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BEMEM103/203

First/Second Semester B.E./B.Tech. Degree Examination, Nov./Dec.2023
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 tables are permitted to solve numerical on steam.

		Module – 1	M	L	C
Q.1	a.	Explain the emerging trends of Mechanical Engineering in manufacturing and Automotive industry.	10	L2	CO1
	b.	What is the enthalpy of 5 kg of steam under the following condition : (i) 0.8 bar absolute and 90% dry (ii) 20 bar absolute and $300°C$. Specific heat of superheated steam is 2.25 kJ/kgK.	10	L3	CO4
		OR			
Q.2	a.	Explain the types of steam. Enumerate the advantages of superheated steam.	10	L2	CO1
	b.	With a neat sketch, explain the functioning of a tidal power plant.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain with the sketch the principle of taper turning by Swivelling the compound rest.	10	L2	CO2
	b.	With suitable sketches, explain the following drilling machine operations : (i) Drilling (ii) Boring (iii) Counter sinking (iv) Counter boring	10	L2	CO2
		OR			
Q.4	a.	What is the principle of milling? Sketch and explain, (i) End milling (ii) Slot milling.	10	L2	CO2
	b.	With the help of a block diagram, explain the components of CNC.	10	L2	CO2
		Module – 3			
Q.5	a.	With the help of P-V diagram, explain the working of 4-stroke diesel engine.	10	L2	CO2
	b.	A single cylinder four-stroke engine runs at 1000 rpm and has a bore of 115 mm and has a stroke of 140 mm. The brake load is 60 N at 600 mm radius and the mechanical efficiency is 80%. Calculate brake power and mean effective pressure.	10	L3	CO4
		OR			
Q.6	a.	Define Air Conditioning. With a neat sketch explain the working of a typical room air conditioner.	10	L2	CO2
	b.	Write the desirable properties of a good refrigerant.	06	L1	CO2
	c.	List the four commonly used refrigerant with their boiling points.	04	L1	CO2
		Module – 4			
Q.7	a.	Briefly explain the following gear drives with neat sketches : (i) Helical gear. (ii) Worm gear. (iii) Rack and Pinion. (iv) Bevel gear	10	L2	CO3
	b.	In a compound gear train of wheels, A, B, C and D have 15, 30, 20 and 40 teeth respectively. The wheels B and C are keyed to the same spindle. If the wheel A runs at 400 rpm, find the speed of wheel D. Sketch the arrangement if B meshes with A and C meshes with D.	10	L3	CO3

		OR			
Q.8	**a.**	Explain TIG welding process with a suitable sketch.	10	L2	CO2
	b.	Power is to be transmitted from a shaft to another by means of a belt drive. The diameter of the larger pulley is 600 mm and that of smaller pulley is 300 mm. The distance between the center of the two pulleys is 3 meter. If the axes of the two shafts are in the some plane and parallel to each other, find the length of the belt required for, (i) Open belt drive (ii) Crossed belt drive.	10	L3	CO4
		Module – 5			
Q.9	**a.**	List and briefly explain the components of a Hybrid Electric Car.	10	L2	CO3
	b.	Enumerate the advantages and disadvantages of Electric Vehicles and Hybrid Vehicles.	10	L1	CO3
		OR			
Q.10	**a.**	With a suitable sketch, explain the types of Robot Joints.	10	L2	CO3
	b.	Explain the application of Robot in material handling.	10	L2	CO3

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