

U.S.N.									
--------	--	--	--	--	--	--	--	--	--

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.

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

		UNIT – III			
5	a)	Explain the working of 4 stroke petrol engine with appropriate line diagrams and <i>P-V</i> diagram.	<i>CO2</i>	<i>PO1</i>	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.	<i>CO3</i>	<i>PO1</i>	06
	c)	List the advantages and disadvantages of electric vehicles.	<i>CO2</i>	<i>PO1</i>	04
		OR			
6	a)	Discuss the function of any four components of electric vehicles with a block diagram.	<i>CO2</i>	<i>PO1</i>	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.	<i>CO3</i>	<i>PO1</i>	06
	c)	Classify internal combustion (IC) engines.	<i>CO2</i>	<i>PO1</i>	04
		UNIT - IV			
7	a)	Explain the following engineering materials with their two applications: (i) Piezo electric materials, and (ii) Shape memory alloys.	<i>CO2</i>	<i>PO1</i>	06
	b)	Differentiate between metal matrix composites and fiber reinforced composites	<i>CO2</i>	<i>PO1</i>	06
	c)	Illustrate the working of electric arc welding process with a sketch	<i>CO2</i>	<i>PO1</i>	08
		OR			
8	a)	Describe the soldering operation by soldering iron method with a sketch.	<i>CO2</i>	<i>PO1</i>	08
	b)	Differentiate between soldering and welding processes	<i>CO2</i>	<i>PO1</i>	06
	c)	Illustrate the any three engineering applications for each of the following materials: (i) Aluminum alloys, and (ii) Smart materials	<i>CO2</i>	<i>PO1</i>	06
		UNIT - V			
9	a)	Explain the concepts of open loop and closed loop control systems with block diagrams.	<i>CO1</i>	<i>PO1</i>	06
	b)	With suitable examples, explain fixed automation, flexible automation and programmable automation.	<i>CO1</i>	<i>PO1</i>	06
	c)	With block diagrams, describe any two types of communication models used in Internet of Things (IoT).	<i>CO1</i>	<i>PO1</i>	08
		OR			
10	a)	Mention the various configurations of robots, and illustrate with sketch any two types of robot configurations.	<i>CO1</i>	<i>PO1</i>	10
	b)	Explain any two applications of robots in an engineering industry.	<i>CO1</i>	<i>PO1</i>	04
	c)	Illustrate the functional block diagram of IoT	<i>CO1</i>	<i>PO1</i>	06
