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# B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

## February / March 2025 Semester End Main Examinations

Programme: B.E.

Semester: I / II

Branch: Common to all Branches

Duration: 3 hrs.

Course Code: 18ME1ESEME / 18ME2ESEME

Max Marks: 100

Course: Elements of Mechanical Engineering

**Instructions:** 1. Answer any FIVE full questions, choosing one full question from each unit.  
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.			<b>UNIT - I</b>	<b>CO</b>	<b>PO</b>	<b>Marks</b>
	1	a)	Compare Renewable and Non- Renewable sources of energy with examples.	CO1	PO1	04
		b)	Explain the working of Reaction steam turbine with a Pressure Velocity Diagram	CO2	PO2	08
		c)	Explain with a schematic, how a parabolic type of collector is used in solar energy conversion.	CO2	PO1	06
			<b>OR</b>			
	2	a)	With a neat sketch, explain the working of an open cycle and closed cycle gas turbine plant	CO1	PO2	10
		b)	With the help of temperature-enthalpy diagram, explain the formation of steam at constant pressure.	CO2	PO1	10
			<b>UNIT - II</b>			
	3	a)	Explain the working of a domestic refrigeration system with a neat sketch.	CO1	PO1	10
		b)	List any 4 properties of ideal refrigerants	CO2	PO2	04
		c)	Differentiate between Vapour Compression and Vapour absorption Refrigerator (any 6)	CO1	PO1	06
			<b>OR</b>			
	4	a)	With the help of a P-V diagram explain the working of a four stroke Diesel Engine.	CO3	PO1	10
		b)	A single cylinder 4-stroke engine runs at 1000 rpm and has a bore of 115 mm and a stroke of 140 mm. The brake load is 60 N at 600 mm radius and the mechanical efficiency is 80%. Calculate brake power and mean effective pressure.	CO3	PO2	10

		<b>UNIT - III</b>			
5	a)	Classify welding processes with examples and explain the working of Arc welding with a neat sketch.	CO5	PO1	10
	b)	With a neat sketch, explain the Taper turning by swiveling the compound rest and offsetting the tailstock method.	CO5	PO2	10
		<b>OR</b>			
6	a)	Explain the working of a radial drilling machine with neat sketch.	CO6	PO1	08
	b)	With a neat sketch explain surface grinding and cylindrical grinding operations.	CO6	PO2	08
	c)	Explain with neat sketch Tapping and Counter sinking operations	CO6	PO1	04
		<b>UNIT - IV</b>			
7	a)	List the different types of Gear Drives	CO4	PO2	06
	b)	A compound gear train is formed by 4 gears A, B,C and D. Gear A meshes with gear B and gear C meshes with gear D. Gears B and C are compounded . A is connected to the drive shaft and D is connected to the driven shaft and power is transmitted $T_A = 15$ , $T_B = 30$ , $T_C = 20$ , $T_D = 40$ . If gear A were to rotate at 400 rpm. Calculate the speed of D. represent the gear arrangement schematically.	CO4	PO1	06
	c)	Deduce an expression of Velocity ratio for a Compound gear train	CO5	PO1	08
		<b>OR</b>			
8	a)	Classify bearings and explain its features and applications of radial and Thrust ball bearings with a neat sketch.	CO4	PO2	10
	b)	How are Lubricants classified and explain each with examples?	CO4	PO2	06
	c)	Explain how open and cross belt drives function with neat sketches.	CO4	PO1	04
		<b>UNIT - V</b>			
9	a)	Define mechatronic systems and explain closed loop control systems with neat sketch and example.	CO5	PO1	10
	b)	With the help of block diagram explain the working of open loop system. What are the advantages and disadvantages of this Mechatronics systems?	CO5	PO2	10
		<b>OR</b>			
10	a)	Describe the general steps followed in Additive manufacturing process.	CO4	PO1	08
	b)	Explain DLP process of Additive manufacturing?	CO4	PO1	08
	c)	List any four applications of Additive manufacturing process.	CO4	PO2	04

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