i) An elevation in the direction of arrow X (6 mark) ii) Plan (4 mark) iii) Right hand end view, looking along arrow Y (6 mark)	U	1	
	b)	A pictorial view of an object is shown in fig. (II). Draw to scale full size, the following views. i) An elevation looking in the direction of arrow X (6 mark) ii) Plan (6 mark) iii) End view from left (4 mark)	U	1	
Q.2		Attempt any **ONE**			**(16)**
	a)	Fig (III) shows isometric view of machine component. Draw following views. i) Sectional front view looking in the direction X. (section A-A) (6 mark) ii) Right hand side view (4 mark) iii) Top view (6 mark)	U	2	
	b)	Fig (IV) shows isometric view of machine component. Draw following views. i) Sectional front view looking in the direction X. (section A-A) (6 mark) ii) Sectional left hand side view (section B-B)(6 mark) iii) Top view (4 mark)	U	2	

Q.3		Draw proportionate freehand sketches (any four) i) External thread (2 views) ii) Unified thread iii) Wing nut (2 views) iv) T-headed bolt (2 views) v) Locking by grooved plate (2 views) vi) Rag foundation bolt.	U	3	**(08)**
Q.4		Attempt any **ONE**			**(08)**
	a)	Fig 1 shows F.V & T.V of an object. Draw its RHSV.			
	b)	Fig.2 shows F.V & S.V. Draw T.V.			
	c)	Fig 3 shows F.V & T.V Draw LHSV.			
Q.5		Attempt any **ONE**			**(16)**
	a)	Fig 4 shows F.V & T.V of an object. Draw isometric view of an object using natural scale.			
	b)	Fig 5 shows F.V & S.V of an object. Draw isometric view of an object.			
Q.6		Attempt any **TWO**			**(16)**
	a)	Fig.7 shows a cylinder having a square hole cut in it. Draw the development of lateral surface.			
	b)	Fig 8 shows the elbow joint of two pipes. Draw the development of the lateral surface.			
	c)	A hexagonal prism base 20mm side and height 60mm is standing on the base of H.P. Its surface is cut as shown in fig. 6. Draw the development of lateral surface 'Q' of prism. Open the prism from 'O'.			

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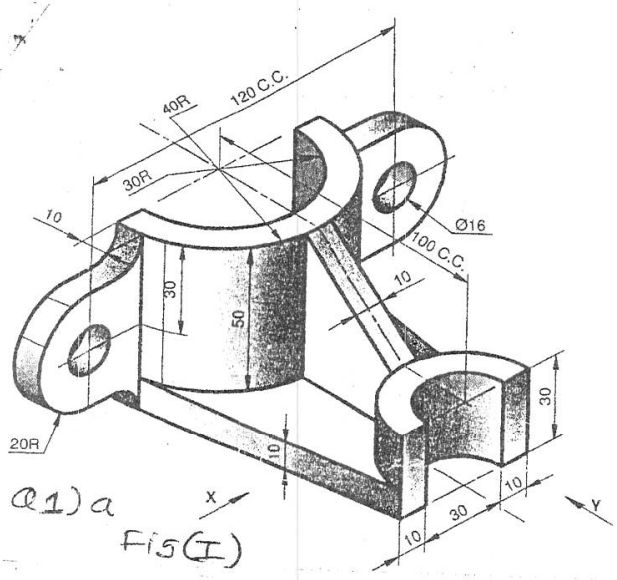
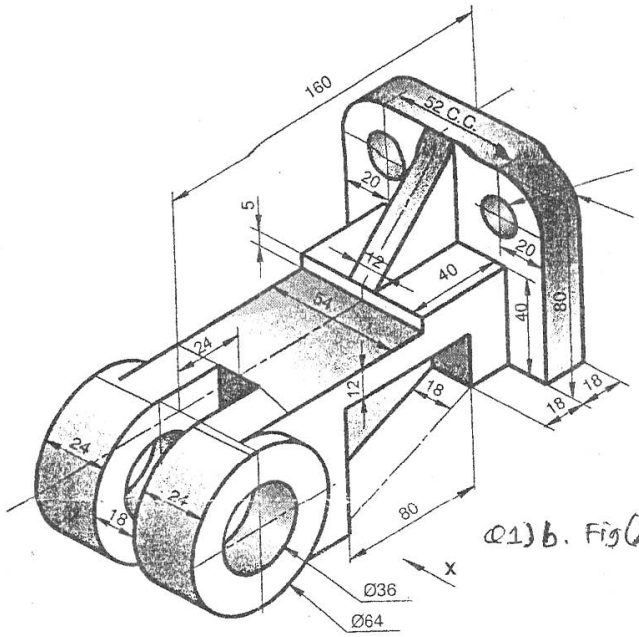
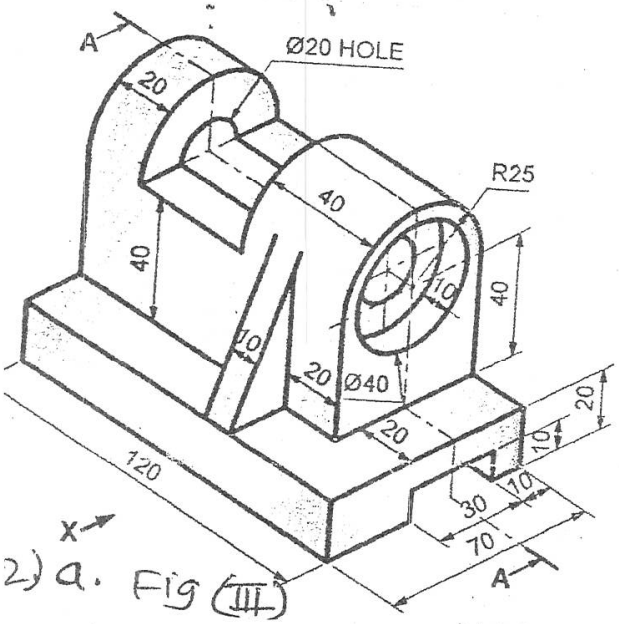


Q1) a

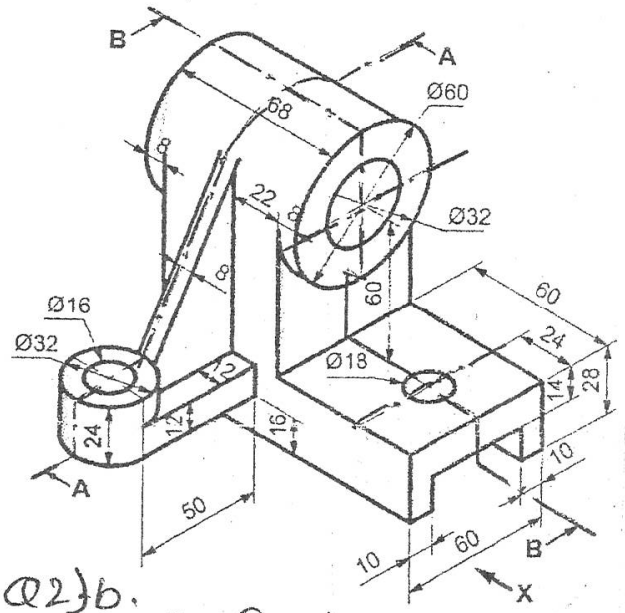
Fig (I)



Q1) b. Fig (II)



2) a. Fig (III)



Q2) b.

