U.S.N.										

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

Autonomous Institute Affiliated to VTU

December 2023 Supplementary Examinations

Programme: B.E. **Semester: II**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 22ME2ESEME **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.

				CO	*PO*	Marks
			UNIT - I			
1	a)		Differentiate between renewable and non-renewable sources of energy (at least four differences)	*CO2*	*PO1*	**04**
	b)		Define the following terms and indicate them on a temperature-enthalpy diagram (T-h) (i) Saturation temperature, (ii) Sensible heat, (iii) Latent heat, (iv) Enthalpy of Superheat	*CO1*	*PO1*	**06**
	c)		Explain the working principle of a parabolic collectors with a neat sketch. Differentiate it from flat plate collector in terms of any two applications.	*CO1*	*PO1*	**10**
			UNIT - II			
2	a)		What are the modes of heat transfer? Write the appropriate equations for them and name the variables.	*CO1*	*PO1*	**04**
	b)		With a neat sketch, highlight the salient aspects of arc-welding.	*CO1*	*PO1*	**06**
	c)		Explain the construction and working of a reaction turbine with neat sketch.	*CO1*	*PO1*	**10**
			OR			
3	a)		With an example explain the active and passive cooling techniques	*CO1*	*PO1*	**04**
	b)		Differentiate between arc welding and soldering (at-least six differences)	*CO2*	*PO1*	**06**
	c)		Explain the working of an impulse hydraulic turbine with a neat sketch	*CO2*	*PO1*	**10**
			UNIT - III			
4	a)		Difference between Electric vehicle and Hybrid vehicle (any four)	*CO2*	*PO1*	**04**
	b)		A single cylinder 4-stroke engine runs at 1000 rpm and has a bore of	*CO3*	*PO1*	**06**

			115 mm and a stroke length 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 in Pa.			
		c)	Explain the working of Industrial refrigeration system with a block diagram	*CO1*	*PO1*	**10**
			UNIT-IV			
	5	a)	Difference between *Open belt drive* and *Crossed belt drive*	*CO2*	*PO1*	**04**
		b)	A gear train consists of four gears A, B, C and D with 20, 25, 50 and 75 teeth respectively. Sketch the possible arrangements of gears for a speed reduction of 7.5.	*CO3*	*PO1*	**06**
		c)	Explain the common robot configurations with a sketch.	*CO1*	*PO1*	**10**
			OR			
	6	a)	A shaft running at 100 rpm is to drive a parallel shaft at 150 rpm. The pulley on the driving shaft is 0.35m in diameter. Find the diameter of the driven pulley. Calculate the linear velocity of the belt and the velocity ratio.	*CO3*	*PO1*	**04**
		b)	Highlight the salient aspects of the following gear drives with a sketch: (i) bevel gears (iii) worm and worm wheel	*CO1*	*PO1*	**06**
		c)	Explain the robot anatomy with a sketch and list the types of joints. Mention any two applications of robot.	*CO1*	*PO1*	**10**
			UNIT - V			
	7	a)	Explain the concept of open loop control system with a block diagram of an example	*CO1*	*PO1*	**04**
		b)	List the steps involved in additive manufacturing. How is it different from manufacturing using CNC?	*CO2*	*PO1*	**06**
		c)	Mention any four Lathe operations. Explain the following taper turning operations with a neat sketch: (i) Swivelling the compound rest method and (ii) Using forming tool.	*CO1*	*PO1*	**10**

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