

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VII EXAMINATION – WINTER 2025

Subject Code:3171928

Date:13-11-2025

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) List down the various advantages of material handling equipments.	03
	(b) Draw a neat sketch of an EOT Crane.	04
	(c) Classify various types of material handling equipments with sketches.	07
Q.2	(a) “Material handling activity is non productive activity” Criticize the statement.	03
	(b) Differentiate between hydraulic and pneumatic conveyor system.	04
	(c) Explain the factors to be consider for selection of material handling equipments.	07
OR		
Q.3	(c) Design a wire rope for a lift using following data:	07
	• Number of ropes = 2	
	• Maximum load on ropes including cabin weight = 8 kN	
	• Tensile strength for wire rope (6 x 19) = 43.5 d ² (d = rope diameter in cm)	
	• Factor of safety = 12	
	• Acceleration of load = 1 m/s ²	
	• Sheave diameter = 45 d	
	• Wire diameter d _w = d / 16	
	• Cross sectional area of rope, A = 0.404 d ²	
	• Modulus of elasticity for wire rope, E = 83000 N/mm ²	
• Tensile Designation of wire rope S _{ut} = 1570 N/mm ²		
Q.3	(a) How can the flexibility of a wire rope be increased?	03
	(b) List down the various types of idlers.	04
	(c) Explain the steps involved in analysing material handling problems?	07
OR		
Q.3	(a) Write short note on steel wire ropes	03
	(b) Discuss use of cubic space principle of material handling, Citing application in a paint manufacturing industry.	04
	(c) List different types of conveyors. Explain any one of them in detail with a neat sketch.	07
Q.4	(a) Write a short note: Automatic storage and retrieval system (ASRS)	03
	(b) Write a short note: Automated Guided Vehicles in Material Handling	04
	(c) Write short note on: Palletization and containerization.	07
OR		
Q.4	(a) Give specification of hoisting machine & list main component of hoisting equipment.	03
	(b) Explain various tensions in a belt conveyor system and discuss belt sag.	04
	(c) Discuss the design procedure for bucket elevator.	07

- Q.5** (a) Discuss about container used in material handling. **03**
(b) List the application of following crane: **04**
(i) Gantry Crane
(ii) Cantilever crane
(iii) Monorail Crane
(iv) Jib Crane
(c) Suggest Suitable material for crane hook & justify them. Why trapezoidal crosssection is preferred for the hook? **07**
- OR**
- Q.5** (a) What are the design considerations in selecting the number of plies in case of a belt conveyor. **03**
(b) Explain in detail, the functions performed by carcass of the Conveyor Belt. **04**
(c) Explain the Computer Aided Systems for Material Handling. **07**
