

FACULTY OF ENGINEERING

B.E. 4/4 (M/P) II-Semester (Main) Examination, April / May 2013

**Subject : Machine Tool Design
(Elective - II)**

Time : 3 Hours

Max. Marks: 75

Note: Answer all questions of Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1. How the machine power is calculated?
2. Differentiate between special purpose machines with conventional machines.
3. What is range ratio and how can it be fixed in a machine tool?
4. Why involute profiles are used on gear teeth?
5. What are the advantages of rolling guide ways?
6. What materials are used for beds and columns of machine tools?
7. What are the methods used to improve rigidity of machine tool structures?
8. What is the effect of bearing clearance on the rigidity of machine tool spindle?
9. Sketch spindle arrangement for lathe machine.
10. What are the advantages of dove tail guide ways?

PART – B (5x10=50 Marks)

- 11.(a) How the machine tools are classified and explain their applications?
(b) Draw the kinematic structure of screw cutting machine.
- 12.(a) Sketch and explain the construction and working of NC machine.
(b) Differentiate between in-line and rotary transfer machines.
- 13.(a) Draw optimum ray diagram for 9-speed gear box and mention the methods of calculating number of teeth on gears.
(b) Sketch and explain the construction and working of Norton gear box used for feed gear box.
- 14.(a) What are the various stepless drives used in machine tools mention their applications?
(b) What are the various strengthening mechanisms used for machine tool beds and columns?
- 15.(a) Derive an equation to find overall compliance of machine tool structure.
(b) What are the various methods used to adjust clearances in guide ways?
- 16.(a) What is the effect of bearing clearances on the overall rigidity of machine tool spindle?
(b) What are the various controls used for machine tools and explain their relative advantages?
17. Answer the following:
 - (a) Direction control valve
 - (b) Hydro static bearings
 - (c) Design of columns
