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**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  $5^\circ$ , 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  $350 \text{ N/mm}^2$  and coefficient of friction as 0.5.