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

Question Paper Code : 70824

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Fourth/Sixth Semester

Mechanical Engineering

ME 6402 – MANUFACTURING TECHNOLOGY – II

(Regulations 2013)

(Common to : Mechanical Engineering (Sandwich), Industrial Engineering, (Industrial Engineering and Management, Mechanical and Automation Engineering)

(Also Common to : PTME 6402 – Manufacturing Technology – II for B.E. (Part-Time) – Mechanical Engineering – Third Semester – (Regulations – 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Differentiate between orthogonal and oblique cutting.

2. The useful tool life of a HSS tool, machining mild steel at 25 m/mm is 5 hours. Calculate the tool life when tool operates at 40 m/mm.

3. How do specify lathe size?

4. Name the methods of taper turning on lathe.

5. Distinguish Up Milling and Down Milling.

6. Sketch the nomenclature of a drill bit.

7. What are the advantages and limitations of using centreless grinding?

8. Define Grinding ratio.

9. Define CNC and DNC.

10. What is adaptive control?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Discuss any four cutting tool materials used in metal cutting. (7)

(ii) In an orthogonal cutting test with a tool of rake angle 8°, the following observations were made:

Chip thickness ratio : 0.2

Horizontal component of the cutting force = 1190 N

Vertical component of the cutting force = 1450 N

From Merchant's theory, calculate the various components of the cutting forces and the coefficient of friction at the chip tool interface. (6)

Or

(b) (i) Enumerate with neat sketch, measurement of cutting temperature using work-tool thermocouple method. (6)

(ii) Describe various methods of applying cutting fluid at the cutting zone. (7)

12. (a) (i) Enumerate with neat sketch, constructional features of a centre lathe. (8)

(ii) For the component (C40 steel) shown in Fig. 12 (a)(ii), the feed for roughing is 0.24 mm/rev while that for finishing is 0.10 mm/rev. The maximum depth of cut for roughing is 2 mm. Finish allowance may be taken as 0.75 mm. Blank to be used for machining is 50 mm in diameter. Calculate the power required for roughing and finishing passes. (5)

Assume the value of K as 1600 M/mm^2.

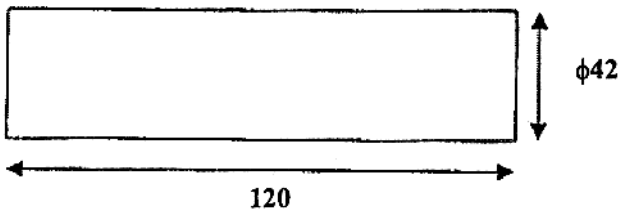

Fig. 12 (a)(ii)

Or

(b) (i) Explain with neat diagram the principal parts of turret lathe. (5)

(ii) Differentiate between parallel action and progressive action multi spindle automatics. (8)

13. (a) (i) Explain with neat sketches the procedure for carrying out the following operations on a shaper: Horizontal cutting, Vertical cutting, concave surface, keyway cutting. (7)

(ii) List out the gear finishing processes. Explain any two with neat sketches. (6)

Or

(b) (i) Enumerate with a neat sketch Gear shaping. (7)

(ii) Compare Plain and Universal milling machine. (6)

14. (a) (i) Describe the terms dressing and trueing of Grinding Wheels. (7)

(ii) Explain, how a wheel is balanced and mounted? (6)

Or

(b) Describe the construction and operation of a vertical broaching machine with a neat sketch. Also sketch a broach tool with nomenclature.

15. (a) (i) Discuss the different data input devices of NC machine tool. (6)

(ii) Describe the features of a machinery center. Why the machining centers are particularly advantages for the use of NC? (7)

Or

(b) (i) What are the different types of control systems in Numeric Control? (5)

(ii) Explain the following with respect to manual part programming :

(1) M codes and G codes

(2) Program sheet

(3) Canned cycle

(4) Coordinate system. (8)

PART C — ($1 \times 15 = 15$ marks)

16. (a) What are recent trends in micromaching? Explain the sequential step in manufacturing silicon wafer.

Or

(b) (i) What is useful of a tool? What are the factors affects the tool life? How these factors are related in Taylor's tool life equation. (8)

(ii) Describe any two gear finishing operator based on plastic deformation. (7)

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