

CBCS SCHEME

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BEMEM103/203

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2026 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.*

Module – 1			M	L	C
Q.1	a.	Enumerate on the role of mechanical engineering in Automotive and Marine sectors covering manufacturing and quality aspects.	10	L2	CO1
	b.	Briefly explain the following terms with reference to steam formation. (i) Specific heat (ii) Specific volume (iii) Internal energy (iv) Enthalpy (v) Degree of superheat	10	L2	CO1
OR					
Q.2	a.	Sketch and explain the wind power plant.	6	L2 L3	CO1
	b.	Mention wind power plant's advantages, disadvantages and its applications.	4	L1	CO1
	c.	With the help of a neat sketch, explain the basic working principles of Fossil fuelled "THERMAL POWER PLANT".	10	L2	CO1
Module – 2					
Q.3	a.	Explain the working principle of "CENTRE LATHE" with neat sketch.	8	L2	CO1
	b.	Enlist the operations that can be performed on Lathe.	2	L1	CO2
	c.	With neat sketches, explain the milling operations : (i) Plane milling (ii) End milling.	10	L2	CO2
OR					
Q.4	a.	Explain the working of a "CNC Machine" with the help of block diagram.	10	L2	CO2
	b.	What do you understand by "3D printing"?	4	L1	CO2
	c.	Enumerate the merits and limitations of 3-D printing technology.	6	L3	CO2

Module – 3

Q.5	a.	With necessary sketches and P-V diagram, briefly explain the working of Four-Stroke-Petrol Engine.	10	L2	CO3
	b.	Following data are collected from a 4-stroke single cylinder engine at full load : (i) Bore = 200 mm (ii) Stroke = 280 mm (iii) Speed = 300 rpm (iv) Indicated mean effective pressure = 5.6 bars (v) Torque on the brake drum = 250 N-m (vi) Fuel consumed = 4.2 kg/hr (vii) Calorific value = 41000 kJ/kg Determine : (i) Mechanical efficiency (ii) Indicated thermal efficiency (iii) Brake thermal efficiency	10	L3	CO4

OR

Q.6	a.	Enlist and enumerate the desirable properties of a good refrigerant.	6	L2	CO3
	b.	Describe the following terms with respect to refrigeration : (i) COP (Co-efficient of Performance) (ii) Ton of Refrigeration	4	L2	CO3
	c.	Explain the principle and operation of Vapour Compression Refrigeration (VCR) system with a suitable diagram.	10	L2	CO3

Module – 4

Q.7	a.	Briefly explain “Flat Belt Drive” and “V-Belt Drive”.	6	L2	CO3
	b.	Discuss the types of Gear Drives and also mention their application.	6	L2	CO3

	c.	A pinion with 120 mm pitch circle diameter meshes with a gear of 400 mm pitch circle diameter. The number of teeth on pinion is 18 and it rotates at 1440 rpm. Determine : (i) Gear ratio (ii) Number of teeth on gear (iii) Speed of the gear	8	L3	CO4
OR					
Q.8	a.	Explain the principle of Arc welding process with neat sketch and also mention its Industrial applications.	8	L2	CO3
	b.	Describe the type of flames that can be obtained in Gas Welding process, with an application of each.	8	L2	CO3
	c.	Differentiate between Brazing and Soldering process.	4	L2	CO3
Module – 5					
Q.9	a.	Discuss on Global trend of the use of “E-vehicles” highlighting their impact on economy.	10	L2	CO3
	b.	With necessary sketches, explain the different “Robotic” configurations and their Industrial applications.	10	L2	CO3
OR					
Q.10	a.	Describe the working of “Hybrid-Vehicles”.	6	L2	CO3
	b.	Discuss the Merits and limitations of Electric-hybrid vehicles.	4	L2	CO3
	c.	Differentiate between “Open-loop” and “Close-loop” mechatronic systems. Cite the at least two examples for each.	10	L2	CO3
