

**IV B.Tech I Semester Supplementary 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) Enumerate different methods of producing surfaces and paths by work-tool combinationl formative motions.  
(b) Explain the K-23 kinematic structure. [8+8]
2. (a) Enumerate the differences in Automatic and NC machine tools.  
(b) Explain how to select highest and lowest speeds of a center lathe. [8+8]
3. A  $2 \times 2$  drive is required to be designed for transmitting 10 H.P. with speeds ranging from 400 rpm with  $\theta=1.4$ . Select a suitable gear sizes, module, width of gears. Caluaulate the shaft sizes. Sketch the gear box. [16]
4. (a) Explain Meander drive mechanism.  
(b) What is the selection criteria for the best material used in machine tool construction? [8+8]
5. (a) Explain the basic principle of "Design for strength".  
(b) Sketch and explain Milling machine spindle unit. [6+10]
6. (a) Explain rolling bearing.  
(b) Explain the working of 4-edged tracer control hydraulic system. [6+10]
7. Explain the principle and working of various types of positive displacement pumps. [16]
8. Explain any two of the following  
(a) Relief valves.  
(b) Rigidity of machine tool.  
(c) Principle features of construction of shaper. [8+8]

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