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Question Paper Code : 82338

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

Fourth Semester

Mechanical Engineering

ME 3493 — MANUFACTURING TECHNOLOGY

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

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

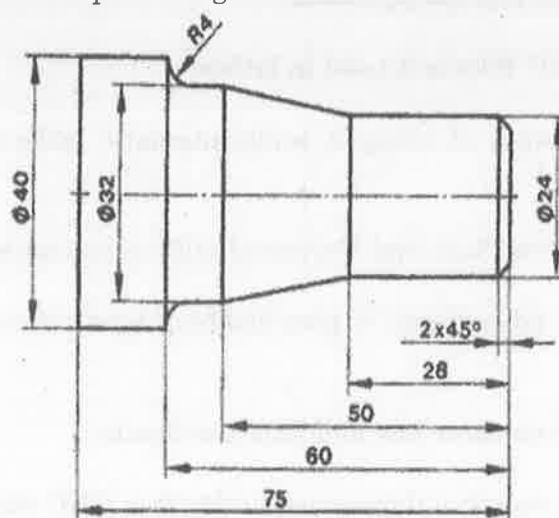
Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. The end of a pipe was orthogonally cut with a tool of 20° rake angle. The chip length was measured as 80 mm whereas uncut chip length was 200 mm. Determine the chip thickness if depth of cut was 0.5mm
2. Define the Taylor's tool life equation.
3. What is a mandrel? Why is it used in lathes?
4. State the advantages of using a semi-automatic lathe over a fully manual lathe.
5. Distinguish between Plain and Universal milling machines.
6. Mention the key advantages of gear hobbing over other gear manufacturing methods.
7. Distinguish between three jaw and four jaw chucks.
8. Why are coolants required during machining in a CNC machine?
9. What are interpolators with respect to CNC program?
10. Mention the significance of subroutines in CNC programming.

PART B — (5 × 13 = 65 marks)

11. (a) Illustrate the nomenclature of a single point cutting tool.
Or
(b) (i) With neat sketches, elaborate on continuous and discontinuous chips. (7)
(ii) Illustrate Crater wear and Nose wear using suitable sketches. (6)
12. (a) Illustrate the process of straight turning and shoulder turning in a lathe.
Or
(b) With a neat sketch, explain the principal parts of a turret lathe.
13. (a) Explain the process of machining the following using a Shaper machine. (7+6)
(i) contoured surface and
(ii) internal keyway
Or
(b) Explain Chucking and Centreless types of internal grinders. (7+6)
14. (a) What type of motor is preferred for spindle drive in a CNC machine? Justify why it is preferred? With a neat sketch, illustrate the construction and working of the motor.
Or
(b) With suitable examples, explain the following types of controls in a CNC machine:
(i) open and closed loop
(ii) point-to-point and continuous. (7+6)
15. (a) A mild steel cylindrical rod of Φ 40 mm and length 75 mm is to be machined as shown in Figure 15(a). Assume cutting speed as 150 m/minute and feed as 0.2 mm/revolution. Write a program using G and M codes for producing the shaft. Assume missing data appropriately.

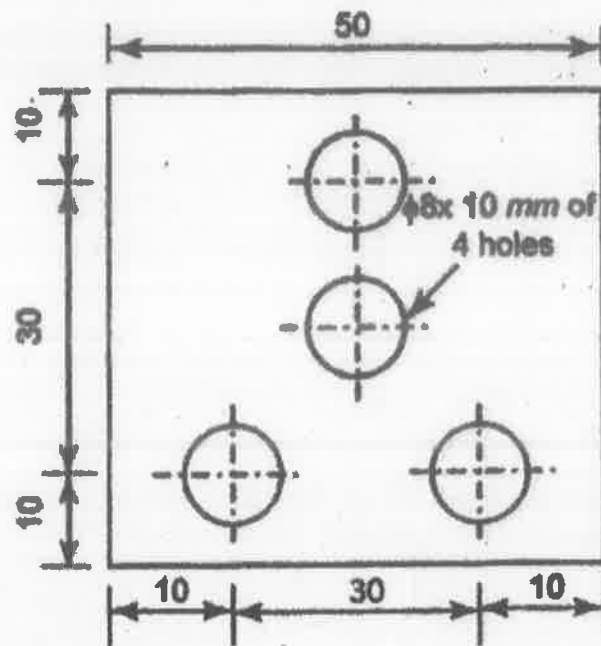


All dimensions are in mm

Figure 15(a)

Or

- (b) Prepare a part program using G and M codes to drill a 10 mm thick component shown in Figure 15(b), in a CNC machining machine. Assume any missing data suitably.



All dimensions are in mm

Figure 15(b)

PART C — (1 × 15 = 15 marks)

16. (a) A conical tapered surface on a cylindrical shaft is to be machined by gradually changing its diameter in a lathe. Illustrate any two methods to manufacture the tapered shafts.

Or

- (b) Illustrate the working principle of recirculating ball screws used in a CNC feed-axes drive. Discuss on two-point and three-point contacts in ball screws. List any four advantages of using recirculating ball screws in a CNC machine. (10+3+2)

