Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) EXAMINATION – SUMMER 2021

Subject Code:2182503 Date:03/08/2021

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.**

			MARKS
Q.1	**(a)**	What are the requirements of machine tool design?	**03**
	(b)	Name the Devices used for intermittent motion. Explain Ratchet-gear Mechanism in detail.	**04**
	(c)	Explain various Elementary transmission for transmitting Rotary motion. 1.Gear transmission, 2. Belt transmission, 3. Chain Transmission.	**07**
Q.2	**(a)**	Discuss various properties of Materials used for sliding contact bearing.	**03**
	(b)	Explain designating ball and roller bearing in S.A.E., SKF, and BIS with example.	**04**
	(c)	With neat sketch explain following gear box: (1) Feed box with sliding gear (2) Feed box with Meander's mechanism.	**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)**	Give the classification of bearing based on type of friction and load.	**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)**	Classify wire ropes with sketches.	**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)**	Give the application of a cast hook and a forged hook with appropriate 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 5 tonnes, having triangular section. Take permissible tensile stress 80 N/mm^2 for forged steel.	**07**
Q.5	**(a)**	Discuss the role of Quality in Product design.	**03**
	(b)	Discuss product design in a viewpoint of: (1) A production manager, (2) Quality control	**04**
	(c)	Discuss the importance of selection of proper tolerance for part dimensions.	**07**

OR

Q.5	**(a)**	Discuss following in brief: 1. Product diversification 2. Modular design	**03**
	(b)	Discuss the importance of various Design software in developing the products.	**04**
	(c)	Discuss the observations that you made from the design of today's car body considering aspects of Product Design	**07**

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