Total No. of Questions—12] [Total No. of Printed Pages—4+2

[3862]-120

S.E. (Mechanical) (Second Semester) EXAMINATION, 2010

PRODUCTION TECHNOLOGY

(2008 COURSE)

Time : Three Hours **Maximum Marks : 100**

N.B. :— (*i*) Attempt *one* question of each unit from Section I and Section II.

(*ii*) Answers to the two sections should be written in separate answer-books.

(*iii*) Draw neat diagrams wherever necessary.

(*iv*) Assume suitable data, if required.

SECTION I

UNIT I

1. (*a*) How is the tool shank of a single point cutting tool designed ? [8]

(*b*) In an orthogonal cutting test with a tool rake angel 10°, the following observations were made :

(*i*) Chip thickness ratio : 0.3

(*ii*) Horizontal component of the cutting force = 1290 N

P.T.O.

(*iii*) Vertical component of the cutting force = 1650 N.

From Merchant's theory, calculate the various components of the cutting force and the coefficient of friction at the chip tool interface. [10]

Or

2. (*a*) What is meant by built-up edge (BUE) ? With a neat sketch explain the formation of a (BUE). [6]

(*b*) How do you define tool life ? Explain the parameters that control the tool life of a single point cutting tool. [6]

(*c*) During an orthogonal machining (turning) operation of C-40 steel, the following data were obtained :

(*i*) chip thickness = 0.45 mm

(*ii*) width of cut = 2.5 mm

(*iii*) feed = 0.25 mm/rev

(*iv*) Tangential cut force = 1130 N

(*v*) Feed thrust force = 295 N

(*vi*) Cutting speed = 2.5 m/s

(*vii*) Rake angle = +10°.

Calculate :

(*a*) Force of shear at the shear time.

(*b*) Kinematic coefficient of friction at the chip tool interface. [6]

UNIT II

3. (*a*) Explain the principle of Gear hobbing. List advantages and disadvantages of gear hobbing. [8]

(*b*) What is thread rolling ? Explain its advantages. [8]

Or

4. (*a*) Sketch the tool shape of broach and write briefly about its elements. [6]

(*b*) The bore of an alloy steel component prior to broaching is $32.25\ ^{+0.05}_{-0.00}$ mm. The bore is to be finish broached to $32.75\ ^{+0.01}_{-0.00}$ mm diameter. If the length of bore is 35 mm and cutting speed is 0.15 m/s, determine the broaching power for broaching and design the broach. Given : Value of Rise per tooth = 0.05 s-mm. Value of 'C' Alloy steel = 45 N/mm^2. [10]

UNIT III

5. (*a*) Write short notes on the following : [8]

(*i*) FMS (Flexible Manufacturing System)

(*ii*) CNC Machine.

(*b*) Explain principle and block diagram of machining centers. State its advantages and disadvantages. [8]

Or

6. (*a*) Explain the advantages and limitations of numerical control of machine tool. [8]

(*b*) Explain the following codes : [8]

(*i*) G06

(*ii*) G08

(*iii*) G11

(*iv*) M68

(*v*) M13

(*vi*) G92

(*vii*) M16

(*viii*) M40-M45.

SECTION II

UNIT IV

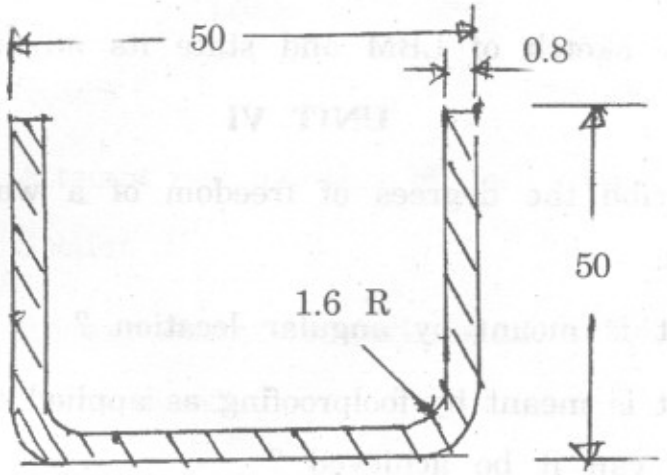
7. (*a*) What factors should be considered for selecting an appropriate press for a given job ? [6]

(*b*) Differntiate between cutting die and blanking die. [4]

(*c*) Find the total pressure, dimensions of tools to produce a washer 50 mm. Outside diameter with a 24 mm diameter hole, from material 4 mm thick, having a shear strength of 360 N/mm^2. [8]

Or

8. (*a*) The symmetrical cup workpiece shown in figure below is to be made from cold rolled steel 0.8 mm thick. Make the necessary calculations for designing the drawing die for this part. [8]



(*b*) Define spring back and explain how allowances may be made to compensate for its harmful effects. [5]

(*c*) Sketch the various methods of applying shear to the punch and die. [5]

UNIT V

9. (*a*) Explain why unconventional machining processes are used. [4]

(*b*) Explain the disadvantages of the relaxation circuit and show the alternative arrangement of pulse generator used in EDM. [6]

(*c*) Briefly explain the working of ECM showing important element. [6]

Or

10. (*a*) What is the function of abrasive slurry in USM ? Explain how the abrasive selection is made. [6]

(*b*) Explain the various methods used for preparing the mask for chemical machining. [6]

(*c*) Draw sketch of LBM and state its advantages. [4]

UNIT VI

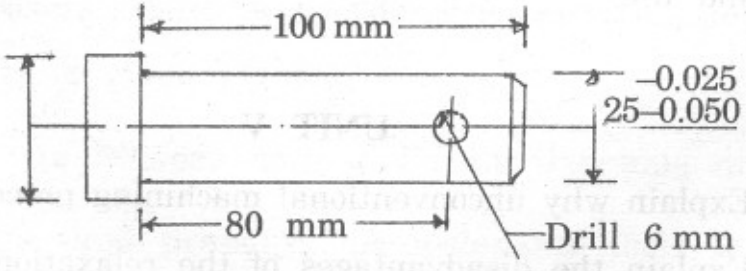
11. (*a*) Describe the degrees of freedom of a workpiece located in space. [6]

(*b*) What is meant by angular location ? [4]

(*c*) What is meant by foolproofing as applied to jig and fixture ? How can it be achieved ? [6]

Or

12. (*a*) Design and draw drilling jig for drilling the holes in the component shown in figure below. [10]



(*b*) Explain the advantages to be obtained from the use of pneumatic and hydraulic clamping devices. [6]