

GLOBAL ACADEMY OF TECHNOLOGY

(Autonomous Institution, Affiliated to VTU)

SEE MODEL QUESTION PAPER-2

UG

First Semester B.E. Degree Examination, April - 2021


Elements of Mechanical Engineering

Time: 3 hrs.

Course Code: 20MEE15

Max. Marks: 100

Note: Answer any Five full questions, choosing ONE full question from each module.

Module 1		Marks
1.a.	Explain the process of obtaining a product from molten metal.	8
1.b.	Two plates have to be joined permanently. The joining process involves the following details: The parts are electrically conductive having a thickness of 10 mm. The melting point of the material is 2000°C. Identify and explain the process of joining used.	8
1.c.	List the application of additive manufacturing process.	4
OR		
2.a.	List out the differences between soldering, brazing and welding process	10
2.b.	A prototype shown in the Fig. 2b has to be manufactured using 3D Printing Technology. Explain the process involved in manufacturing.  Fig. 2b.	10
Module 2		
3.a.	Explain the constructional features of a lathe machine with neat sketch.	10
3.b.	Identify and explain the operation carried out on a milling machine: 1. to reduce the thickness of the workpiece 2. to machine the vertical surfaces simultaneously 3. to produce complex surfaces	10
OR		
4.a.	Identify and explain the operations performed on a lathe machine: 1. to emboss patterns on a cylindrical workpiece. 2. to produce conical surface for a shorter distance. 3. to reduce the length of the workpiece.	10
4.b.	Explain any 3 operations performed on a drilling machine.	10
Module 3		
5.a.	List the configurations of robot and explain any one configuration with a neat sketch.	10

5.b.	Illustrate the various elements of closed loop system in CNC machine. How does it differ from an open loop CNC system?	10
OR		
6.a.	Discuss the important applications of robots used in industries.	10
6.b.	Explain the essential elements of a typical robot systems.	10
Module 4		
7. a.	A four stroke diesel engine has a piston diameter 250mm and stroke 400 mm. The mean effective pressure is 4 bar and speed is 500 rpm. The diameter of the brake drum is 1000mm and the effective brake load is 400N. Find Indicated Power, Brake Power, and Mechanical Efficiency.	10
7.b.	Draw a neat sketch of an impulse turbine and explain its working.	10
OR		
8.a.	Explain the working of a 4 stroke diesel engine along with PV diagram.	12
8.b.	Define the following terms: (i) Refrigerating effect (ii) Ton of refrigeration (iii) Coefficient of performance (iv) Relative COP	8
Module 5		
9.a.	Two shafts drive are arranged parallel to each other at a distance of 5 m. If the pulley diameters mounted on the shafts are 500 mm (driving) and 750 mm (driven), find the length of the belt for (a) open and (b) cross drives. Also, find the velocity ratio.	6
9.b.	A compound gear train consists of 4 gears P, Q, R, S having 20, 40, 60 and 80 teeth respectively. The gear P is keyed to driving shaft; gear S to driven shaft, Q and R are compound gears, Q meshing with P and R meshes S. If P rotates at 150 rpm, what is the rpm of gear S? Sketch the gear arrangement.	7
9.c.	List the advantages and disadvantages of V belts and timing belts.	7
OR		
10.a	Differentiate between open and cross belt drive.	5
10.b.	Enumerate the advantages and disadvantages of gear drive over belt drive.	5
10.c.	Explain the shigley's model of design process.	10