Fig (IV)

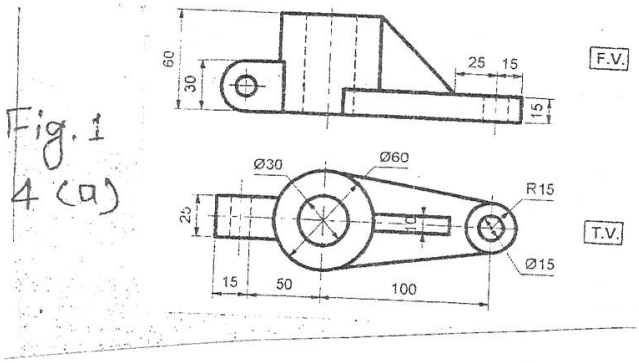


Fig. 1

4 (a)

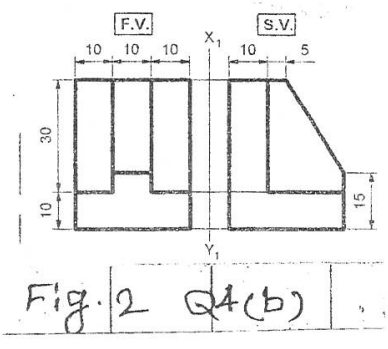
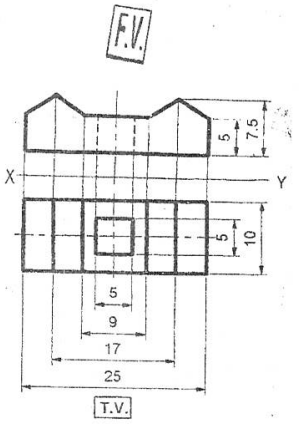
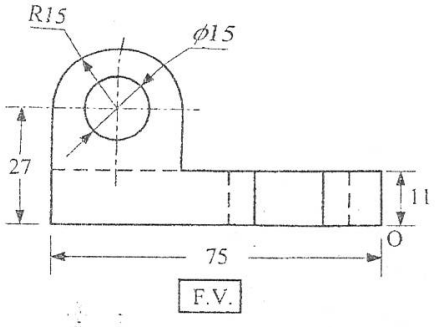
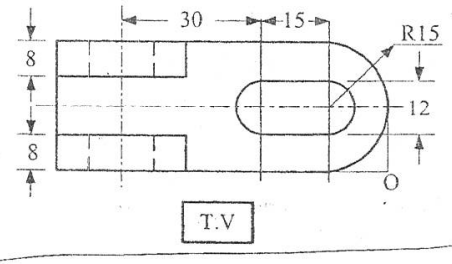


Fig. 2 Q4(b)

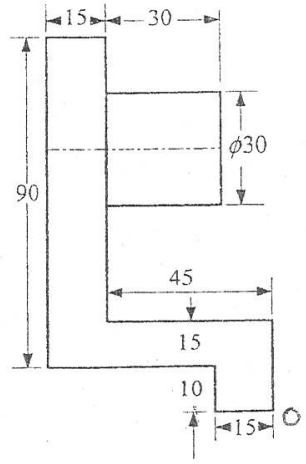


g. 3
4 (c)





Q.5(a)
Fig.: 4



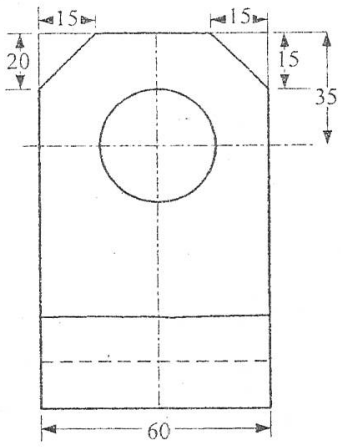


Fig. 5
Q-5 (b)

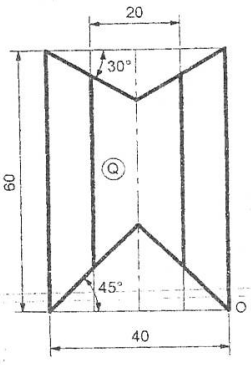


Fig 6 Q-5 (c)

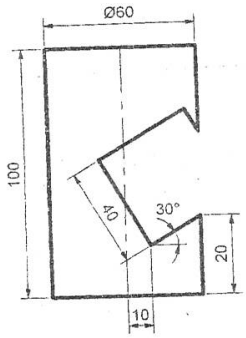


Fig 7 Q-6 (a)

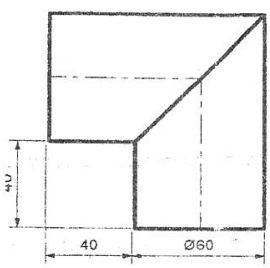


Fig 8 Q-6 (b)

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EVEN TERM END EXAM MAY -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 :- **08 / 05/ 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	SQN	Section- I	Marks
Q.1		Attempt any **FOUR:**	**08**
	a)	Define management process.	
	b)	Name different types of industrial sectors in India.	
	c)	Define 'Business'.	
	d)	List different functions of management.	
	e)	State the different steps in decision making.	
	f)	State advantages of good housekeeping.	
Q.2		Attempt any **FOUR:**	**16**
	a)	Explain the concept of management.	
	b)	State any eight principles of management of Henry Fayol.	
	c)	Explain different levels of management.	
	d)	Describe concepts of 1) communication 2) Administration.	
	e)	Explain co-operative business sector in India.	
	f)	State the legal requirements for partnership ownership.	
Q.3		Attempt any **FOUR:**	**16**
	a)	Explain planning function of management.	
	b)	Explain different leadership styles.	
	c)	State the function and objectives of HRD.	
	d)	State the causes of industrial accidents.	
	e)	State requirements of good housekeeping.	
	f)	Describe recruitment and selection process for placement.	

(P.T.O.)

