4-1 M/P

Code No. : 3147

FACULTY OF ENGINEERING

B.E. 4/4 (M/P) I Semester (Main) Examination, December 2010

TOOL DESIGN (Elective – I)

Time : 3 Hours] [Max. Marks : 75

***Note** : 1) Answer **all** questions from Part A.*
*2) Answer **any five** questions from Part **B**.*

PART – A (Marks : 25)

1. Discuss in brief the basic qualities of a tool material.
2. Compare the basic qualities of carbon tool steels and carbides.
3. What are the various applications of USM process ?
4. How will you select a drill bit for a particular application ?
5. What are the main factors to be considered in the design of plain milling cutters ?
6. Give any five 'principles of design' of jigs and fixtures.
7. What is the shut height of a Press ?
8. What is Burnishing ?
9. What are the points to be considered while designing a broach ?
10. Differentiate between a screwing tap and a forming tap.

PART – B (Marks : 50)

11. a) What are the various process parameters of AJM ? Discuss. 5
    b) Make a sketch of a drill bit and label all parts. What effects does right hand, straight or left hand helix have on the cutting action as a drill bit revolves ? 5
12. a) Discuss various factors affecting MRR in EDM. 5
    b) How is the size of a single point tool designed ? Illustrate with a suitable example. 5

13. a) What do you understand by the following ?

    i) Interloching milling cutter ii) Concave milling cutter 4

    b) Calculate power, torque and MRR in slab milling. Given 300 × 300× 50 mm m.s. block, feed : 0.2 mm/tooth depth of cut = 3.00 mm, cutter : ϕ 50 × 400L × 22 bore, No. of teeth = 20, speed of cutter = 120 rpm. Assume : specific energy for 5 W.S./mm^2. 6

14. a) Discuss the following : 5

    i) Broach Strength ii) Broach Allowance

    b) What will be the tap drill diameter for drilling a tapping hole for M20 threads with pitch 2.5 mm. Assume suitable data, if necessary. 5

15.a) Estimate the blanking pressure required to produce a blank with perimeter of 180 mm from a steel plate of 2 mm thick of ultimate shear stress 4.5 tons/cm^2. If pressure is sustained for 40% of the blank thickness, calculate the amount of work done. 6

    b) What is spring back and how is it controlled in bending dies ? 4

16. a) Briefly explain the following : 5

    i) Six point location principle ii) Redundant location

    b) Describe in brief the different indexing devices that can be incorporated in designing a jig or a fixture. 5

17. Write short notes on :

    i) Sharpening of twist drill. 3

    ii) Plastic dies for simple components. 3

    iii) Economic Analysis of Jigs and Fixtures. 4
