

**III B.Tech II Semester Supplementary Examinations,  
November/December 2005  
MACHINE TOOLS  
(Mechanical Engineering)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions  
All Questions carry equal marks**

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1. (a) Explain different types of chips. [8]  
(b) What are the adverse effects of built up edge? How can we avoid them? [8]
2. Write briefly about following [4x4=16]
  - (a) Face plate
  - (b) Angle plate
  - (c) Lathe carriers
  - (d) Lathe centers
3. (a) What is meant by tool layout? Explain briefly [8]  
(b) Describe in brief the types of head stocks used on semi automatic and automatic machines [8]
4. (a) With help of neat sketch describe main parts of slotter. [10]  
(b) How is slotter machine is specified? Explain [6]
5. (a) Give the detailed classification of reamers [8]  
(b) Explain the following related to reamers [8]
  - i. Left and right hand reamers
  - ii. Left and right hand helix in reamersExplain their application.
6. (a) Explain the characteristics that distinguish a milling process from other machining processes. [8]  
(b) Describe the differences between a lathe and milling machine in terms of the types of surfaces generated, the types of tools used and applicability for general and production applications [8]
7. (a) Define the following from the point of grinding process [8]
  - i. Grindability
  - ii. Sensitivity
  - iii. Finishability
  - iv. Grinding ratio

- (b) Explain clearly the various thermal effects in grinding [8]
8. Compare the broaching operation with that of any other metal machining operation for the purpose of generating constant inside contours. Show sketches of some example jobs made using broaching. [16]

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1. (a) Define various tool angles used in single point cutting tool with neat sketch [8]  
(b) Explain importance and functions of different tool angles and other parameters associated with a single point cutting tool. [8]
2. (a) Explain, with the help of neat sketch, the working principle of Lathe machine [12]  
(b) How is size of lathe specified? [4]
3. (a) What is meant by tool layout of a turret lathe? Discuss [8]  
(b) Enumerate various rules, which must be followed while laying out sequence of operations for a turret lathe. [8]
4. (a) What is planer? Illustrate and describe its working principle. [8]  
(b) Give detailed classification of planer machines. [8]
5. (a) How a drilling machine is specified? [4]  
(b) Define and write the formulae of the following for a drilling machine [12]
  - i. Cutting speed
  - ii. Feed
  - iii. Machining time in drilling
6. (a) Explain clearly what is meant by milling. [6]  
(b) Give a brief classification of various milling machines used in the industry giving a brief note on the application [10]
7. (a) What is the marking system followed in case of grinding wheels? Explain the individual elements of the marking system from the stand point of the functioning of the wheel [10]  
(b) Describe vitrified shellac, and resinoid bonds [6]
8. (a) What is meant by 3-2-1 principle of location. [8]  
(b) Explain the essential characteristics in the proper design of Jigs and Fixture. [8]

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1. (a) Describe basic elements of machining. [8]  
(b) Explain briefly mechanics of chip formation. [8]
2. Give neat diagram of engine lathe, and describe its main parts and controls. [16]
3. Describe briefly about following holders used in capstan lathe. [4x4=16]
  - (a) Knurling tool holder
  - (b) Tap holder
  - (c) Recessing tool holder
  - (d) V-steady box tool holder
4. Briefly describe about the following? [4x4=16]
  - (a) Planer miller
  - (b) plate or edge planer
  - (c) Divided table planer
  - (d) Pit planer
5. (a) Is it possible to correct an out of round hole with a reamer? If not, give reasons. If possible specify the type of reamer used for the purpose [10]  
(b) Write a short note on lip, helix and rake angles in drilling [6]
6. (a) Briefly explain some of the problems caused in milling. Give their causes and remedies [8]  
(b) What are the motions of the arbor mounted milling cutter has with respect to the work piece? Discuss [8]
7. (a) Show the neat sketches for different methods of grinding [10]  
(b) State and explain the grinding parameters in surface grinding [6]
8. (a) Explain clearly how work pieces are located . [8]  
(b) Write a short note on Clamps and clamping devices. [8]

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1. (a) Prove that  $\tan\phi = r \cos\alpha / 1 - r \sin\alpha$  where  $\phi$  is shear angle,  $r$  chip thickness ratio and  $\alpha$  is rake angle. [6]  
(b) A mild steel bar of 50mm diameter was orthogonally machined on lathe. Its feed rate 0.5mm/rev, chip thickness 1.2mm, rotational speed 100rpm, rake angle  $14^\circ$ , Calculate chip thickness ratio, shear angle, Chip reduction ratio [10]
2. (a) Explain, with the help of neat sketch, the working principle of Lathe machine [12]  
(b) How is size of lathe specified? [4]
3. (a) Describe constructional features of speed gearbox of machine tools? [8]  
(b) Compare the merits and demerits of turret and capstan lathe with engine lathe. [8]
4. (a) Explain the working of a hydraulic quick return mechanism of a shaper. [8]  
(b) Sketch and describe the working of automatic table feed mechanism of shaper [8]
5. (a) Explain clearly what is meant by Jig boring. [8]  
(b) Explain clearly about the hole location procedure in drilling and boring operations [8]
6. Explain clearly with neat sketch the various types of milling cutters and state their advantages and applications. [16]
7. (a) Define the following from the point of grinding process [8]
  - i. Grindability
  - ii. Sensitivity
  - iii. Finishability
  - iv. Grinding ratio  
(b) Explain clearly the various thermal effects in grinding [8]
8. (a) What is meant by 3-2-1 principle of location. [8]  
(b) Explain the essential characteristics in the proper design of Jigs and Fixture. [8]

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