QN	SQN	Section- II	Marks
Q.4		Attempt any **FOUR:**	**08**
	a)	State four functions of materials management.	
	b)	Classify "purchases" in a manufacturing industry.	
	c)	What do you meant by "working capital"?	
	d)	State any four duties of Boiler inspector.	
	e)	What is AOA system of CPM?	
	f)	What do you meant by "Critical path"?	
Q.5		Attempt any **FOUR:**	**16**
	a)	Enumerate the duties of material manager.	
	b)	State the various functions of "Financial Management".	
	c)	Explain the importance of material management.	
	d)	Explain briefly the purpose of workmans compensation act.	
	e)	Explain any four provisions for safety provided in the factory act.	
	f)	State the advantages and limitations of network technique.	
Q.6		Attempt any **TWO:**	**16**
	a)	Write a short note on "Methods of purchasing".	
	b)	Describe the various methods for raising the capital.	
	c)	Write a short note on modern trends in material managements.	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **MEF307/M207/MEE307**

COURSE NAME :- **APPLIED ELECTRONICS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **11/ 05 / 2018**

Instruction :-

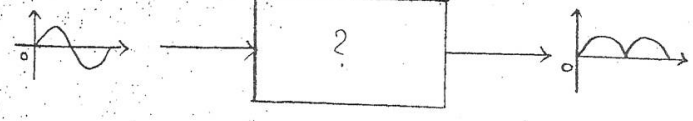
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention 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	SQN	Question Text	R/U/A	Co ME F307	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Give any two applications of zener regulator.	A	3	
	b)	Define i) Intrinsic semiconductor. Ii) Extrinsic semiconductor.	U	1	
	c)	Draw circuit diagram of full wave center tapped rectifier.	R	2	
	d)	List the names of regulator IC's.	R	3	
	e)	BJT is 'Bipolar Junction Transistor'. Justify answer.	U	1	
	f)	Identify the block name and write it. Ref. fig 1(f)	A	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw block diagram of SMPS and explain.	R	3	
	b)	Compare C filter and L filter.	U	2	
	c)	Give any four applications of zener diode.	A	1	
	d)	Explain n type extrinsic semiconductor with suitable diagram.	U	1	
	e)	Draw the circuit diagram of half wave rectifier. Explain operation with waveforms.	R	2	
	f)	Label the circuit and write name for it. Ref. fig 2(f)	A	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw and explain V-I characteristics of zener diode.	A	1	
	b)	Draw circuit diagram of L-type filter and draw output wave form for voltage and current.	A	1	
	c)	Explain the concept of line regulation with circuit diagram and characteristics.	U	3	
	d)	Compare LC filter and Π filter (any four points)	U	2	
	e)	Explain with block diagram off line UPS.	U	3	
	f)	Label the circuit and write name for it. Ref. fig 3(f)	A	2	

(P.T.O.)

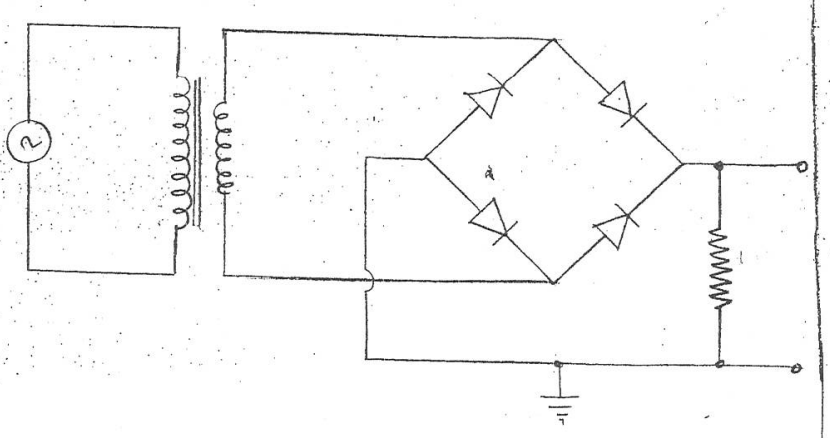
QN	SQN	Question Text	R/U/A	Co MEF 307	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define latch.	R	6	
	b)	State the need of multiplexer.	R	7	
	c)	List any two applications of register.	R	6	
	d)	Convert the following binary number into its decimal equivalent $(1011.01)_2 = (\ )_{10}$.	A	4	
	e)	What is race around condition in level triggered J-K flip-flop?	U	6	
	f)	Draw symbol and truth table of AND gate.	R	4	
Q.5		Attempt any **FOUR** :			**16**
	a)	Draw and explain half adder.	U	5	
	b)	For 3 bit SISO shift register, draw the output waveform for positive edge trigger clock with input as 10110.	R	7	
	c)	Draw a logical circuit diagram of 1:4 demultiplexer and give its truth table.	A	6	
	d)	Solve the following expression using K-map i) $F(A,B,C) = \Sigma m(0,1,2,3) + d(4,5,7)$ ii) $F(A,B,C) = \Sigma m(0,1,4,6,7)$	A	5	
	e)	Draw and working of clocked S-R flip-flop using NAND gate.	U	6	
	f)	State and explain De-Morgan's theorem..	U	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Solve the following i) $(ABC.DE)_{16} = (\ )_2$. ii) $(263.32)_8 = (\ )_{10}$. iii) $(11011.011)_2 = (\ )_{10}$. iv) $(375)_{10} = (\ )_8$	U	4	
	b)	Compare multiplexer and demultiplexer. (any four points)	U	5	
	c)	Explain 3-bit up (Asynchronous) counter.	U	6	
	d)	Simply following using Boolean algebra i) $Y = A\,B\,\overline{C} + \overline{A}\,\overline{B}\,\overline{C} + ABC + + \overline{A}\,\overline{B}\,C + \overline{A}\,B\,C$ ii) $F = A\,B\,C + BC + + \overline{A}$	U	6	
	e)	Show in symbolic notation, Boolean equation and truth table for i) EX-NOR gate ii) OR gate.	U	4	
	f)	Compare counter and shift register (any Four point)	A	6	

Q.1 (B)



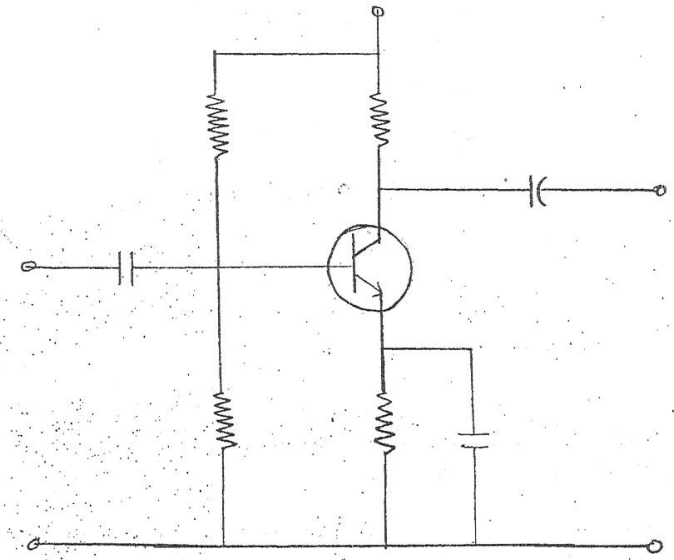
A | MEF307 | 02 | 2

Q.2 (B)



