Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 30260

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Third/Fourth Semester

Mechanical Engineering

ME 3493 – MANUFACTURING TECHNOLOGY

(Common to Mechanical Engineering (Sandwich)/Mechanical and Automation
Engineering/Mechatronics Engineering/Robotics and Automation)

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Taylor's tool life equation.

2. List the factors that determine the selection of cutting fluid.

3. Write down the differences between a capstan and a turret lathe.

4. List the three most commonly employed types of single-spindle automatics.

5. Mention a few work-holding devices.

6. Mention four differences between the plain milling machine and the Universal milling machine.

7. What is the purpose of an Automatic Tool Changer (ATC)?

8. What is a Point-to-point (PTP) system?

9. Define circular interpolation with some codes.

10. Define NC.

PART B — (5 × 13 = 65 marks)

11. (a) Explain in detail the following :

    (i) Formation of different types of chips. (7)

    (ii) Types of cutting fluids. (6)

Or

(b) Describe with neat sketches for force relationship in orthogonal cutting. (13)

12. (a) Give a sketch illustrating the principle of operation of the Swiss-type automatic screw machine and brief their advantages and limitations. (13)

Or

(b) Draw neat sketches and explain any four work-holding devices in the lathe. (13)

13. (a) (i) Describe with neat sketches, the quick return mechanism of a shaper. (9)

    (ii) Differentiate the up-milling from down-milling process. (4)

Or

(b) (i) Discuss the three types of feed in a centreless grinding machine. (9)

    (ii) Explain wheel truing and dressing. (4)

14. (a) Discuss the following CNC control systems with a neat sketch.

    (i) Closed loop system and open loop system. (5)

    (ii) Straight-line system (4)

    (iii) Continuous system (4)

Or

(b) Define constructional features of CNC machine tools. (13)

15. (a) Describe manual part programming with examples. (13)

Or

(b) Explain in detail the following :

    (i) Interpolators and their types. (7)

    (ii) Absolute and incremental coordinate systems. (6)

PART C — (1 × 15 = 15 marks)

16. (a) Give some gear-specific manufacturing techniques that are mostly employed for producing the tooth gap in most power gears for the automotive and high-performance industry sectors.

Or

(b) During the orthogonal machining test, the rake angle is 5°, un-deformed chip thickness is 0.25 mm and width of cut is 4 mm. Determine the cutting force and thrust force. Assume shear strength of work material as 350 N/mm² and coefficient of friction as 0.5.

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