Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME SEMESTER III (OLD) EXAMINATION – SUMMER - 2017

Subject Code:730804 Date:04/05/2017

Subject Name: Design of Material Handling Equipments

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.**
4.
5. **Use of standard design data book (containing only equations, no theory) is permissible.**

Q.1 **(a)** Select a suitable steel wire rope and design a drum and pulley required for an electric overhead travelling crane with a lifting magnet from the following data: **09**

Lifting capacity Q = 10000 kg. Lifting height H = 6 m

Medium service duty service Weight of the lifting magnet G = 2000 kg

Number of rope parts Z = 4 Weight of lifting tackle G_o = 150 kg.

Efficiency of the pulley system = 90 %

(b) List and explain recent trends (advances) in material handling equipments design. **05**

Q.2 **(a)** State and explain the basic design aspects used for designing the material handling equipments in detail. **07**

(b) List the important components commonly used in different material handling equipments and explain any two of them. **07**

OR

(b) Explain the basic principles to be considered in designing material handling equipment. **07**

Q.3 **(a)** Explain the design consideration to be considered in the design of main girder of an E.O.T. crane with neat sketches. Also draw the different types of cross-sections used for main girder of crane. **07**

(b) Explain the design of monorail cranes with neat sketch. **07**

OR

Q.3 **(a)** Explain the design of main girder (box type) of an E.O.T. crane with neat sketches. **07**

(b) Draw a neat sketch of Gantry crane and label the main parts in it. Explain the design of this crane with neat sketch. **07**

Q.4 **(a)** Write short note on steel wire ropes. **07**

(b) Suggest and Explain the load handling attachments to be used for the handling materials : (Any three) **07**

1. Plastic (acrylic) sheets
2. Steel sheets packs – 2.4 x 1.2 m size , 5T weight
3. Steel sheet in coil form – 1 m width, 5T weight

4. Large size pressure vessel
5. Steel/Aluminum bars – 2 m length

OR

Q.4 **(a)** Explain the stability analysis of movable crane used in railway yard for loading and unloading of goods from wagon with neat sketch. **07**

(b) Explain the different types of load handling attachments used in material handling equipments stating their applications with neat sketches. **07**

Q.5 **(a)** Explain the safety devices used in material handling equipments. **07**

(b) Explain the design of horizontal Belt Conveyor alongwith power requirements in detail with a neat sketch. **07**

OR

Q.5 **(a)** Explain the design of Bucket elevators / Cage elevators in detail with a neat sketch. **07**

(b) Explain the working of Pneumatic Conveyors / Screw conveyors with a neat sketch and main points related to its design. **07**

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