

**IV B.Tech. I Semester Regular Examinations, November -2005**  
**MACHINE TOOL DESIGN**  
**(Production Engineering)**

**Time: 3 hours**

**Max Marks: 80**

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

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1. (a) Give the classification of Machine tools. [8]  
(b) Give various mechanisms used for converting rotary to linear motion. [8]
2. (a) How do you select a range of speeds for machine tool gear box? Explain. [8]  
(b) Discuss the features of sliding type gear box. [8]
3. (a) Explain the importance of G.P; A.P, and Logarithmic progressions in the design of gear boxes and feed gear boxes. [8]  
(b) Discuss the features of **clutched drives** in detail. [8]
4. (a) Give the analysis of Lathe beds in detail. [8]  
(b) Give various methods of improving the rigidity of Lathe bed. [8]
5. (a) Give the materials for various structural elements of machine tools. [8]  
(b) Give the analysis of drilling machine column. [8]
6. (a) Sketch and show the spindle unit of drilling machine and explain its design.[8]  
(b) Sketch and explain the working Hydro static bearing in detail. [8]
7. (a) Compare the relative advantages and disadvantages of Hydraulic and Pneumatic systems used in Machine tools. [8]  
(b) Sketch and explain the working of hydro-copying system. [8]
8. Write short notes on any Four of the following: [4x4=16]
  - (a) Automatic Machine Tools
  - (b) Clutched drives
  - (c) Guide ways design
  - (d) Materials for spindles
  - (e) Accumulators.

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1. (a) Give the basic features of construction of general purpose machine tools. [8]  
(b) Explain the mechanisms for **intermittent motion**. [8]
2. (a) How do you select highest and lowest speeds for any machine tool? What is range ratio? Explain? [8]  
(b) Write a brief note on standardization of speeds and feeds. [8]
3. (a) Give the Kinematic diagram of an engine lathe. [8]  
(b) Give a brief procedure to design of a 9 speed gear box, with minimum speed 50 r.p.m and common ratio,  $\phi = 1.26$ . [8]
4. (a) Explain the working of Norton and Meander drive by means of a sketch. [8]  
(b) Write a brief note on functional accuracy of Machine Tools. [8]
5. (a) Discuss the analysis of Machine Tool frames. [8]  
(b) Give the analysis of machine tools guide ways. [8]
6. (a) Sketch and explain the spindle unit of Grinding machine and explain its design. [8]  
(b) Write a brief note on selection of bearings. [8]
7. (a) Discuss various controls used in Machine Tools. [8]  
(b) Discuss the properties of Hydraulic fluids used in Machine Tools. [8]
8. Write short notes on any Four of the following: [4x4]
  - (a) N.C. Machine Tools
  - (b) Support Drive
  - (c) Thermal effects
  - (d) Materials for spindles
  - (e) Power pack.

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1. (a) Give the constructional features of special purpose machine tools. [8]  
(b) Discuss the features of N.C machines. [8]
2. (a) What is the importance of G.P in selecting speeds for a gear box? Explain.[8]  
(b) How do you design a ray diagram? Explain. [8]
3. (a) What is productivity loss? Explain its importance in the design of gear boxes. [8]  
(b) What is meant by structural diagram? Explain. [8]
4. (a) Explain the methods of pre selection of speeds in detail. [8]  
(b) Give the design analysis of frames. [8]
5. (a) Explain the working of Norton and Meander drives in detail. [8]  
(b) Explain various methods of improving the rigidity of machine Tool structures [8]
6. (a) Sketch and show the spindle unit of milling machine and explain its design.[8]  
(b) Sketch and explain the working of rolling bearings in details. [8]
7. (a) Sketch and explain the working of Hydro-copying systems used in Machine Tools. [8]  
(b) Write a brief note on positive displacement pumps. Give its applications and advantages. [8]
8. Write short notes on any Four of the following: [4x4]
  - (a) Classification of Machine Tools
  - (b) Rupport drive
  - (c) Analysis of beds
  - (d) Hydro static bearing
  - (e) Properties of hydraulic fluids.

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1. (a) What are transfer machines? Explain their features. [8]  
(b) Discuss the features of Automatic machine tools. [8]
2. (a) Write a brief note on the drives of machine tools. [8]  
(b) Explain the working of Ruppert drive with a sketch. [8]
3. (a) Explain the features of clustered drives in detail. [8]  
(b) Design a feed gear box for an engine lathe. [8]
4. (a) Write a brief note on stepped and stepless regulation of speeds in Machine Tools. [8]  
(b) Give the design analysis of radial drilling machine column. [8]
5. (a) What is the overall compliance of Machine Tools? Discuss. [8]  
(b) Give the materials for various machine tool elements. [8]
6. (a) Sketch and show the spindle unit of lathe and explain its design. [8]  
(b) Sketch and explain the working of hydro dynamic bearing. [8]
7. (a) Sketch and explain the speed regulation of surface grinding machine in detail. [8]  
(b) Explain the working of positive displacement pumps in detail. Give its applications and advantages. [8]
8. Write short notes on any Four of the following: [4x4=16]
  - (a) Special purpose Machine Tools
  - (b) Design of Ray diagram
  - (c) Analysis of Beds
  - (d) Selection of bearings
  - (e) Properties of Hydraulic fluids.

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