A | MEF307 | 04 | 2

Q.3 (B)



A | MEF307 | 04 | 1

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2018

EXAM SEAT NO. | | | - | | | |

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

COURSE CODE: **MEF310/ME210/MEE310** COURSE NAME: **ENGINEERING METALLURGY AND MATERIALS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **23/05/2018**

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

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QN	SQN	Question Text	RUA	CO MEF310	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Enlist four Hume Rothery's rules.	R	1	
	b)	Explain dendritic structure.	U	1	
	c)	Write lever arm principle.	R	1	
	d)	State general equations for eutectoid and peritectoid reaction.	U	2	
	e)	Classify various types of cast iron.	R	1	
	f)	Enlist four standards for designation and coding of metals.	A	1	
Q.2		Attempt any **TWO**			**(16)**
	a)	Classify and explain various imperfections of crystals.	U	1	
	b)	Draw crystal structure of BCC and FCC. Calculate number of atoms per unit cell and give its packing factor.	A	1	
	c)	Define equilibrium diagram and explain the process of constructing equilibrium diagram by thermal analysis method with sketch.	U	2	
Q.3		Attempt any **TWO**			**(16)**
	a)	Explain Iron – Ironcarbide equilibrium diagram with neat sketch. Explain various phase & reaction in it.	A	2	
	b)	Classify plain carbon steels and alloy steels. Explain with composition and applications.	A	1	
	c)	i) Explain S.G Iron with its structure and applications. ii) Explain slow cooling of carbon steels.	U	1	
Q.4		Attempt any **FOUR**			**(08)**
	a)	State the purpose of heat treatment.	R	3	
	b)	State different heat treatment processes.	R	3	

P.T.O

	c)	Define hardenability.	R	3	
	d)	Enlist two bearing materials and state composition.	R	4	
	e)	State any four properties of copper.	R	4	
	f)	State any four applications of polyvinyl chloride.	R	4	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Distinguish between annealing and hardening.	U	3	
	b)	State the significance of TTT diagram. Draw TTT diagram for eutectoid steel.	U	3	
	c)	State any four properties of aluminium. State four applications of aluminium.	U	3	
	d)	Differentiate between thermoplastic polymers and thermosetting polymers.	U	4	
	e)	State the advantages of non destructive testing.	U	5	
	f)	State the non destructive testing method which is suitable for the quality inspection of welded joints. Justify your answer.	A	5	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Is it desirable to retain austenite in finished component? Justify your answer.	A	3	
	b)	Represent variation in i) Internal stress ii) Hardness iii) Toughness with tempering temperature in steel.	A	3	
	c)	State advantages and disadvantage of nitriding.	R	4	
	d)	State four types of bronzes. State one application of each type.	U	4	
	e)	State the factors affecting the properties of a polymer.	R	4	
	f)	State the applications of Eddy-current test. State the limitations of this method.	U	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL: **FIFTH** PROGRAM: **MECHANICAL ENGINEERING**

COURSE CODE: **MEE504** COURSE NAME: **INDUSTRIAL ENGINEERING**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **22/05/2018**

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) Define production & productivity.

b) Name any two material handling equipments that can be used in a machine tool industry.

c) List any four details required about the job for preparing operation sheet.

d) Define machine capacity.

e) What is progressive control?

f) Enlist two limitations of Gantt chart.

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

a) Explain the design principle of plant layout.

b) Describe the process of combing operations.

c) What are inspection stages? How they are decided.

d) Differentiate between plant capacity and plant efficiency.

e) Seven jobs to be processed first on machine M1 and then on machine M2. Processing in hours are given below. Find optional sequence and total elapsed time.

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

P.T.O

f) Describe the process of line balancing.

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

a) Explain the calculation of break even point.

b) Explain i) Group technology ii) cellular layout.

c) Explain the principles of selection of material handling systems and devices.

Section – II **Marks**

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

a) State objectives of method study.

b) State the uses of string diagram.

c) Explain material requirement planning (MRP)?

d) Enlist various clamping devices used in Jigs and fixtures.

e) Explain rapid prototyping?

f) State the advantages of flexible manufacturing system (FMS).

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

a) Construct outline process chart to check the dimension of a shaft.

b) Explain the procedure of work measurement.

c) What is EOQ? How it is calculated?

d) Differentiate between Jigs and fixtures.

e) Explain 5 'S' concept.

f) Explain poka yoke on the basis of concept, principle & its application.

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

a) Explain the multiple activity chart with suitable example.

b) Define allowance. State & explain their types.

c) Draw & explain time study form.

d) State different methods of inventory management and explain inventory cost relationship.

e) Explain design principles common to Jigs & Fixtures.

f) Differentiate between pull and push types of manufacturing system.

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2018

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCF106/0108/X110/CCE106/R108** COURSE NAME: **ENGINEERING MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **05/05/2018**

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

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QN	SQN	Question Text	RUA	CO CCF106	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	State whether the points (6, -2) (3, 9) & (-3, -1) are collinear.	R / U	1	
	b)	Find the length of perpendicular from a point (3, 4) on the line $3x+4y=7$.	R / U	2	
	c)	Show that the following three lines $2x+3y+18=0$; $3x-2y+1=0$ and $5x-y+11=0$ intersect at a single point.	U	2	
	d)	Find the slope and both the intercepts made by the line $\frac{2x}{3}+\frac{y}{4}=-1$ on the axes.	R / U	2	
	e)	Find the center and radius of the circle $5x^2+5y^2-12x+64y-560=0$	R / U	3	
	f)	Find the internal in which a root of $x^3-x+1=0$ lies.	R / U	4	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Show that the area of triangle whose vertices are (3, 4), (0, 5), (2, -1) is four times the area of triangle formed by the midpoints joining the midpoints of the sides.	U / A	1	
	b)	If A(1, -4) and C(-2, 8) are the opposite vertices of a square, find the equation of diagonal BD.	U / A	2	
	c)	Find the equation of circle passing through (6,4) and concentric with $x^2+y^2-4x-2y-35=0$	U / A	3	
	d)	Find the approximate root of $x^4-x-9=0$ upto 3 iterations by Bisection method.	A	4	
	e)	Using Jacobi's method, solve $10x+y+2z=13$ $3x+10y+z=14$ $2x+3y+10z=15$ Carry out 3 iterations.	A	5	
	f)	Solve $x+2y+3z=14$; $3x+y+2z=11$; $2x+3y+z=11$ by Gauss seide method.(carry out 3 iterations)	A	5	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Find the area of triangle whose vertices are (5, 2), (5, -2) & (0, 0)	A	2	

