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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: 22ME1ESIME / 22ME1ESIME

Max Marks: 100

Course: Introduction to 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
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.	1	a)	With the help of neat sketch explain the construction and working of flat plate solar collector.		<i>CO1</i>	<i>PO1</i>		08
		b)	Illustrate working of hydroelectric power plant with a sketch.		<i>CO2</i>	<i>PO1</i>		06
		c)	Discuss the effects of the following issues on the environment (i) Global warming (ii) Ozone layer depletion.		<i>CO1</i>	<i>PO1</i>		06
			OR					
	2	a)	Illustrate with a sketch, parabolic trough collector with reference to solar power plant.		<i>CO1</i>	<i>PO1</i>		06
		b)	Illustrate the working of a wind mill with a sketch.		<i>CO2</i>	<i>PO1</i>		06
		c)	With the help of neat sketch explain the construction and working of Biogas plant.		<i>CO1</i>	<i>PO1</i>		08
			UNIT - II					
	3	a)	Illustrate taper turning operation by swiveling the compound rest method on a lathe machine with a sketch.		<i>CO1</i>	<i>PO1</i>		08
		b)	Differentiate between boring and reaming operations.		<i>CO1</i>	<i>PO1</i>		04
		c)	Describe the various components of CNC system with a block diagram.		<i>CO1</i>	<i>PO1</i>		08
			OR					
	4	a)	With the sketches, explain the following milling operations: (i) Plain milling, and (ii) Slot milling.		<i>CO1</i>	<i>PO1</i>		08
		b)	Differentiate between facing and turning operations in a lathe machine.		<i>CO1</i>	<i>PO1</i>		04
		c)	Explain the various steps involved in 3-D printing process.		<i>CO1</i>	<i>PO1</i>		08

UNIT – III					
5	a)	Explain the working of 4 stroke petrol engine with appropriate line diagrams and <i>P-V</i> diagram.	CO2	PO1	10
	b)	The following data refer to 4 stroke diesel engine: cylinder diameter = 200 mm, stroke length = 300 mm, engine speed = 300 rpm, effective brake load = 500 kg, mean radius of brake drum = 63.7 mm, mean effective pressure = 6 bar, calculate: (i) Indicated power, (ii) Brake power and (iii) Mechanical efficiency.	CO3	PO1	06
	c)	List the advantages and disadvantages of electric vehicles.	CO2	PO1	04
OR					
6	a)	Discuss the function of any four components of electric vehicles with a block diagram.	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 600mm radius and the mechanical efficiency is 80%. Calculate: (i) Brake power, (ii) Indicated power, and (iii) Mean effective pressure.	CO3	PO1	06
	c)	Classify internal combustion (IC) engines.	CO2	PO1	04
UNIT - IV					
7	a)	Explain the following engineering materials with their two applications: (i) Peizo electric materials, and (ii) Shape memory alloys.	CO2	PO1	06
	b)	Differentiate between metal matrix composites and fiber reinforced composites	CO2	PO1	06
	c)	Illustrate the working of electric arc welding process with a sketch	CO2	PO1	08
OR					
8	a)	Describe the soldering operation by soldering iron method with a sketch.	CO2	PO1	08
	b)	Differentiate between soldering and welding processes	CO2	PO1	06
	c)	Illustrate the any three engineering applications for each of the following materials: (i) Aluminum alloys, and (ii) Smart materials	CO2	PO1	06
UNIT - V					
9	a)	Explain the concepts of open loop and closed loop control systems with block diagrams.	CO1	PO1	06
	b)	With suitable examples, explain fixed automation, flexible automation and programmable automation.	CO1	PO1	06
	c)	With block diagrams, describe any two types of communication models used in Internet of Things (IoT).	CO1	PO1	08
OR					
10	a)	Mention the various configurations of robots, and illustrate with sketch any two types of robot configurations.	CO1	PO1	10
	b)	Explain any two applications of robots in an engineering industry.	CO1	PO1	04
	c)	Illustrate the functional block diagram of IoT	CO1	PO1	06