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Question Paper Code : 91958

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 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. Compare orthogonal and oblique cutting with respect to tool life and surface finish.
2. List any four reasons to justify the use of cutting fluids in machining operations.
3. State any four parameters to express the size of a lathe.
4. Determine the time required for one complete cut on a piece of work 350 mm long and 50 mm in diameter. The cutting speed is 35 metres per minute and feed is 0.5 mm per revolution.
5. Distinguish between shaper and planer.
6. 'Is wheel speed a factor in selection of a grinding wheel?'- Justify your answer.
7. Why are CNC turning centers provided with slant bed configuration?
8. 'Selection of appropriate workholding method can reduce the effort and cost of machining'- How?
9. Distinguish between absolute and incremental programming methods.
10. What are canned cycles?

PART B — (5 × 13 = 65 marks)

11. (a) (i) What type of chip is produced during machining of ductile materials like aluminium? Brief on the chip formation mechanism. (8)
- (ii) 'High-speed steel and cubic boron nitride are suitable materials for tool' Justify. (5)

Or

- (b) Illustrate the nomenclature of a single point cutting tool.

12. (a) Explain any one taper turning method in a lathe using a suitable sketch.

Or

- (b) With a suitable sketch, explain the principal parts of a Turret lathe.

13. (a) Illustrate how the following processes can be done using a shaping machine. (i) cutting external keyway and (ii) machining vertical surface (7+6)

Or

- (b) (i) Illustrate upmilling, downmilling processes and discuss their advantages and limitations (8)

- (ii) Explain through feed and infeed methods of Centreless grinding. (5)

14. (a) With a neat sketch, elaborate on the working of recirculating ballscrew mechanism. List any four advantages of the mechanism. (11+2)

Or

- (b) (i) Citing suitable example, explain closed loop control system in a CNC machine. (8)

- (ii) Explain the point-to point and continuous control systems in a CNC machine. (5)

15. (a) A mild steel cylindrical rod of diameter 40 mm and length 75 mm is to be machined as shown in Fig. 15(a). Assume cutting speed as 150 m/minute and feed as 0.2 mm/revolution. Write a program for producing the shaft. Assume missing data appropriately.

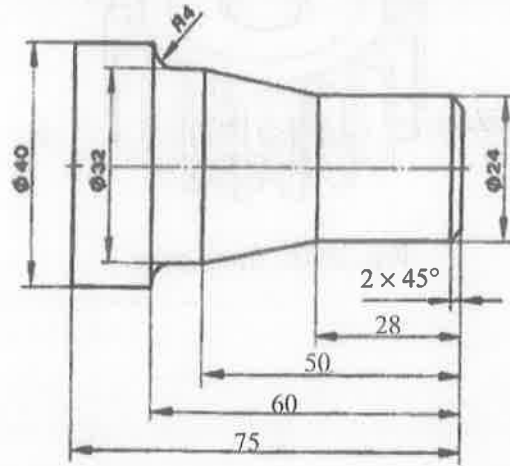


Fig. 15 (a) Component to be machined

Or

- (b) With suitable example, explain loops and subroutines in CNC program. (7+6)

PART C — (1 × 15 = 15 marks)

16. (a) Explain the procedure of cutting threads on a solid cylindrical shaft (Fig.16a) using a lathe. Highlight the significance of change gear mechanism.

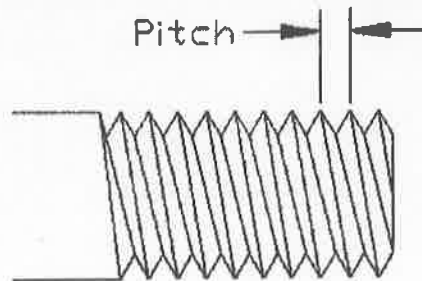


Fig. 16 (a) Thread

Or

- (b) Illustrate the process of generating a spur gear (Fig.16b) by Gear Hobbing process.

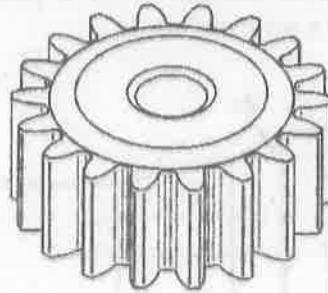


Fig. 16 (b) Spur gear.

