

Code No.: 6393/N

## FACULTY OF ENGINEERING B.E. 4/4 (M/P) I Semester (New) (Suppl.) Examination, June/July 2010 TOOL DESIGN

Time: 3 Hours]

[Max. Marks: 75

Note: Answer all questions from Part A. Answer any five questions from Part B.

## PART - A

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- 1. List out the factors upon which the selection of a tool-material depends.
- 2. Name any two latest cutting tool material and their approximate composition.
- 3. What is the principle of operation of EDM?
- 4. Discuss in brief the important elements of a drill that are to be taken care of while designing a drill.
- 5. Why is it important that the diameter of a face milling cutter be wider than the workpiece?
- 6. Differentiate a jig and a fixture.
- 7. What is meant by press tannage?
- 8. Differentiate between honing and lapping.



10. How are reamers classified?





PART – B

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- 11. a) Discuss various elements of USM process.
  - b) Give the nomenclature of a Twist Drill.
- 12. a) What are the various factors affecting MRR in ECM? Discuss.
  - b) A rectangular cross section cutting tool is used for machining on a lathe at a speed of 60 m/min. The diameter of the work piece is 100 mm. Assume shank height to width ratio 1.6 and the tool over hang as 1.3 times the height. Find the cross section of the tool shank considering safe stress for tool material =  $250 \text{ N/mm}^2$ ,  $E = 20 \times 10^4 \text{Nmm}^2$ . Also estimate the shank deflection.
- 13. a) Considering the design of a milling cutter, explain how will you design the following elements.
  - i) Diameter of the cutter
- ii) No. of teeth in the cutter.
- b) Find the power requirement for a face milling operation taking an example and assuming suitable data.
- 14. a) A hole of 40 mm diameter and 62.5 mm depth in a steel work piece is required to be finished to 42.625 mm diameter by broaching. Design suitable teeth of the broach. Assume suitable data, if necessary.
  - b) Considering the design of a tap discuss the following:
    - i) Thread relief

- ii) Chamber angles
- 15. a) Prove that the smallest hole that can be pierced is twice the thickness of the plate (Stock-material), assuming that the compressive strength of the punch material is twice the shear strength of the plate to be pierced.
  - b) What is coefficient of drawing? Discuss its importance.
- 16. a) What are the criteria generally used for the classification of clamping system used in jigs and fixtures.
  - b) What are the consideration that must be taken into account while designing a fixture for turning operation?
- 17. a) Write short notes on:
  - i) Plastic die
  - ii) Economic Analysis of Jigs and Fixtures
  - iii) Vacuum clamping.

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