

**FACULTY OF ENGINEERING****B.E. 3/4 (Mech.) II – Semester (New) (Main) Examination, April / May 2013****Subject : Metal Cutting and Machine Tool Engineering****Time : 3 hours****Max. Marks : 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (25 Marks)**

1. Sketch the geometry of twist drill and name all angles and edges. 2
2. What are the types and functions of chip breakers in metal cutting? 3
3. What are types and properties of cutting fluids? 3
4. Define machinability. How metals are rated? 2
5. Differentiate between shaper, planer and slotter. 3
6. Enlist work holding and tool holding devices in Lathe, Milling and Drilling machine. 3
7. Sketch various lathe operation carried out on a lathe machine. 2
8. Briefly describe the principle of thread grinding. 2
9. What are the various quick clamping devices? 3
10. What are the advantages of unconventional machining? 2

**PART – B (5 x 10 = 50 Marks)**

- 11.a) List various cutting tool materials, their properties and applications. 6
- b) Explain the nomenclature of single point cutting tool by ASA system. 4
- 12.a) Explain the temperature measurement by tool-work thermocouple method. 4
- b) The following data were obtained while orthogonal cutting of M.S rod of 120 mm diameter with  $10^\circ$  rake angle tool, cutting speed 25 m/min, feed 0.20 mm/rev, length of chip is 150 mm, cutting force 1500 N, feed force 650 N. Calculate i) Shear plane angle ii) Chip thickness, iii) Chip velocity and iv) Power required for cutting. (Missing data may be suitably assumed) 6
- 13.a) Define tool life. What are the factors effecting too life. 5
- b) Explain various operations carried out on milling machine. 5
- 14.a) Discuss the center less grinding with help of a neat sketch. 4
- b) Explain the following i) Honing, ii) Burnishing and iii) Gear shaping. 6
- 15.a) What are the design principles for clamping and location? 5
- b) Explain the working principle of EDM with aid of neat sketch. 5
- 16.a) Differentiate between drilling and boring machines. 5
- b) Explain the full type broaching operation with help of neat sketch. 5
17. Write short notes on any **TWO** of the following : (10)
  - a) Merchant's theory
  - b) Tool wear mechanism
  - c) AJM and ECM
  - d) Indexing methods