U.S.N.										

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

Autonomous Institute Affiliated to VTU

May 2023 Semester End Main Examinations

Programme: B.E. **Semester: I**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 22ME1ESIME **Max Marks: 100**
Course: Introduction to Mechanical Engineering **Date: 19.05.2023**

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

1	a)	Differentiate between renewable and non-renewable energy resources.	**04**
	b)	With the help of neat sketch explain the working principle of parabolic solar collector.	**06**
	c)	Explain the Biogas plant with the help of neat sketch and list the advantages of the same.	**10**

UNIT - II

2	a)	What are the differences between up milling and down milling?	**04**
	b)	Define Drilling. With the help of neat sketch explain the reaming operation in drilling machine.	**06**
	c)	Explain the following taper turning methods in lathe with the help of neat sketches: (i) Swiveling the compound rest method. (ii) Tailstock offset method.	**10**

OR

3	a)	What is CNC Machine?. List out its applications.	**04**
	b)	What are the advantages and disadvantages of CNC systems?.	**06**
	c)	Define 3D printing and explain the various steps involved in it.	**10**

UNIT - III

4	a)	What is IC Engine? Write its classification. (Any three)	**04**
	b)	Differentiate between SI and CI engines. (Atleast six)	**06**
	c)	The following observations were obtained during a trial on a four-stroke diesel engine: Cylinder diameter = 25 cm, stroke of the piston = 40 cm, crankshaft speed = 250 RPM, spring balance readings of brake drum are 100 kg and 30 kg, brake drum radius = 0.95 m, radius of rope = 0.05 m, area of indicator diagram = 3 cm^2, length of indicator diagram = 5 cm, engine indicator spring constant = 100 $N/cm^2/cm$. Determine: i) Mean effective pressure acting on piston, ii) Indicated power, iii) Torque available at crankshaft, iv) Brake power, v) Friction power and vi) Mechanical efficiency.	**10**

OR

5	a)	List the advantages and disadvantages of electric vehicles.	**04**
	b)	Explain the components of hybrid vehicles with the help of block diagram.	**06**
	c)	With a neat sketch explain the working of 4-stroke Diesel engine and represent the same on P-V diagram.	**10**

UNIT - IV

6	a)	Explain the effect of shape memory alloy with the help of simple sketch.	**04**
	b)	What is composite material? List the types of composites and explain any one type with neat sketch.	**06**
	c)	Explain the electric arc welding process with a help of neat sketch. List any three differences between welding and soldering processes.	**10**

UNIT - V

7	a)	Define IoT and list out its characteristics.	**04**
	b)	Discuss any three advantages and disadvantages of industrial automation?	**06**
	c)	Explain the following with the help of neat sketch. (i) Closed loop control system. (ii) Cylindrical configuration of robot.	**10**

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