

SEE MODEL QUESTION PAPER-1

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.

Q. No.	MODULE - 1	Marks
1.a.	Enumerate the steps in powder metallurgy process. Also list the applications of the process	09
1.b.	With the help of a neat sketch explain the oxy acetylene welding process	06
1.c.	It is required to prepare 500ml bottles of a soft drink. Suggest the method to be employed. Draw a neat sketch of the suggested process and explain.	05
OR		
2.a.	Enumerate the different steps involved in 3-D printing process.	07
2.b.	Draw a neat sketch of an extrusion operation and explain.	06
2.c.	With the help of a neat sketch explain the arc welding process	07
MODULE-2		
3.a.	Explain the up milling and down milling operation.	06
3.b.	Identify and explain the operation carried out on a milling machine to: 1. Increase the diameter of the hole already drilled. 2. To have a square cross section at the beginning of the hole.	10
3.c.	Draw a neat sketch and explain the process of turning on a lathe	04
OR		
4.a.	Draw a neat sketch and explain the principle of a drilling operation.	06
4.b.	Explain the following operations done on a milling machine: a. Gang Milling b. Form Milling	5+4
4.c.	Draw a neat sketch of a drilling operation done on a lathe.	05
MODULE-3		
5.a.	Define the terms a. Automation b. Advanced Manufacturing Systems	04
5.b.	It is required to have an application of a robot doing the material handling operation. Suggest the configuration you would choose and explain the same with a neat sketch.	10

5.c.	Draw a neat sketch and explain the robot control unit.	06
OR		
6.a.	It is required to have an application of a robot doing the spot welding operation. Suggest the configuration you would choose and explain the same with a neat sketch.	10
6.b.	List the advantages of using a CNC machine over an unconventional one.	05
6.c.	Explain the feedback mechanism of a CNC machine.	05
MODULE-4		
7. a.	During a test on a four-stroke diesel engine, the following readings were taken when running at full load: Area of the indicator diagram = 3 cm ² , Length of the indicator diagram = 5cm, Spring constant = 100 N/cm, Engine crank speed = 500 rpm, diameter of cylinder = 150mm, stroke of the piston = 200mm. Find the indicated power of the engine.	05
7.b.	Draw a neat sketch of a Kaplan turbine and explain its working.	09
7.c.	Draw a neat sketch and explain the working of a Vapor absorption refrigeration system.	06
OR		
8.a.	Draw a neat layout of a thermal power plant and explain its working	10
8.b.	Explain the principle of working of an Electric vehicle	05
8.c.	Write short notes on green fuels	05
Module-5		
9.a.	A shaft running at 100 rpm is to drive a parallel shaft at 150 rpm. The pulley on the driving shaft is 35cm in diameter. Find the diameter of the driven pulley. Calculate the linear velocity of the belt and the velocity ratio.	06
9.b.	A simple gear train is made up of 4 gears A, B, C and D having 20, 40, 60 and 70 teeth respectively. If gear A is the main driver rotating at 500 rpm clockwise, calculate the following: a. Speed of intermediate gears b. Speed and direction of the last follower. c. Train Value. Also sketch the arrangement.	09
9.c.	Draw a neat sketch of a Bevel gear and explain when bevel gears are used.	05
OR		
10.a	Two spur gears A and B connect two parallel shafts that are 500mm apart. Gear A runs at 600 rpm and gear B at 200 rpm. If the module is given as 10mm, calculate the number of teeth on gears A and B.	06
10.b.	Define the following terms: a. Slip b. Creep c. Ratio of belt tensions.	06
10.c.	Draw a neat sketch of the following and explain: a. Rack and Pinion arrangement b. Helical Gears	08