Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 85031

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

First Semester

Mechanical Engineering

ME25C03 – INTRODUCTION TO MECHANICAL ENGINEERING

(Common to : Aeronautical Engineering/Aerospace Engineering/Automobile Engineering/Industrial Engineering and Management/Manufacturing Engineering/Marine Engineering/Mechanical Engineering (Specialised in Automobile)/Mechanical Engineering (Specialised in Smart Manufacturing)/ Mechanical and Automation Engineering/Mechatronics Engineering/Robotics and Artificial Intelligence/Robotics and Automation)

(Regulations 2025)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate between mass and weight.

2. What is meant by professional ethics?

3. How does pressure differ from stress?

4. Define 'Elasticity'.

5. Write the basic mechanism of convection energy transfer.

6. What does the term HVAC refer to?

7. State four applications of gears.

8. How is a bolt specified?

9. What is green sand?

10. Define 'Smart Manufacturing'.

PART B — (5 × 13 = 65 marks)

11. (a) Discuss how the historical transition from steam engines to internal combustion engines can be used to understand and address current mechanical engineering challenges. (13)

Or

(b) Explain the physical meanings of force, work, energy and power in mechanical engineering. Using suitable sketches, describe how these quantities are interrelated in the functioning of a bicycle. (13)

12. (a) With suitable diagrams, explain the concepts of tensile stress, compressive stress, and shear stress with their units. Discuss how each type of stress is developed within a material when external forces act on it. (13)

Or

(b) Discuss the significance of shear force and bending moment in structural analysis. Also explain how these factors influence the design of the beam structure in your classroom. (13)

13. (a) With a suitable example and neat sketch, explain the process of heat conduction in solids and describe the factors that influence the rate of heat transfer. (13)

Or

(b) With a neat sketch, describe the working principle of a household refrigerator. (13)

14. (a) Describe the similarities and differences between solid shafts and hollow shafts. Explain why hollow shafts are often used in rotating machinery. (13)

Or

(b) Discuss the different types of couplings used in real-life applications and explain the factors that help in choosing the right coupling for aspecific application with proper justification. (13)

15. (a) With a suitable diagram, explain the construction and working principle of a CNC machine. (13)

Or

(b) Describe how additive manufacturing differs from traditional subtractive manufacturing and list the major steps involved in producing a part using additive manufacturing. (13)

PART C — (1 × 15 = 15 marks)

16. (a) With a suitable example, analyze the quality of the finished product you made in the workshop and review the safety practices followed during the work. Suggest your recommendations to improve both the product quality and the safety measures for future workshop activities. (15)

Or

(b) Examine the major parameters that influence metal forming and casting processes with suitable examples and analyze the potential challenges involved in these processes. (15)

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