P. T. O.

	b)	Find the equation of circle passing through three points (1,5), (5, 7), (-5, 1)	A	3	
	c)	Using Bisection method, find the approximate root $x^3 - 2x - 5 = 0$ in the interval (2, 3) (carry out 3 iterations)	A	4	
	d)	Using Regula Falsi method, evaluate $\sqrt[3]{100}$ by carrying out 2 iterations.	A	4	
	e)	Use Jacobi's method to solve $10x - y + 2z = 15$; $2x - 15y + 4z = 25$; $-3x + 2y + 25z = 45$ by carrying out 3 iterations.	A	5	
	f)	Solve $5x - y - 2z = -3; 3x + 5y - z = 10; -2x + y + 4z = 8$ by Gauss Seidel method. apply 2 iterations only	A	5	
Q.4		Attempt any **FOUR**			**(08)**
	a)	If $f(x) = x^4 - 3x + 4$, *find* $f(1) + f(-2)$	R / U	3	
	b)	$\lim_{x \to 2} \dfrac{x-2}{x^2+x-6}$	R / U	3	
	c)	$\lim_{x \to 0} \dfrac{1-\cos mx}{x^2}$	R / U	3	
	d)	If $y = e^{7x}.\cos 3x$ *find* $\dfrac{dy}{dx}$	R / U	4	
	e)	If $y = (\log x)^x$, *find* $\dfrac{dy}{dx}$	R / U	4	
	f)	If $y = \log_2 \sin x$ *find* $\dfrac{dy}{dx}$	R / U	4	
Q.5		Attempt any **FOUR**			**(16)**
	a)	If $f(x) = \dfrac{x+3}{4x-5}$ *and* $t = \dfrac{3+5x}{4x-1}$ then show that $f(t) = x$	A	3	
	b)	If $f(x) = \log\left(\dfrac{x-1}{x}\right)$, *show that* $f(y^2) = f(y) + f(-y)$	A	3	
	c)	$\lim_{x \to 2} \left[\dfrac{1}{x-2} - \dfrac{1}{x^2-3x+2}\right]$	U	3	
	d)	$\lim_{x \to \pi} \dfrac{\sin 3x - 3\sin x}{(x-\pi)^3}$	U	3	
	e)	If $y = \tan^{-1}\left[\dfrac{\cos x}{1+\sin x}\right]$ *find* $\dfrac{dy}{dx}$	A	4	
	f)	If $x^3.y^2 = (x+y)^5$, show that $\dfrac{dy}{dx} = \dfrac{y}{x}$	U	4	
Q.6		Attempt any **FOUR**			**(16)**
	a)	If $y = \sin(\log x)$, *prove that* $x^2.\dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx} + y = 0$	A	4	
	b)	If $x^2 + 3xy - y^2 = 10$ *find* $\dfrac{dy}{dx}$ *at* $(1,2)$	U	4	
	c)	If $y = \log\left[e^{3x}.\left(\dfrac{x-2}{x+8}\right)^{4/5}\right]$ *find* $\dfrac{dy}{dx}$	A	4	
	d)	Find $\dfrac{dy}{dx}$ *at* $\theta = \dfrac{\pi}{4}$ *if* $x = a(\theta + \sin\theta)$, $y = a(1 + \cos\theta)$	U / A	4	
	e)	Find the equation of tangent to the curve $y = 4xe^x$ at the origin.	A	4	
	f)	The perimeter of a rectangle is 100 meter. Find the length of sides when area is maximum	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM APRIL/MAY -2018

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCF106/0108/X110/CCE106/R108** COURSE NAME: **ENGINEERING MATHEMATICS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **05/05/2018**

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	SQN	Question Text	RUA	CO CCF106	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	State whether the points (6, -2) (3, 9) & (-3, -1) are collinear.	R / U	1	
	b)	Find the length of perpendicular from a point (3, 4) on the line $3x+4y=7$.	R / U	2	
	c)	Show that the following three lines $2x+3y+18=0$; $3x-2y+1=0$ and $5x-y+11=0$ intersect at a single point.	U	2	
	d)	Find the slope and both the intercepts made by the line $\frac{2x}{3}+\frac{y}{4}=-1$ on the axes.	R / U	2	
	e)	Find the center and radius of the circle $5x^2+5y^2-12x+64y-560=0$	R / U	3	
	f)	Find the internal in which a root of $x^3-x+1=0$ lies.	R / U	4	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Show that the area of triangle whose vertices are (3, 4), (0, 5), (2, -1) is four times the area of triangle formed by the midpoints joining the midpoints of the sides.	U / A	1	
	b)	If A(1, -4) and C(-2, 8) are the opposite vertices of a square, find the equation of diagonal BD.	U / A	2	
	c)	Find the equation of circle passing through (6,4) and concentric with $x^2+y^2-4x-2y-35=0$	U / A	3	
	d)	Find the approximate root of $x^4-x-9=0$ upto 3 iterations by Bisection method.	A	4	
	e)	Using Jacobi's method, solve $10x+y+2z=13$ $3x+10y+z=14$ $2x+3y+10z=15$ Carry out 3 iterations.	A	5	
	f)	Solve $x+2y+3z=14$; $3x+y+2z=11$; $2x+3y+z=11$ by Gauss seide method.(carry out 3 iterations)	A	5	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Find the area of triangle whose vertices are (5, 2), (5, -2) & (0, 0)	A	2	

P. T. O.

	b)	Find the equation of circle passing through three points (1,5), (5, 7), (-5, 1)	A	3	
	c)	Using Bisection method, find the approximate root $x^3 - 2x - 5 = 0$ in the interval (2, 3) (carry out 3 iterations)	A	4	
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	f)	Solve $5x - y - 2z = -3$; $3x + 5y - z = 10$; $-2x + y + 4z = 8$ by Gauss Seidel method. apply 2 iterations only	A	5	
Q.4		Attempt any **FOUR**			**(08)**
	a)	If $f(x) = x^4 - 3x + 4$, *find* $f(1) + f(-2)$	R / U	3	
	b)	$\lim_{x \to 2} \dfrac{x-2}{x^2+x-6}$	R / U	3	
	c)	$\lim_{x \to 0} \dfrac{1-\cos mx}{x^2}$	R / U	3	
	d)	If $y = e^{7x}.\cos 3x$ *find* $\dfrac{dy}{dx}$	R / U	4	
	e)	If $y = (\log x)^x$, *find* $\dfrac{dy}{dx}$	R / U	4	
	f)	If $y = \log_2 \sin x$ *find* $\dfrac{dy}{dx}$	R / U	4	
Q.5		Attempt any **FOUR**			**(16)**
	a)	If $f(x) = \dfrac{x+3}{4x-5}$ *and* $t = \dfrac{3+5x}{4x-1}$ then show that $f(t) = x$	A	3	
	b)	If $f(x) = \log\left(\dfrac{x-1}{x}\right)$, *show that* $f(y^2) = f(y) + f(-y)$	A	3	
	c)	$\lim_{x \to 2} \left[\dfrac{1}{x-2} - \dfrac{1}{x^2-3x+2}\right]$	U	3	
	d)	$\lim_{x \to \pi} \dfrac{\sin 3x - 3\sin x}{(x-\pi)^3}$	U	3	
	e)	If $y = \tan^{-1}\left[\dfrac{\cos x}{1+\sin x}\right]$ *find* $\dfrac{dy}{dx}$	A	4	
	f)	If $x^3.y^2 = (x+y)^5$, show that $\dfrac{dy}{dx} = \dfrac{y}{x}$	U	4	
Q.6		Attempt any **FOUR**			**(16)**
	a)	If $y = \sin(\log x)$, *prove that* $x^2.\dfrac{d^2y}{dx^2} + x\dfrac{dy}{dx} + y = 0$	A	4	
	b)	If $x^2 + 3xy - y^2 = 10$ *find* $\dfrac{dy}{dx}$ *at* $(1,2)$	U	4	
	c)	If $y = \log\left[e^{3x}.\left(\dfrac{x-2}{x+8}\right)^{4/5}\right]$ *find* $\dfrac{dy}{dx}$	A	4	
	d)	Find $\dfrac{dy}{dx}$ *at* $\theta = \dfrac{\pi}{4}$ *if* $x = a(\theta + \sin\theta)$, $y = a(1 + \cos\theta)$	U / A	4	
	e)	Find the equation of tangent to the curve $y = 4xe^x$ at the origin.	A	4	
	f)	The perimeter of a rectangle is 100 meter. Find the length of sides when area is maximum	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE **MEE402/M302/ME302**

