

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VIII • EXAMINATION – SUMMER • 2015

Subject Code: 181908**Date:05/05/2015****Subject Name: Machine Tool Design****Time:10.30AM-01.00PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain design procedure of speed gear box. **07**
 (b) Enlist various requirements of machine tool. One of the requirements of machine tool should provide good surface finish, which depends on Machine tool vibrations. Explain how these vibrations can be controlled. **07**
- Q.2** (a) Why geometric progression series is preferred over arithmetic progression series? Discuss their merits and demerits. **07**
 (b) List various methods of obtaining stepless/ infinitely variable drives and explain with help of neat sketch stepless friction drive. **07**
- OR**
- (b) Explain function of machine tool structure and also discuss about their requirement during design. **07**
- Q.3** (a) What is ray diagram? For 2 X 2 gear box transmitting 10 hp power which has a minimum $\sum d$ where d is the diameter of shaft. Which has better layout? **07**
 (b) Discuss in brief with neat sketch hydro dynamically lubricated slideway stating its load carrying capacity, advantage and disadvantages. **07**
- OR**
- Q.3** (a) A 2 X 2 drive is required to be designed for transmitting 12 HP with speed ranging from 400 rpm with $\phi = 1.4$. Select suitable structure from and optimum ray diagram. **07**
 (b) What are the advantages of using geometric progression for deciding the spindle speeds? Draw open and cross type structure diagram and possible ray diagram for this speed structure diagram for 2 X 2 drive having speeds N_1, N_2, N_3 and N_4 . **07**
- Q.4** (a) Compare various section of bed and discuss how their rigidity of bed section is increased. **07**
 (b) Explain in detail with help of neat sketch the control of feed by limit switch. **07**
- OR**
- Q.4** (a) Explain hydraulic circuit for shaping and grinding machine. **07**
 (b) Compare various shapes of slide ways. **07**
- Q.5** (a) List various automatic machines and explain the automatic cutting of machine **07**
 (b) Explain design procedure for a spindle of lathe machine. **07**
- OR**
- Q.5** (a) Choice of hydraulic circuit depends on which factors? Explain selection of electrical motor for a machine. **07**
 (b) Explain about recalculating ball screw for machine tool. **07**
