CBCS SCHEME

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BEMEM103/203

First/Second Semester B.E./B.Tech. Degree Examination, June/July 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 is permitted.

		Module – 1	M	L	C
Q.1	a.	Define (i) Quality of steam (ii) Degree of superheat (iii) Sensible Heat (iv) Latent heat of vaporation	04	L1	CO1
	b.	Explain the mole of mechanical engineers in industry and society.	08	L2	CO1
	c.	Find the enthalpy of 3 kg steam at 20 bar when (i) Steam is dry saturated (ii) Steam is 22% wet (iii) Superheated to 250°C. Take specific heat of superheated steam as 2.25 kJ/kg K.	08	L3	CO4
		OR			
Q.2	a.	With the help of temperature enthalpy (T - H) diagram, explain the various stages in steam formation.	10	L2	CO1
	b.	Explain with a neat sketch principle and working of hydel power plant.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain Reaming, Boring, Counter Sinking and Tapping operations with neat sketches performed on drilling machine.	12	L2	CO2
	b.	With neat sketch explain Taper Turning operation by swiveling the compound rest.	08	L2	CO2
		OR			
Q.4	a.	With neat sketches explain Plain milling, End milling and Slot milling operations performed on a milling machine.	10	L2	CO2
	b.	With the help of block diagram explain the components of CNC machines.	10	L2	CO2
		Module – 3			
Q.5	a.	Define the following with respect to internal combustion engines : (i) Engine (ii) Indicated power (iii) Brake Thermal Efficiency	06	L1	CO2
	b.	With the help of P-V diagram explain the working of a four stroke spark ignition engine.	10	L2	CO2
	c.	A four stroke single cylinder diesel engine with bore 25 cm, stroke 400mm develops mean effective pressure 4 bar at 500 rpm. Diameter of brake drum is 100 cm with brake load of 400N. Find (i) Indicated Power (ii) Brake Power (iii) Mechanical efficiency.	04	L3	CO4
		OR			
Q.6	a.	With neat sketch explain the working of vapour compression refrigeration.	10	L2	CO2
	b.	List the desirable properties of a good refrigerant.	06	L1	CO2
	c.	List the applications of refrigeration.	04	L1	CO2

		Module – 4			
Q.7	**a.**	With a neat sketches explain (i) Spur gear (ii) Bevel gear (iii) Rack and pinion gear.	**09**	**L2**	**CO3**
	b.	With a neat sketch explain the principle and working of tungsten Inert Gas Welding.	**06**	**L2**	**CO2**
	c.	A simple gear train consists of 3 gears. Driving gear has 60 teeth, with roller gear 40 teeth and 80 teeth on driven gear. If driving gear rotates at 1200 rpm in anticlockwise direction, find the speed of the gears and velocity ratio. Sketch the arrangement.	**05**	**L3**	**CO4**
		OR			
Q.8	**a.**	What is gas welding? Explain with neat sketch on operation of oxy-acetylene gas welding.	**10**	**L2**	**CO2**
	b.	Derive an expression for length of open belt drive system.	**10**	**L3**	**CO4**
		Module – 5			
Q.9	**a.**	With the help of a line diagram explain the working of a hybrid vehicle.	**10**	**L2**	**CO3**
	b.	List the applications of robot.	**06**	**L2**	**CO3**
	c.	List the advantages and disadvantages of electric vehicles.	**04**	**L2**	**CO3**
		OR			
Q.10	**a.**	With suitable example explain the concept of open and closed loop system.	**12**	**L2**	**CO3**
	b.	Briefly explain robot anatomy with neat sketch.	**08**	**L2**	**CO3**

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