COURSE NAME :- **MACHINE DESIGN**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **05 / 05/ 2018**

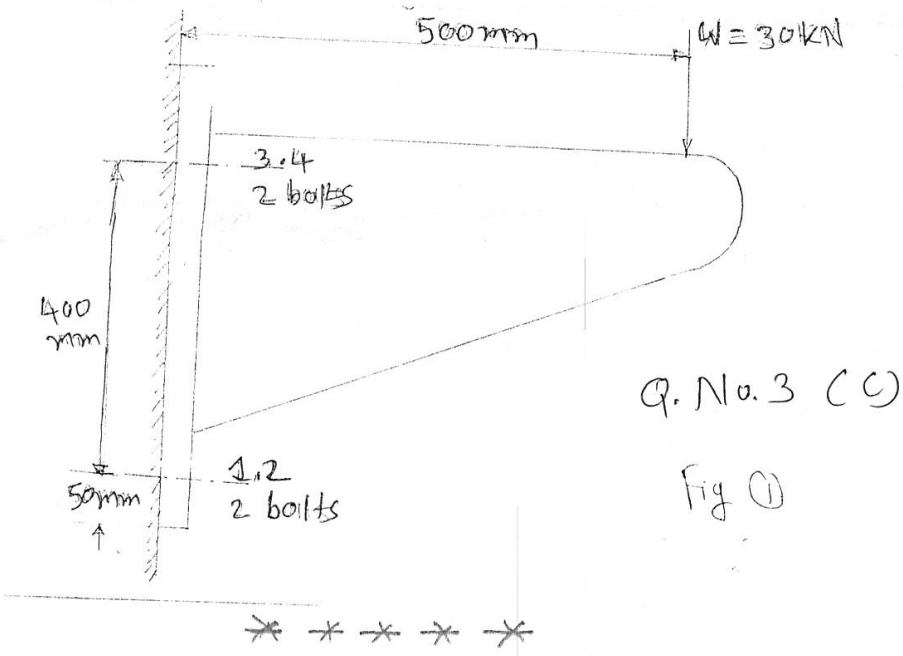
Instruction :-

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	SQN	Section- I	Marks
Q.1		Attempt any **FOUR:**	**08**
	a)	List steps involved in Mechanical engineering design process.	
	b)	What standards used in Mechanical Engineering design?	
	c)	Draw stress-strain diagram of ductile materials.	
	d)	Write any four advantages of plain carbon steel.	
	e)	Write meaning of i) 30C8 ii) SG 900/2.	
	f)	Define bending stress induced in machined member with suitable example.	
Q.2		Attempt any **TWO:**	**16**
	a)	i) List ergonomic consideration in design. ii) What are different types of screw fastening?	
	b)	State and explain following theories with uses i) Maximum principle stress theory. ii) Maximum shear stress theory. iii) Maximum distortion energy theory.	
	c)	A triple threaded power screw used in a screw-jack, has a nominal diameter of 50mm and a pitch of 8mm. The threads are square and the length of the nut is 48mm. the screw-jack is used to lift a load of 7.5KN. the coefficient of friction at the threads is 0.12 and the collar friction is negligible calculate : i) The principal shear stress in the screw body. ii) The transverse shear stresses in the screw and the nut, and iii) The unit bearing pressure. State whether the screw is self-locking.	
Q.3		Attempt any **TWO:**	**16**
	a)	Write a design procedure for designing a knuckle joint subjected to axial tensile force.	
	b)	i) State the meaning of self locking and overhauling of screw. ii) Compare square threads and trapezoidal threads and state two applications of each.	
	c)	A bracket as shown in figure No.1 is fixed to wall by means of four bolts. Find the size of the bolts if $\sigma_t = 70N/mm^2$ for materials.	

P.T.O.

QN	SQN	Section- II	Marks
Q.4		Attempt any **FOUR:**	**08**
	a)	How stress concentration can be reduced?	
	b)	Define end endurance limit.	
	c)	Enlist two advantages of flexible coupling.	
	d)	Define backlash in gears.	
	e)	What are the assumptions in Lewis formula?	
	f)	Define bearing load.	
Q.5		Attempt any **TWO:**	**16**
	a)	Classify various types of springs. A close coiled helical spring is made of 10mm diameter of steel wire. The coil consisting of 10 complete turns with a mean diameter of 120mm. the spring carries a pull of 200N. Determine the shear stress, neglecting effect of stress concentration. Determine stiffness and use $G=80KN/mm^2$.	
	b)	Explain deflection equation for helical spring with various styles of end.	
	c)	Explain the force analysis of spur gear.	
Q.6		Attempt any **TWO:**	**16**
	a)	A shaft 800mm long is supported between two bearings. A 200mm diameter pulley is keyed at distance 300mm from belt. The pulley receives 5KW at 900 rpm, overload is 25%. The angle of contact of pulley belt is 180^0 & coefficient of friction is 0.3 and belt is vertical. Find shaft diameter at $f_s=60N/mm^2$.	
	b)	A turbine shaft transmits 500kW at 900rpm. The permissible shear stress is $80N/mm^2$, while twist is permitted 0.5^0 in length of 2.5m. Calculate shaft diameter. Consider overload of 25% and $G=6.8 X10^5 N/mm^2$.	
	c)	i) Describe the procedure used for selecting bearing from handbook. ii) Explain modes of lubrication for sliding contact bearings.	



