

**III B.Tech II Semester Regular Examinations, Apr/May 2006**  
**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) What is tool signature? [4]  
(b) Explain ASA and ORS system of tool nomenclature. [6]  
(c) Differentiate ORS and ASA system. [6]
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. Describe single spindle automatic in detail with help of neat sketch. [16]
4. (a) Differentiate slotter and vertical shaper? [6]  
(b) Describe constructional features of speed gearbox of planer? [10]
5. (a) Explain clearly what is meant by boring? [6]  
(b) Explain clearly with a neat sketch the construction and working principle of a horizontal boring machine. [10]
6. Explain with a neat sketch what do you understand by the words “ helix angle” and “direction of cut” in the case of milling. What is their importance with respect to machining performance? Explain the basis on which these are selected. [16]
7. Describe in detail the various arrangements of centreless grinding with neat sketches. Mention the applications in each case. [16]
8. (a) What is the purpose of clamping? [6]  
(b) What factors govern the choice of a clamping device to achieve the purpose of clamping? Discuss them in detail [10]

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1. (a) Determine undeformed chip thickness during metal cutting operation With neat sketch [6]  
(b) Differentiate orthogonal cutting of first kind and second kind? [4]  
(c) Describe the role of various alloying elements in tool steels? [6]
2. (a) Describe briefly about taper turning methods? [8]  
(b) What are the different types of Lathe attachments? Discuss them briefly. [8]
3. How do you classify turret lathes? Give a brief description of different types. [16]
4. (a) What is planer? Illustrate and describe its working principle. [8]  
(b) Give detailed classification of planer machines. [8]
5. (a) Differentiate between taper, plug and bottoming taps. [6]  
(b) What is the function of a tap drill? [5]  
(c) Why are drilled holes superior to punched holes in vessel work? [5]
6. (a) What is an indexing?-Explain. [6]  
(b) Distinguish Peripheral milling and Face milling. Derive an expression for power generated in Peripheral milling. [10]
7. Describe in detail the various arrangements of centreless grinding with neat sketches. Mention the applications in each case. [16]
8. (a) What factors contribute to increase the production rates for broaching? [6]  
(b) Describe the various broaching machines used in the industry [10]

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1. Draw a merchant circle and derive expressions to show relationships among different forces acting on cutting tool. [16]
2. (a) Describe the internal mechanism of cone-pulley type headstock of a Lathe showing location of different parts. [8]  
(b) What is an “all geared head stock”? Describe briefly. [8]
3. How do you classify turret lathes? Give a brief description of different types. [16]
4. (a) What is planer? Illustrate and describe its working principle. [8]  
(b) Give detailed classification of planer machines. [8]
5. (a) Define the process drilling. Give classification of various drilling machines [8]  
(b) Explain with a neat sketch the construction and working principle of a radial drilling machine [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 do you understand by fool-proofing in connection with locating principles for jigs and fixtures? [8]  
(b) What are the advantages of locating a piece against an inclined surface compared to particular plane? [8]

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1. (a) Differentiate orthogonal cutting and oblique cutting. [6]  
(b) In orthogonal cutting of a mild steel bar 60mm diameter on a lathe a feed of 0.8mm /rev was used. A continuous chip of 1.4mm was removed at a rotational speed of 80rpm. Calculate total length of chip removed in one minute? [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) Discuss the different operations that can be performed on turret and capstan lathe operations? [8]  
(b) Write briefly about tooling layout of automatic lathes? [8]
4. (a) Write in detail about slotter operations? [6]  
(b) Describe constructional features of speed gearbox of shaper? [10]
5. (a) What is the function of a Tap drill? [6]  
(b) Write a brief note on fine boring machine. [10]
6. Explain clearly with neat sketch the various types of milling cutters and state their advantages and applications. [16]
7. (a) How is grinding different from other machining operations? Explain its applications in view of its capabilities. [8]  
(b) Why is it undesirable to continue running coolant on to a grinding wheel after the wheel has stopped? [8]
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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