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Course Code

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First Semester B.E. Degree Examinations, May 2022  
**ELEMENTS OF MECHANICAL ENGINEERING**  
 (Common to all Branches)

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.  
 2. Missing data, if any, may be suitably assumed

Q. No	Question	Marks	(RBTL:CO:PI)
<b>Module - 1</b>			
1	a Differentiate between conventional and non-conventional energy sources.	05	(2:1 : 1.3.1)
	b Sketch and explain the hydroelectric power plant.	10	(2:1 : 1.3.1)
	c Define turbine. Mention the classification of turbines.	05	(2:1 : 1.3.1)
<b>(OR)</b>			
2	a Sketch and explain the Francis turbine.	10	(2:1 : 1.3.1)
	b Discuss the open cycle and closed cycle gas turbines with neat sketch.	10	(2:1 : 1.3.1)
<b>Module - 2</b>			
3	a Sketch and explain the four stroke petrol engine.	12	(2:2 : 1.4.1)
	b A four stroke IC engine running at 450 rpm has bore diameter 100 mm and stroke length 120 mm. The details of the indicator diagram are as follows. Area of indicator diagram = 4 cm <sup>2</sup> , length of the indicator diagram = 6.5 cm, and spring value of the spring used is 10 bar/cm. calculate the indicated power of the engine.	08	(2:2 : 1.4.1)
<b>(OR)</b>			
4	a Sketch and explain the vapour absorption refrigerator.	10	(2:2 : 1.3.1)
	b Explain the room air conditioner with the neat sketch.	10	(2:2 : 1.3.1)
<b>Module-3</b>			
5	a Draw the stress- strain curve for ductile material and explain the salient points.	10	(2:3 : 1.3.1)
	b Explain the following with the neat sketches (i) spur gears (ii) helical gears (iii) worm gears.	10	(2:3 : 1.4.1)
<b>(OR)</b>			
6	a Distinguish between open and crossed belt drives.	08	(2:3 : 1.4.1)
	b The velocity ratio of a belt drive is 3:2. If the diameter of the driven pulley is 120 cm which runs at 180 rpm, find the diameter and speed of the driver pulley and linear velocity of the belt.	12	(2:3 : 1.4.1)
<b>Module-4</b>			
7	a Sketch and explain the working principle of lathe.	10	(2:4 : 1.4.1)

**b** Sketch and explain the arc welding. Mention the advantages and applications. **10** **(2:4 : 1.4.1)**

**(OR)**

**8 a** Sketch and explain the horizontal milling machine. **10** **(2:4 : 1.4.1)**

**b** Mention the specifications of lathe with the outline diagram. **10** **(2:4 : 1.4.1)**

**Module-5**

**9 a** Define CNC machining. Explain the components of CNC machine. **10** **(2:5 : 1.4.1)**

**b** What is robot? Mention the advantages and industrial applications. **10** **(2:5 : 1.3.1)**

**(OR)**

**10 a** Define Automation. Explain the types of automation. **10** **(2:5 : 1.3.1)**

**b** Explain the Cartesian coordinate robot with the neat sketch. **10** **(2:5 : 1.3.1)**

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