Q. No. 3 (c)

Fig (1)

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEE510/ME411**

COURSE NAME :- **INDUSTRIAL HYDRAULICS & PNEUMATICS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **21 / 05/ 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	SQN	**Section- I**	Marks
Q.1		Attempt any **FOUR:**	**08**
	a)	Define viscosity and viscosity index.	
	b)	Draw the symbol of hydraulic motor.	
	c)	Give the classification of hydraulic motors.	
	d)	List any three circuits used to control the speed of double acting cylinder.	
	e)	State any two advantages of meter out circuit.	
	f)	State functions of oil filters and gaskets.	
Q.2		Attempt any **FOUR:**	**16**
	a)	State any four applications of hydraulic system.	
	b)	What are the limitations of hydraulic systems?	
	c)	With the help of neat sketch explain working of pressure compensated flow control value.	
	d)	Differentiate between single acting cylinder and double acting cylinders.	
	e)	Explain construction of Hoses with the help of neat sketch.	
	f)	List different types of hydraulic seals, describe any one briefly.	
Q.3		Attempt any **TWO:**	**16**
	a)	i) With the help of neat sketch explain construction and working of Gerotor pump. ii) sketch and explain construction and working of screw pump.	
	b)	What are different types of rotary spool values? Explain construction and working of 4/2 rotary spool valve.	
	c)	Draw Bleed of circuit and explain working of Bleed off circuit.	

P.T.O.

QN	SQN	Section- II	Marks
Q.4		Attempt any **FOUR:**	**08**
	a)	State any four applications of pneumatic systems.	
	b)	Draw general layout of pneumatic system.	
	c)	Draw symbol of time delay valve.	
	d)	Enlist different types of compressors used in pneumatic systems. (any four)	
	e)	State any four reasons of seal failure.	
	f)	Draw symbols of i) FRL unit ii) T- win pressure valve.	
Q.5		Attempt any **FOUR:**	**16**
	a)	Explain with neat sketch two stage reciprocating air compressor.	
	b)	Compare merits and limitations of pneumatic system with hydraulic system.	
	c)	State advantages and limitations of air motors.	
	d)	State various valve actuation methods. How they are symbolically shown?	
	e)	Explain with neat sketch air filter.	
	f)	Draw speed control circuit for double acting cylinder.	
Q.6		Attempt any **FOUR:**	**16**
	a)	Explain with neat sketch 5/2 direction control valve.	
	b)	Explain with neat sketch working quick exhaust valve.	
	c)	State functions of accumulator and sketch any one type of accumulator.	
	d)	Draw pneumatic circuit for automatic operation of double acting cylinder.	
	e)	Draw pneumatic circuit diagram to operate single acting cylinder using twin pressure valve. (AND valve)	
	f)	Draw neat sketch of double acting cylinder label the various parts of it.	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2018

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **MEF309/ME309/MEE309** COURSE NAME: **ELECTRICAL TECHNOLOGY**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **21/05/2018**

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

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QN	SQN	Question Text	RUA	CO MEF309	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Define the term 'power' and state its unit.	R	1	
	b)	Define the terms i) Bilateral Network ii) Uni-lateral Network.	R	1	
	c)	State the parameters that are measured by digital multi-meter.	U	2	
	d)	Draw the sinusoidal waveform for an alternating current showing its instantaneous value and peak value.	R	2	
	e)	State the necessity of earthing.	U	3	
	f)	Draw the connection diagram for 3 phase-4wire system.	U	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	State and explain Kirchhoff's laws.	R	1	
	b)	The following are the details of load on a circuit connected through a supply meter: i) Six lamps of 40watts each working for 4 hours per day ii) Two fluorescent tubes 125watts each working for 2 hours per day iii) One 1000 watt heater working for 3 hours per day If each unit of energy costs 70 Paise, what will be the electric energy charges for the month of June?	A	1	
	c)	Explain with circuit diagram purely inductive circuit. Draw the necessary waveform. Write the equations for voltage, current and power.	U	2	
	d)	Define the terms related to AC circuit. i) Instantaneous value ii) Average value iii) RMS value iv) Peak value	R	2	
	e)	With neat sketch explain construction of Megger.	R	3	
	f)	State any four advantages of polyphase system.	R	3	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Explain R-L-C series circuit with circuit diagram and phasor diagram.	U	2	

P.T.O

	b)	Find the equivalent resistance of circuit for the following two cases, having three resistances 4Ω, 6Ω and 8Ω are connected in series and parallel,	A	1	
	c)	List out the measuring instruments used for measurement of AC and DC quantities.	R	2	
	d)	State and explain Faraday's laws of electromagnetic induction.	R	2	
	e)	Explain the term Balanced electrical load. Draw the connection diagram of three phase delta connected system. Write the necessary equations of line and phase values of voltage current and power.	U	3	
	f)	With neat sketch explain pipe earthing.	U	3	
Q.4		Attempt any **FOUR**			**(08)**
	a)	Explain any one situation where a DC motor is used in the industry.	U	6	
	b)	List the parts of the DC motor.	R	6	
	c)	List the parts of the DC servo motor.	R	6	
	d)	Explain briefly the working principle of the servo motor.	U	6	
	e)	State any two applications of the stepper motor.	R / U	6	
	f)	Give the classification of the DC motors.	R	6	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain the principle of working of the single phase transformer using relevant figure and mathematical expression.	U	4	
	b)	State the classification of three phase AC motors and draw the torque –speed characteristics of any two of them.	U / A	7	
	c)	Draw a relevant diagram of the single phase transformer to illustrate its construction features. Label it.	U	4	
	d)	Explain the operating (torque –speed) characteristics of the single phase capacitor start induction motor and write two applications justifying its use there.	U / A	7	
	e)	A transformer has a full load copper loss of 1600W, iron loss of 1400W. Determine the efficiency if it is fully loaded and supplying a load of 1200kW on its secondary side.	A	4	
	f)	Explain using properly labeled diagram the operation of the star-delta starter used for a 3 phase squirrel cage induction motor.	A	7	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Compare the practical and ideal single phase transformer.	U	4	
	b)	State the laws of illumination explaining the terms involved in brief.	U	5	
	c)	Draw a schematic diagram of the dielectric heating unit and label it.	U / A	5	
	d)	Write values of illumination required for the following areas: - workshops with general lathe machines, drawing halls, offices and classrooms.	U	5	
	e)	Explain with sketch the working of the rotor resistance starter used for slipring induction motors.	A	7	
	f)	Explain using the labeled schematic diagram the working of any one type of induction furnace.	A	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM APRIL/MAY -2018

