

# CBCS SCHEME

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BEMEM103/203

## First/Second Semester B.E./B.Tech. Degree Examination, June/July 2025 Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks:100

- Note:** 1. Answer any FIVE full questions, choosing ONE full question from each module.  
2. M : Marks , L: Bloom's level , C: Course outcomes.  
3. Use of steam table is permitted.

Module – 1			M	L	C
1	a.	Explain the role of mechanical engineering in industry and society.	7	L2	CO1
	b.	Explain emerging trends and technologies in automobile sector.	7	L2	CO1
	c.	Find enthalpy of 1 kg of steam at 12 bar when steam is : i) Dry saturated ii) 22% wet iii) Super heated to 250°C Assume specific heat of super heated steam as 2.25 kJ/kg K.	6	L3	CO4
OR					
2	a.	Explain with neat sketch working principle of hydel power plant.	7	L2	CO1
	b.	Explain with neat sketch working principle of nuclear power plant.	7	L2	CO1
	c.	Find the enthalpy of 0.5 kg of steam at a pressure of 10 bar when steam is : i) Dry saturated ii) 1.5% wet iii) Super heated to 200°C Assume specific heat of super heated steam as 2.25 kJ/kg K.	6	L3	CO4
Module – 2					
3	a.	Explain with neat sketches the following lathe operations : i) Turning ii) Knurling iii) Thread cutting.	10	L2	CO2
	b.	Explain with neat sketches the following drilling operations : i) Drilling ii) Boring iii) Counter sinking.	10	L2	CO2
OR					
4	a.	Explain with neat sketches the following milling operations : i) Plain milling ii) Slot milling iii) End milling.	10	L2	CO2
	b.	Explain the basic components and applications of CNC.	10	L2	CO2

**Module – 3**

5	a.	Explain with neat sketches the working principle of four stroke petrol engine.	10	L2	CO2
	b.	Explain the properties of refrigerants.	5	L2	CO2
	c.	A four stroke single cylinder diesel engine has a piston diameter of 250 mm and stroke 400 mm. The mean effective pressure is 4 bar and speed is 500 rpm. The diameter of the brake drum is 1000 mm and effective brake load is 400 N. Find IP, BP and FP.	5	L3	CO4

**OR**

6	a.	Explain with neat sketch the working principle of VCR.	10	L2	CO2
	b.	Explain the applications of Air Conditioner.	5	L2	CO2
	c.	A single cylinder four stroke engine runs at 1000 rpm and has a bore of 115 mm, stroke 140 mm. The brake load is 60 N at 600 mm radius and mechanical efficiency is 80%. Find IP, BP and mean effective pressure.	5	L3	CO4

**Module – 4**

7	a.	Explain with neat sketch spur and simple gear train.	8	L2	CO3
	b.	Explain flat and v-belt drive.	6	L2	CO3
	c.	A simple gear train consists of 3 gears. The number of teeth on the driving gear is 60, on the idler gear 40 and on the driven gear 80. If the driving gear rotates at 1200 rpm. Find the speed of the driven gear and also velocity ratio. Sketch the arrangement of gear drive.	6	L3	CO4

**OR**

8	a.	Explain with a neat sketch Arc welding.	8	L2	CO3
	b.	Explain with neat sketches types of flames used in gas welding.	6	L2	CO3
	c.	It is required to drive a shaft as 600 rpm by a belt using a pulley of 150 mm diameter on another parallel shaft B running at 240 rpm. What would be the diameter of the pulley on the shaft A and also find velocity ratio.	6	L3	CO4

**Module – 5**

9	a.	Explain the basic components of hybrid vehicle.	10	L2	CO3
	b.	Explain advantages of electric and hybrid vehicles.	10	L2	CO3

**OR**

10	a.	Explain with block diagram open and closed loop mechatronics system.	10	L2	CO3
	b.	Explain with neat sketch robot anatomy and applications of robots.	10	L2	CO3

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