Model Question Paper- I

CBCS SCHEME

First/ Second Semester B.E Degree Examination

Elements of Mechanical Engineering (1BEME105)

TIME: 03 Hours **Max. Marks: 100**

Notes:

1. *Answer any FIVE full questions, choosing at least ONE question from each MODULE*
2. *M: Marks, L: Bloom's level, C: Course outcomes.*

		Module - 1	M	L	C
Q. 1	a	Define ferrous and non-ferrous materials. Describe their properties and applications.	10	2	1
	b	What are nanomaterials? Explain the types, advantages, and disadvantages.	10	2	1
		OR			
Q. 2	a	What are composite materials? Write the classification, advantages, and disadvantages of composite materials.	10	2	1
	b	What are Shape memory alloys? Enlist its properties in support of the claim that the shape memory alloys are smart materials.	10	2	1
		Module – 2			
Q. 3	a	With the help of Temperature –Enthalpy diagram, explain the generation of steam at constant pressure.	8	2	2
	b	With the help of neat diagrams, explain the working of a 2-stroke petrol engine.	6	2	2
	c	List the advantages and disadvantages of Electric vehicles over the Internal combustion vehicles.	6	2	2
		OR			
Q. 4	a	With the help of neat diagrams, explain the working of a 4-stroke diesel engine. Write its p-V diagram.	8	2	2
	b	Enumerate with the block diagram the various components of Hybrid vehicle.	6	2	2
	c	Define Conduction, Convection and Radiation.	6	2	2
		Module – 3			
Q. 5	a	With a neat sketch, enlist the specifications of a lathe.	8	2	3
	b	With neat sketches, explain any three operations performed on Milling machine.	6	2	3
	c	Differentiate between soldering, brazing, and welding.	6	3	3
		OR			
Q. 6	a	Explain the following operations with neat sketches: i) Reaming ii) Boring iii) Counter boring, and iv) Countersinking.	8	2	3
	b	Explain with a neat sketch, the working principle of Arc welding process.	6	2	3
	c	Differentiate between Up Milling and Down Milling with neat sketches.	6	3	3
		Module – 4			
Q. 7	a	Illustrate with sketches the following configurations of a robot: i) Cartesian configuration ii) Cylindrical configuration	10	2	4
	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	3	5

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OR					
Q. 8	a	Explain any two types of sensors used in robots with their working principles and applications.	10	2	4
	b	Derive the velocity ratios for simple and compound gear trains.	10	3	5
Module – 5					
Q. 9	a	Explain the following: i) NC ii) CNC iii) CAD iv) CAE v) CIM	10	2	6
	b	What is additive manufacturing? Explain the various steps in additive manufacturing process.	10	2	6
OR					
Q. 10	a	What is automation? Explain the types of automation.	10	2	6
	b	Explain the applications of AI in Automobile and mechanical design. .	10	2	6