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **CCF107/CCE107/X105** COURSE NAME: **ENGINEERING DRAWING - I**

MAX. MARKS: **80** TIME: **4 HRS.** DATE: **11/05/2018**

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

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QN	SQN	Question Text	RUA	CO CCF107	Marks
Q.1		Attempt any **TWO**			**(08)**
	a)	List any four drawing Instruments.	R	1	
	b)	Construct a pentagon of base side 30mm.	A / U	1	
	c)	Construct a plain scale to show meter when 1 centimeter represents 4 meters and long enough to measure upto 60 meters. Find the R.F and mark on it a distance of 43 meters.	U / A	1	
Q.2	**A**	Attempt any **TWO**			**(12)**
	a)	A circle of 40 mm diameter rolls along the circumference of another circle of 120mm diameter form outside. Trace the path of a point on the circumference of the rolling circle for one complete revolution. Draw epicydoid. (6 marks)	U / A	2	
	b)	Draw an ellipse, having major and minor axis 120mm and 70mm respectively by concentric circle method. (6 marks)	A	2	
	c)	The distance between the fixed straight line and fixed point is 80mm. draw a hyperbola, if eccentricity is $\frac{5}{3}$. (6 marks)	U / A	2	
	B	Attempt any **TWO**			**(08)**
	a)	Draw an involute of a pentagon of side 25mm. (04 marks)	U / A	2	
	b)	Draw an Archimedion spiral of one convolution the maximum and minimum radius being 80mm and 20mm respectively. (04 Marks)	U / A	2	
	c)	Construct a rectangular parabola with base length 80mm and axis height 60mm respectively. (04 marks)	U / A	2	
Q.3		Attempt any **TWO**			**(12)**
	a)	A line PQ, 110mm long, is in H.P with its end P20mm in front V.P. Draw its two views, when the end Q is 60mm in front of V.P. Determine its inclination with V.P (6 marks)	U / A	3	
	b)	A line AB, 80mm long, is in H.P and inclined at an angle 45^0 to V.P. Draw its projections, if the end A is 25mm infront of V.P (06 marks)	U / A	3	

P.T.O

	c)	The distance between the projectors through the ends of a line MN, 75mm long is 60mm. Its end M is 15 mm above the H.P and 20mm infront of V.P. Draw its two views, when it is parallel to V.P. Determine its inclination with H.P. (06 marks)	U / A	3	
Q.4		Attempt any **TWO**			**(08)**
	a)	A regular pentagon of 25 mm side has one side in the H.P. Its plane is inclined at an angle of 45^0 to the H.P and perpendicular to the V.P. Draw its projections.	U	4	
	b)	The front view and top view of a circular plane are straight lines perpendicular to reference line xy. Diameter of circular plane is 50mm. State its position with respect to principal planes. State the shape of side view. Draw its projection.	U	4	
	c)	An isosceles triangular plate ABC of negligible thickness it resting on its base AB on H.P. Which measure 50mm. The other two sides BC and AC measure 70mm each. Draw its projection of plate ABC when its top view appears to be an equilateral triangle.	U	4	
Q.5		Attempt any **TWO**			**(16)**
	a)	A hexagonal prism side of base 20mm and axis length 60mm, is kept on the H.P on one of its base edge such that the rectangular face containing that edge makes an angle of 30^0 with H.P and perpendicular to V.P. Draw the projection of prism.	U	5	
	b)	A pentagonal pyramid having side of base 30mm and axis 65mm long, is resting on one of its base corner in the H.P. Draw its projection if its slant edge containing that corner makes an angle of 45^0 with H.P and axis is parallel to V.P.	U	5	
	c)	A cylinder of base diameter 50mm and axis length 70mm is kept on H.P on a point its base circle such that its axis is inclined to H.P at 30^0 and parallel to V.P. Draw its projection of cylinder.	U	5	
Q.6		Attempt any **TWO**			**(16)**
	a)	A square prism, base 40mm side and 80mm height, stands vertically on the H.P with the edge of base equally inclined to V.P A cutting plane, perpendicular to V.P and inclined at 60^0 to H.P. Cuts its axis at point 15mm from its top end. Draw front view, sectional top view and true shape of section.	U	6	
	b)	A cone base 60mm diameter and axis 70mm long, is resting on its base on H.P. It is cut by section plane perpendicular to V.P and parallel to and 16mm away from one of its end generator. Draw front view, sectional top view and true shape of section.	U	6	
	c)	A hexagonal pyramid, base 30mm side and axis 65mm long has its base on the H.P with one edge of base parallel to V.P. A section plane perpendicular to H.P and inclined at 45^0 to V.P cut the pyramid at a distance of 10mm from its axis. Draw top view, sectional front view and true shape of section.	U	6	
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EVEN TERM END EXAM MAY -2018

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **MECHANICAL ENGINEERING**

COURSE CODE :- **MEE503/ME404**

COURSE NAME :- **QUALITY MANAGEMENT**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **14 / 05/ 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	SQN	**Section- I**	Marks
Q.1		Attempt any **FOUR:**	**08**
	a)	Which are two components of customer satisfaction?	
	b)	Define reliability.	
	c)	Enlist two advantages of having quality circles for management.	
	d)	What should be the competence of auditors?	
	e)	Give two differences between cost of quality and value of quality.	
	f)	Enlist various internal failure costs.	
Q.2		Attempt any **FOUR:**	**16**
	a)	Describe availability.	
	b)	Define maintainability and describe its measures.	
	c)	Explain the activities included in reliability programs.	
	d)	Define inspection. Give the number of task involved in inspection function.	
	e)	Explain the role of upper management in ensuring the quality of the product.	
	f)	Discuss "External Failure Cost' category of quality cost.	
Q.3		Attempt any **FOUR:**	**16**
	a)	Give the responsibilities of quality assurance.	
	b)	Describe contents of quality audits.	
	c)	Give the essential ingredients for a successful quality audit program.	
	d)	Describe the benefits of quality circle.	
	e)	Discuss appraisal cost category of quality costs.	
	f)	Explain the economics of quality of design and quality of conformance.	

P.T.O.

QN	SQN	Section- II	Marks
Q.4		Attempt any **FOUR:**	**08**
	a)	What is standard deviation?	
	b)	What is variable? Give examples.	
	c)	Define TQM.	
	d)	Name four tools of process improvement.	
	e)	Why Benchmarking is necessary?	
	f)	Explain principles of six sigma in brief.	
Q.5		Attempt any **FOUR:**	**16**
	a)	Explain the steps in preparation of '$\overline{X}$' and 'R' chart.	
	b)	Define process capability and explain its use in quality.	
	c)	List four needs of '$\bar{x}$' and 'R' charts.	
	d)	How KAIZAN helps in process improvement?	
	e)	List characteristics of successful team.	
	f)	What is Deming philosophy? Explain in brief.	
Q.6		Attempt any **FOUR:**	**16**
	a)	List Eight characteristics of Quality leader.	
	b)	Explain cause and effects of (ISHIKAWA) diagram.	
	c)	List the benefits of ISO 14000 series of standard.	
	d)	Explain in detail any one application of six sigma.	
	e)	How 5's theory is used for improving Quality?	
	f)	Explain scatter diagram in brief.	

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