

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VIII (New) EXAMINATION – WINTER 2019

Subject Code: 2182503

Date: 21/11/2019

Subject Name: Design of Product and Machine Tools

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of Design Data book is permitted

		MARKS
Q.1	(a) Explain the classification of the speed box.	03
	(b) Differentiate between hydraulic transmission and mechanical transmission.	04
	(c) With neat sketch explain following gear box: (1) Feed box with tumbler gear (2) Feed box with change gear.	07
Q.2	(a) Explain the materials of spindles.	03
	(b) Describe the functions and requirements of spindle unit.	04
	(c) List causes of failure of antifriction bearings. Give comparison between journal and antifriction bearing.	07
OR		
	(c) Design hydrodynamic journal bearing for lathe spindle from following data: Load on spindle: 20 kN, Speed of Spindle: 2000 rpm, diameter of spindle at journal: 100 mm, $l/d = 2$, Clearance ratio: 2×10^{-3} , viscosity of oil at working temperature = 35×10^{-3} kg/m.s Calculate: bearing characteristic number.	07
Q.3	(a) What is the purpose of guide ways ?	03
	(b) Write a short note on Antifriction Guide ways.	04
	(c) Give requirement of Protecting devices for slide ways and explain various types of protecting devices with neat sketch.	07
OR		
Q.3	(a) Explain the general requirements of column structure.	03
	(b) Discuss various types of Bed structure and wall arrangements and their applications with neat sketch.	04
	(c) Explain the shapes of slide ways.	07
Q.4	(a) State the important properties of material used for hook.	03
	(b) Discuss design procedure of wire rope sheave.	04
	(c) Design the crane hook for the lifting capacity of 10 tonnes, having triangular section. Take permissible tensile stress 120 N/mm^2 for forged steel.	07
OR		
Q.4	(a) How does the design of sheave and pulley differ?	03
	(b) Give classification of lay of steel wire ropes.	04

- (c) Design the crane hook for the lifting capacity of 12 tonnes, having triangular section. Take permissible tensile stress 130 N/mm^2 for forged steel. **07**
- Q.5** (a) Discuss steps involved in product design process. **03**
(b) What are the challenges of product development? **04**
(c) You are selected as Product design and development engineer in SAMSUNG washing machine manufacturing company. To develop a new model of washing machine is a work assign to you. How will you attempt this task? While developing the model which parameters you will consider. **07**
- OR**
- Q.5** (a) Define the term 'Product' and explain the classification of product giving suitable examples. **03**
(b) How the customer's needs are focused during product development stages. **04**
(c) You are appointed as a senior engineer (Product design) in a TATA's Voltas Air condition manufacturing company. It is required to develop a new improved model of AC. How will you carry out the work assign to you? **07**
