M.E. First Semester (Mechanical Engineering (Adv. Manu. & Mech. Sys. Desig.)) (New-CGS)

13461 : Design of Material Handling Equipments : 1 MMD 4

P. Pages : 2
Time : Three Hours

* 1 0 8 5 *

AW - 3821
Max. Marks : 80

Notes : 1. Answer **three** question from Section A and **three** question from Section B.
2. Due credit will be given to neatness and adequate dimensions.
3. Illustrate your answer necessary with the help of neat sketches.
4. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) What are the various material handling equipments used in industries ? State the characteristics of good material handling system. **9**

b) Explain the factor considered for selection of material handling system. **5**

2. a) Explain the following principles of material handling - **6**
i) Gravity Principle ii) Dead - weight principle
iii) Planning principle

b) Explain the stresses developed in wire ropes along with mathematical equations **7**

3. a) What are the different types of bucket elevators ? Explain the components of bucket elevators with neat sketch. **7**

b) Explain the components of a hoist with neat sketch. **6**

4. a) Explain the procedure of selection of proper drive and the precautions for proper functioning of the drive **7**

b) What is continuous bucket elevator ? Explain the feeding and discharge mechanism of a continuous bucket elevator. **6**

5. A 6 x 19 wire rope is used for vertical mine hoist to lift a load of 60 kN from a depth of 300 m. The rope attains a speed of 500 m/min in 10 sec. Determine diameter of rope. **13**
i) Tensile strength = 595 d^2 N
ii) Area of rope = 0.38 d^2 mm
iii) Diameter of wire = 0.063 d mm
iv) Diameter of sheave = 100 d mm
v) Factor of safety for design load = 2
vi) Factor of safety for mine hoist for depth of 300 to 600 m = 7.

SECTION - B

6. a) Explain different types of conveyors used for material handling in industries. **6**

b) What are different types of belts used in conveyors ? State advantages and limitations of each. **7**

7.	a)	What are idlers in belt conveyors ? Explain the various types of idlers.	**6**
	b)	Explain various drive designs for vibrating conveyors with neat diagram.	**7**
8.	a)	What are the drawbacks of belt slipping ? Explain various methods used to avoid belt slipping.	**7**
	b)	Design a belt conveyor for its conveying capacity and power requirement.	**6**
9.	a)	What are different types of grabbing arrangements ? State their applications.	**7**
	b)	Explain electromagnetic feeder used in vibratory conveyors.	**7**
10.		A differential band brake is operated by a lever of length 500 mm. The diameter of brake drum is 500 mm. The maximum torque on the drum is 1000 N-m. If the coefficient of friction between the rope and the drum is 0.3, find operating force 'P'. Design the steel band and the shaft. Take : OA = 100 mm, OB = 80 mm, OC = 500 mm.	**13**

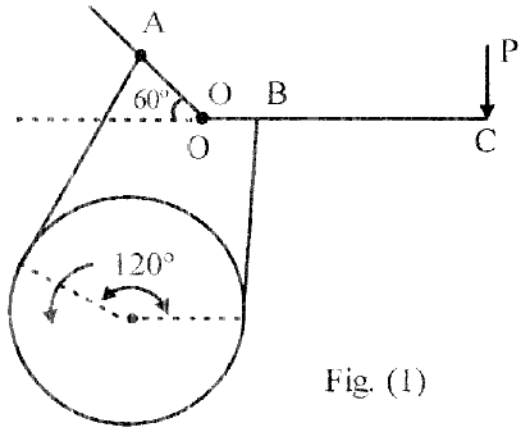

Fig. (1)

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