

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

## GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2022

Subject Code:3171928

Date:16-01-2023

Subject Name:Design of Material Handling Equipment

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. Simple and non-programmable scientific calculators are allowed.

		Marks
Q.1	(a) Why lifting magnets are used in material handling equipments?	03
	(b) Draw a neat sketch of a vertical belt and bucket elevator system assembly.	04
	(c) Classify material handling equipment in detail.	07
Q.2	(a) List down the various components for a crane hook assembly with pulleys and show it with help of a neat sketch.	03
	(b) Explain the following Belt Conveyor idlers in context of its construction, salient features and application of Impact Idler and Flat carrying idler	04
	(c) Explain the factors to be consider for selection of material handling equipments.	07
	<b>OR</b>	
	(c) Find the main dimensions of a cast iron rope drum for following data for winding rope (2 sides)	07
	<ul style="list-style-type: none"><li>• Maximum load to be lifted – 40 kN</li><li>• Diameter of wire rope – 14 mm</li><li>• Lifting height – 10 m</li><li>• Drum diameter – 30 x (rope diameter)</li><li>• Allowable stress for cast iron – 25 MPa</li><li>• Number of Falls – 4</li><li>• Two movable sheaves</li></ul>	
Q.3	(a) List down the various methods of loading of conveyors and explain any one with a sketch.	03
	(b) Differentiate between Hydraulic & Pneumatic Conveyors.	04
	(c) Give step by step procedure for Design of Belt conveyors.	07
	<b>OR</b>	
Q.3	(a) How can the flexibility of a wire rope be increased?	03
	(b) Suggest Suitable material for crane hook & justify them. Why trapezoidal cross section is preferred for the hook?	04
	(c) Discuss importance of a good layout for success of material handling system. What are the steps in analysing material handling problems?	07
Q.4	(a) How does the Design of Sheave and Pulley differ? Explain with a neat sketch.	03
	(b) Explain various tensions in a belt conveyor system and discuss	04

- belt sag.
- (c) Write down steps involved in designing a bucket elevator. **07**
- OR**
- Q.4** (a) Write short note on steel wire ropes **03**  
 (b) Explain Gantry crane with the help of neat sketch. **04**  
 (c) Explain the principal technical factors to be consider for selection of material handling equipment. **07**
- Q.5** (a) Explain in details Hemp and wire ropes. **03**  
 (b) Write a short note: Automated Guided Vehicles in Material Handling **04**  
 (c) Explain the design of main girder (box type) of an E.O.T. crane with neat sketches **07**
- OR**
- Q.5** (a) Explain in detail, the functions performed by carcass of the Conveyor Belt **03**  
 (b) Write a short note: Automatic storage and retrieval system (ASRS) **04**  
 (c) Explain the stability analysis of movable crane used in railway yard for loading and unloading of goods from wagon with neat sketch **07**

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