

B. TECH.
(SEM VI) THEORY EXAMINATION 2017-18
PRINCIPLES OF MACHINE TOOL DESIGN

Time: 3 Hours

Total Marks: 100

- Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.
2. Any special paper specific instruction.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**
- a. What is a transfer machine?
 - b. Write down the components of lathe machine.
 - c. What is the function of tool dynamometer?
 - d. Lathe is the queen of all machine tools justify.
 - e. Write General requirement of machine tool design.
 - f. Write Elements of hydraulic transmission system for pumps.
 - g. Differentiate Automatic and manual Control system.
 - h. Write down Laws of stepped regulation.
 - i. What is the necessity of speed chart?
 - j. Write steps for selection of bearings machine tools.

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**
- a. Explain the working of any tool dynamometer giving its important characteristics.
 - b. What do you understand by numerical control of machine tools, Explain?
 - c. Discuss the factors to be considered in the selection of machine tool drive.
 - d. Explain tool wear? Explain crater wear and flank wear
 - e. Write a detailed note on the history and development of machine tools.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**
- (a) Describe one mechanical friction stepless drive and one electrical stepless drive with suitable sketches.
 - (b) What is meant by Preferred numbers? Describe Androin progression ratio and explain how the basic series of preferred numbers is derived from it?
4. Attempt any *one* part of the following: **10 x 1 = 10**
- (a) Describe the working of a four ways, two position, piston type direction control valve, with diagram.
 - (b) Explain the working principle and importance application of Geneva mechanism.

5. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) What materials are used for the machine tool spindles? What main characteristics a spindle should possess?
 - (b) Explain various types of quick return mechanism, their application and advantages.
6. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) Describe the working principle of Oldham coupling with the help of neat sketch.
 - (b) What are the main requirements of a machine tool structure? Show that using steel in reference to cast iron for machine tool structure would result into weight saving of about 50-70%.
7. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) What do you understand by chatter in machine tools? How it affects the product quality? Explain.
 - (b) Explain in detail various steps involved in testing of machine tools.