AU – 2853

Seventh Semester B. E. (Mechanical Engineering) (CGS) Examination

TOOL ENGINEERING

Elective - I

Paper – 7 ME 05

(USC – 10875)

P. Pages : 4

Time : Three Hours] [Max. Marks : 80

Note : (1) Separate answer book must be used for each section in the subject Geology, Engineering material of civil branch and Separate answer book must be used for Section A and B in Pharmacy and Cosmetic Tech.

(2) Answer **Three** questions from Section A and **Three** questions from Section B.

(3) Due credit will be given to neatness and adequate dimensions.

(4) Assume suitable data wherever necessary.

(5) Diagrams and Chemical equations should be given wherever necessary.

(6) Illustrate your answer wherever necessary with the help of neat sketches.

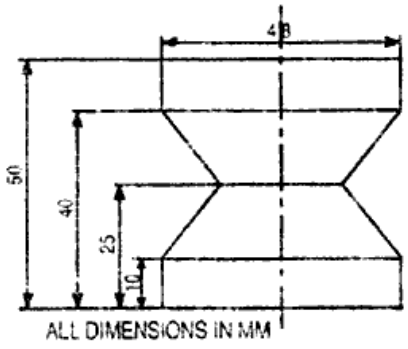
SECTION A

1. (a) How do you calculate the dimensions of shank of a single point cutting tool? Explain with suitable sketch. Assume suitable data if necessary. 8

(b) Draw Merchant circle showing the various components of resultant force. 6

OR

2. (a) Draw a circular form tool for the work piece shown in the following figure, from a bar stock of 50 mm diameter from a free cutting steel (σt = 60 kgf/mm2).



9

(b) Prove that $V_c = V\sin\phi/\cos(\phi - \nu)$ and $V_s = V\cos\nu/\cos(\phi - \nu)$ Where V, V_c, V_s are cutting, chip and shear velocities respectively, ϕ" is shear angle and ν is rake. 5

3. (a) What is 3–2–1 locating principle ? Explain with neat sketches. 7

(b) What are the important elements of jigs and fixtures ? What advantages can be achieved by their use ? 6

OR

4. (a) Explain what is the need of drill bush. What are the various drill bushes commonly used ? Draw neat sketch of any one type of drill bush. 7

(b) Explain the principle of extreme locating points and mutually perpendicular planes. 6

5. (a) Design a drill jig for drilling 6 holes of 12 dia. in the flange of Adaptor shown in fig E2. The part is complete except this operation.
Mention clearly

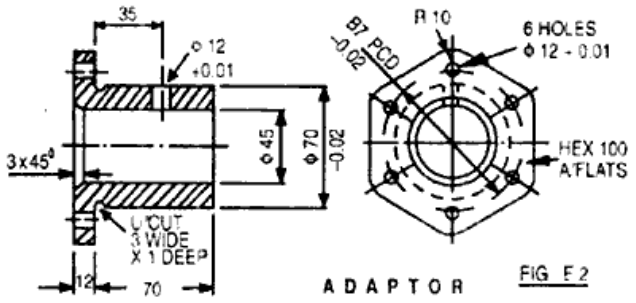
(i) The surface used for location

(ii) The type of the locator used for location

(iii) The surface selected for clamping

(iv) Type of clamp used

(v) Type of jig.



ADAPTOR FIG E2

13

OR

6. Enumerate the various types of Jigs and explain in detail any two Jigs with neat sketches. 13

SECTION B

7. (a) Explain constructional features of Twist Drill with neat sketch. 7

   (b) Explain clearly the need of reamer. Draw neat sketch of straight fluted reamer. 6

OR

8. (a) With a neat sketch explain the geometrical elements of a helical flute plain milling cutter. 6

   (b) What is broaching ? Explain the constructional features of broach with a neat sketch. 7

9. (a) A washer with a 12.7 mm internal hole and an outside diameter of 25.4 mm is to be made from 1.5 mm thick strip of 0.2 percent carbon steel, considering the elastic recovery of material.
   Find :

   (i) The clearance

   (ii) Blanking die opening size

   (iii) Blanking punch size

   (iv) Piercing punch size

   (v) The piercing die opening size. 9

   (b) What are the methods of reducing cutting forces in press working ? 4

OR

10. (a) List the various operations generally performed in sheet metal working. Explain any three with neat sketches. 7

(b) What is centre of pressure ? Give the procedure and calculate the centre of pressure for a component of suitable dimension of your choice. 7

11. Design and draw a compound die for making a washer of 50 mm diameter with a hole of 15 mm from a 2 mm mild steel sheet. 14

OR

12. (a) Design a drawing die for making a cup of suitable dimensions. 8

(b) What is spring back ? How can you compensate its effect in bending ? 6