U.S.N.										

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

Autonomous Institute Affiliated to VTU

August 2024 Semester End Main Examinations

Programme: B.E.   **Semester: I / II**
Branch: Common to all Branches   **Duration: 3 hrs.**
Course Code: 21ME1ESEME / 21ME2ESEME   **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.

			UNIT - I	CO	PO	Marks
1	a)		Compare the renewable and non-renewable resources of energy.	CO1	PO1	**04**
	b)		Explain the working and construction of parabolic focusing collector with help of neat sketches used for high temperature application.	CO2	PO1	**08**
	c)		Explain the formation of steam at constant pressure with help of Temperature-enthalpy diagram.	CO2	PO1	**08**
			OR			
2	a)		Explain the working principle of Hydel Power plant with the help of neat diagram.	CO2	PO1	**08**
	b)		Explain the working principle of centrifugal pump with the help of a neat sketch.	CO2	PO1	**08**
	c)		How do you classify Hydraulic turbines?	CO1	PO1	**04**
			UNIT-II			
3	a)		Classify composite materials. Explain the fiber reinforced composite (FRC) and metal matrix composites (MMC) with the help of neat sketches.	CO2	PO1	**10**
	b)		Differentiate between welding and soldering processes.	CO2	PO1	**10**
			OR			
4	a)		Classify the joining processes. Explain electric arc welding with the help of a neat sketch.	CO2	PO1	**10**
	b)		What are the three modes of heat transfer? Explain their governing laws. Discuss the principle of heat transfer in automobile radiators.	CO2	PO1	**10**
			UNIT-III			
5	a)		With the help of neat sketches, explain the working principle of CI Engine.	CO2	PO1	**10**

		b)	A 4-stroke diesel engine has a piston diameter of 250 mm and stroke 400 mm. The mean effective pressure is 4 Bar and the crank speed is 500 rpm. The diameter of the brake drum is 1000 mm and the effective brake load is 400 N. Find indicated power, brake power, frictional power, and mechanical efficiency.	CO2	PO2	**06**
		b)	Discuss the advantages and disadvantages of hybrid electric vehicles.	CO2	PO1	**04**
			OR			
6	a)	With the help of neat sketches explain the working of vapor absorption type of refrigeration system.	CO2	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.	CO2	PO1	**06**
	c)	Mention any four differences between SI and CI Engines.	CO2	PO1	**04**
		UNIT-IV			
7	a)	With the help of neat sketches explain the working principal of open and crossed type of belt drives.	CO2	PO1	**08**
	b)	Classify Gear Drives.	CO2	PO1	**04**
	c)	What are the applications of Robots? Explain cylindrical coordinate robots with the help of neat sketch.	CO2	PO1	**08**
		OR			
8	a)	Define the 'Machine' and 'Mechanism'. Explain the different applications of linear motion.	CO2	PO1	**08**
	b)	With help of neat sketch, explain the anatomy of a 'Robot'.	CO2	PO1	**08**
	c)	Discuss the differences between belt drives and gear drives.	CO2	PO1	**04**
		UNIT-V			
9	a)	With the help of neat sketches explain the working of following taper turning method: i. Swiveling the compound tool post ii. Tail stock offset method	CO2	PO1	**10**
	b)	Explain the open and closed loop type of control systems. Discuss the applications of Mechatronics.	CO2	PO1	**10**
		OR			
10	a)	With the help of neat sketches explain 'Plain Turning', 'Facing', and 'Knurling' operation.	CO2	PO1	**10**
	b)	What are advantages and disadvantages of CNC? Explain the components of CNC.	CO2	PO1	**10**

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