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**Question Paper Code : 80657**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016

Fourth Semester

Mechanical Engineering

ME 6402 – MANUFACTURING TECHNOLOGY – II

(Common to Industrial Engineering, Industrial Engineering and Management and Mechanical and Automation Engineering and also common to Sixth Semester Mechanical Engineering (sandwich))

(Regulation 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the Conditions that would allow a continuous chip to be formed in metal Cutting?
2. If the Taylor's tool life constants for a given operation are specified as  $n=0.5$  and  $C = 400$ , what is the percentage increase in tool life when the Cutting speed is reduced by half?
3. What are the various methods available for taper turning in a lathe?
4. Differentiate between an automatic and a semi automatic lathe
5. Make a comparison between gear shaping and gear hobbing
6. What is gear finishing? Why is it done?
7. What are the advantages and limitations of using centreless grinding?
8. Define Grinding ratio.
9. State the functions of the following G and M codes  
G01 G04 M04 M30
10. Compare bulk and surface micro machining processes

PART B — (5 × 16 = 80 marks).

11. (a) (i) Show schematically the merchant's force circle in orthogonal cutting and derive the expressions for various components of cutting force. Mention the assumptions made. (10)

- (ii) In an Orthogonal cutting test with a tool of rake angle  $8^\circ$ , the following observations were made:

Chip thickness ratio = 0.2

Horizontal component of the cutting force = 1050 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) Describe with neat sketch the measurement of average chip tool interface temperature using tool-work thermocouple. (8)

- (ii) How are cemented carbides classified by ISO? Explain the general applications of each category? (8)

12. (a) (i) Enumerate with neat sketch, constructional features of a centre lathe. (10)

- (ii) For the component (C40 steel) shown in Fig Q 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.

Assume the value of  $k$  as  $1600\text{N/mm}^2$ . (6)

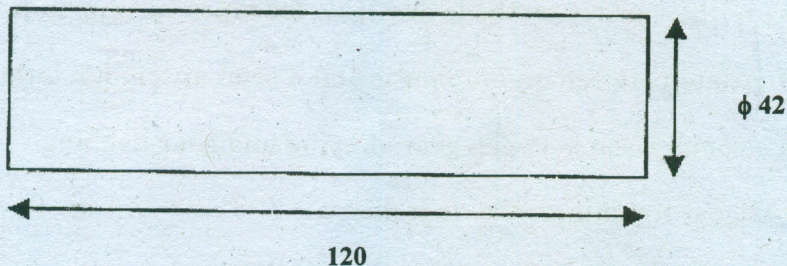


Fig. Q. 12 a (ii)

Or

- (b) (i) Explain with neat diagram the principal parts of turret lathe. (6)

- (ii) Differentiate between parallel action and progressive action multi spindle automatics. (10)

13. (a) (i) Describe with neat sketch the quick return mechanism used in shaper. (8)
- (ii) What are the various types of milling cutters that are used in milling? Discuss any three. (8)

Or

- (b) (i) Discuss with neat sketches gear grinding and gear lapping methods. (10)
- (ii) Enumerate with neat sketch, gear cutting on a gear shaper using a rotary gear shaper. (6)
14. (a) (i) Discuss any four abrasives used in grinding wheel. (8)
- (ii) Explain with neat sketches the four different types of surface grinding operations. (8)

Or

- (b) (i) Sketch and indicate various elements of a pull broach (6)
- (ii) Describe various types of broaching machine used in industry (10)
15. (a) (i) Discuss salient features of CNC machining centre. (8)
- (ii) Enumerate various steps involved in wafer preparation. (8)

Or

- (b) Write CNC part program for the component shown in Fig Q.15(b) Mention the assumptions made. (16)

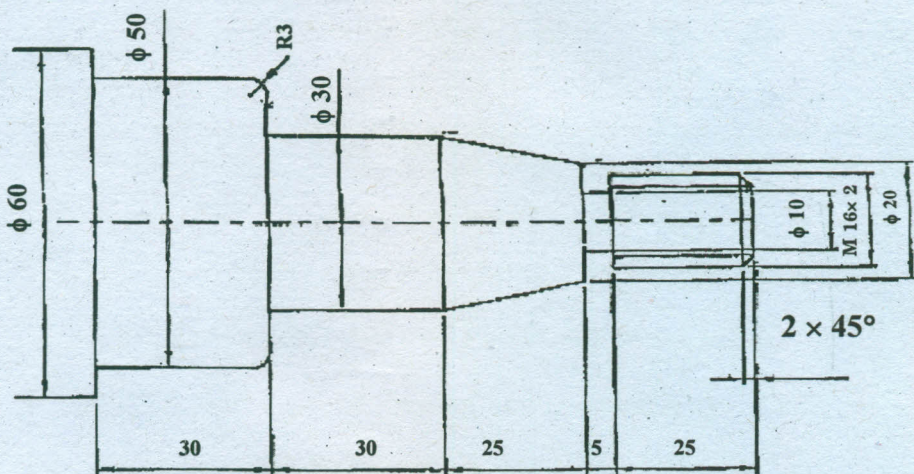


Fig. Q. 15 (b)

**ALL DIMENSIONS ARE IN MM**