M.E. First Semester (Mecha. Engg. (Adv. Manu. & Mech. Sys. Design)) (New-CGS)

13461 – Design of Material Handling Equipments : 1 MMD 4

P. Pages : 2 | AU - 3381

Time : Three Hours | Max. Marks : 80

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Notes : 1. Answer **three** questions from Section A and **three** questions 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 objectives of a material handling system? **6**

b) What is planning principle associated with the design of a material handling system? Also explain the system principle. **7**

2. a) With the help of a neat sketch, explain the working of a standard type of continuous bucket elevator. **6**

b) What are the factors which affect the selection of material handling equipments. **6**

3. a) How are wire ropes classified? What are the advantages of using wire ropes in material handling equipments. **6**

b) How are chains classified and what are the merits of chain drive over belt or rope drives? **7**

4. a) What are different below- the- hook lifting devices for hoists. Describe any two. **6**

b) How to carry out inspection in horsts when it is in use, daily, in industry? **7**

5. A wire rope hoist is used to lift a load of 25000 N. The hook of the hoist that hooks the load weighs 15000N. The load is lifted with an acceleration of 1 m/s^2. The drum diameter may be taken 30 times the rope diameter. Calculate the diameter of the wire rope. Take a factor of safety of 6 and Young's modulus for the wire rope as 80 $\frac{KN}{mm^2}$. The ultimate stress may be taken as 1800 MPa. The cross sectional area of the wire rope may be taken as 0.38 times the square of the wire rope diameter. **14**

SECTION – B

6. a) Draw a troughed belt conveyor and explain the terms associated with the conveyor. **6**

b) What are different types of conveyor belts? Discuss their merits and demerits. **7**

7. a) Explain the working of a horizontal gravity- take up with the help of a neat sketch. **6**

b) What are various measures adopted to avoid the slippage of belt from a pulley in belt conveyors? **7**

8. a) Explain with a neat sketch the working of closed loop vacuum system with rotary positive displacement blower for pneumatic conveyor. **6**

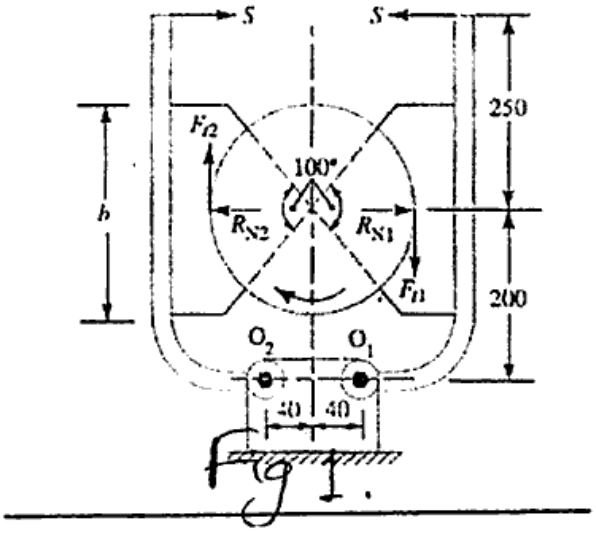
   b) What are brute force feeders and natural frequency feeders in vibratory conveyors? **7**

9. A double 'Shoe brake, as shown in fig1 is capable of absorbing a torque of 1400 N-m. The diameter of the brake drum is 350mm and the angle of contect for each shoe is 100°. If the coefficient of friction between the brake drum and lining is 0.4; find **13**

   i) The spring force necessary to set the brake and

   ii) The width of the brake shoes.

   (If bearing pressure on the lining material is not to exceed 0.3 $\frac{N}{mm^2}$.)



10. a) What are different methods of discharge from a flat belt conveyor? Illustrate with neat sketches. **7**

    b) Draw a general layout of a flat belt conveyor and explain the role of each component of the belt conveyor. **7**

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