

[Total No. of Questions - 5] [Total No. of Printed Pages - 4]
(2064)

14696

B. Tech 6th Semester Examination

Machine Tools

ME-6003

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Question Paper consist of five sections A, B, C, D & E. Section E is compulsory Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C, D.

SECTION - A

1. (a) How are the machine tools classified? Explain in detail basic elements of machine tools.
- (b) Explain with neat sketches methods of generating and forming surfaces. (10+10=20)

OR

- (a) Discuss the effect of machining parameters on surface finish.
- (b) What is ray diagram? A drilling machine is to be designed to have 6 spindle speeds ranging from about 110 rpm to about 650 rpm. Assuming a proper series for the layout of the speeds, determine the values of all these 6 spindle speeds. Modify the computed values so as to render them acceptable a standard. (6+14=20)

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[P.T.O.]

SECTION - B

2. Write short notes on
- (i) CAM design for automatic lathes
 - (ii) Taper turning methods (20)

OR

Provide a diagram showing constructional features of centre lathe. Also, state the limitations of centre lathe over capstan and turret lathes. (20)

SECTION - C

3. (a) How the milling cutters are classified? Sketch the tooth shape of plain milling cutter showing the nomenclature. Explain the importance of 'helix angle' and 'direction of cut' in the case of milling.
- (b) Discuss the important machining parameters for drilling operation. Evaluate them in following case. Drill Diameter = 10mm, Rotational speed of the drill = 900 rpm, in feed = 0.1 mm/rev, point angle of drill = 118°, required length of the hole = 10cm, helix angle = 30°. (10+10=20)

OR

- (a) Discuss grinding wheels designation and selection. What are 'Through Feed', 'In Feed', and 'End Feed' in centreless grinding operations? Discuss honing and lapping as finishing process.
- (b) Recent researches have shown that two variants of grinding process i.e. (i) very high speed grinding and (ii) creep feed grinding have come out clearly for bulk material removal of unwanted material just like turning, milling etc. Explain the above processes with help of neat sketches. (10+10=20)

SECTION - D

4. (a) What do you mean by Numerical control of machine tools? Describe briefly the main components of an NC machine tool.
- (b) Write down the part programme for the drawing shown in Figure 1. (State the assumptions made). All dimensions are in mm. (10+10=20)

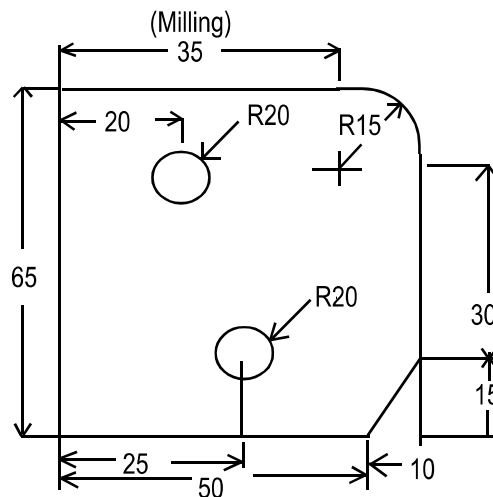


Fig. 1

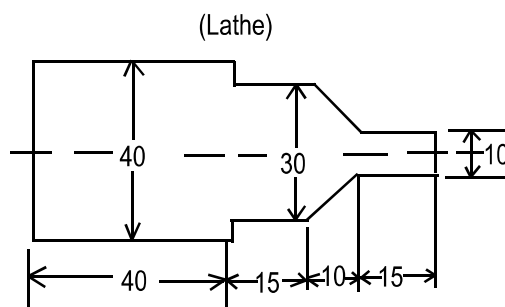


Fig. 2

[P.T.O.]

OR

- (a) Write down the part programme for the drawing shown in Figure 2. (State the assumptions made). All dimensions are in mm.
- (b) What do you know about coordinate system and machine motion with reference to NC machines? Explain absolute and incremental method. (Draw necessary diagram).
(10+10=20)

SECTION - E

5. Attempt all the questions. Each question carries equal marks
- (a) What are the functions of machine tool drives?
 - (b) Sketch a typical hydraulic circuit used in a machine tool and explain briefly.
 - (c) Mention main lathe accessories used to clamp the work piece or the tool.
 - (d) Show the following design features of a broach with help of schematic diagram
 - (i) Width of land
 - (ii) Depth of cutting tooth
 - (iii) Rake and relief angles
 - (iv) Tooth fillet radius
 - (e) What is meant by 'tool layout' of a turret lathe?
 - (f) What is the advantage of using hydraulic drives in machine tools?
 - (g) What is the function of combination tool holder in a turret lathe?
 - (h) Write types of statements used in APT languages, with examples.
 - (i) Provide sketches for tapping and die threading operations
 - (j) What is adaptive control? Cite some examples of adaptive control of machining. (10×2=20)