Seat No.: _____ Enrolment No._____

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 Dmin/d = 23, d_w=0.045, E_r=8*10^4 N/mm^2, σ_u= 1500 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: (1) Designer, (2) Customer	**04**
	(c)	Discuss the importance of selection of proper tolerance for part dimensions.	**07**

OR

Q.5	**(a)**	Discuss following in brief: 1. Value Engineering 2. Consumer Quality level	**03**
	(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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