

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII(NEW) EXAMINATION – SUMMER 2019

Subject Code:2182503

Date:09/05/2019

Subject Name:Design of Product and Machine Tools

Time:10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

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

		MARKS
Q.1	(a) Why feed box with gear cone with sliding key is not suitable for heavy duty lathe machine?	03
	(b) Name the Devices used for intermittent motion. Explain Geneva Mechanism in detail.	04
	(c) Explain various Elementary transmission methods for Transforming rotary motion into Translatory.	07
Q.2	(a) Discuss various properties of Materials used for sliding contact bearing.	03
	(b) State the functions and requirements of the spindle unit along with the materials.	04
	(c) With neat sketch explain following gear box: (1) Feed box with tumbler gear (2) Feed box with change gear	07
	OR	
	(c) Design hydrodynamic journal bearing for a shaft of blower for following data: Bearing Load due to belt force: 3000N, Bearing Load due to weight of rotor: 600N, Speed of Blower: 600 rpm, diameter of shaft: 50 mm, Expected temperature of oil:70°, ambient temperature: 30°, c/d ratio = 0.0015, Minimum film thickness: 0.019 mm Calculate: actual attitude, type of oil used, power loss, heat generated, actual minimum film thickness.	07
Q.3	(a) Discuss various methods to improve dynamic stiffness of machine tools.	03
	(b) Discuss various types of Bed structure and wall arrangements and their applications with neat sketch.	04
	(c) Explain the design procedure of Slideways for wear resistance.	07
	OR	
Q.3	(a) Why it is important to adjust the clearance in slide ways?	03
	(b) Write a note on Antifriction Guideways.	04
	(c) Give requirement of Protecting devices for slide ways and explain various types of protecting devices with neat sketch.	07
Q.4	(a) What do you understand by 6 × 37 rope? Explain with neat sketch.	03
	(b) How does the design of sheave and pulley differ?	04
	(c) Find the diameter of rope required for an overhead travelling crane with lifting magnet. Take, Lifting capacity: 5000 kg, Weight lifting magnet = 2000 kg, weight lifting tackle = 120 kg, Lifting height = 8 meters, No of Rope parts = 4Take $D_{min}/d = 23$, $d_w=0.045$, $E_r=8 \times 10^4 \text{ N/mm}^2$, $\sigma_u= 1500 \text{ N/mm}^2$	07

OR

- Q.4** (a) Will you prefer a cast hook or forged hook in cranes? Give reason. **03**
(b) Draw diagram of material handling system with rope bending diagram for multiple crane pulley having 3 and 6 bends. **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**
- Q.5** (a) Discuss the role of Aesthetics in Product design. **03**
(b) Discuss product design in a viewpoint of: **04**
(1) Designer, (2) Customer
(c) Discuss the importance of selection of proper tolerance for part dimensions. **07**

OR

- Q.5** (a) Discuss following in brief: **03**
1. Value Engineering 2. Consumer Quality level
(b) Discuss the importance of CAD in developing the products. **04**
(c) Comment on the statement "A Design needs sound knowledge of Manufacturing technology and machine tools" **07**

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