AQ – 2853

First Semester M. E. (Mech. Engg.) (AMMSD) F. T. Examination

DESIGN OF MATERIAL HANDLING EQUIPMENTS

Paper - 1 MMD 4

P. Pages : 3

Time : Three Hours] [Max. Marks : 80

Note : (1) Separate answer book must be used for each section in the subject Geology, Engineering material of civil branch and Separate answer book must be used for Section A and B in Pharmacy and Cosmetic Tech.
(2) Answer **Three** question from Section A and **Three** question from Section B.
(3) Due credit will be given to neatness and adequate dimensions.
(4) Assume suitable data wherever necessary.
(5) Use of Data tables for wire ropes is permitted.
(6) Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION A

1. (a) What are various classes/types of material handling equipments ? Write a feature of each type. 7

   (b) What are the objectives of a material handling system ? 6

2. (a) How are wire ropes classified ? What are various faults / damages seen in wire ropes ? 7

   (b) What are various stresses that arise in wire ropes ? Give their mathematical formulae as well. 6

3. (a) What are the factors considered for selection of material handling system? 7

   (b) What are the applications of a continuous bucket elevator ? What are its general features ? (Draw a neat diagram) 6

4. (a) What are different types of hoists ? What are various design consideration for a various components of hoists ? 7

(b) What are various take-up arrangements in belt conveyers ? What is the necessity for providing take-up arrangements ? 6

5. A workshop crane is lifting a load of 25 KN through a wire rope and a hook. The weight of the hook is 15 KN. The rope drum diameter may be taken as 30 times the diameter of the rope. The load is to be lifted with an acceleration of 1 m/s^2. Calculate the diameter of the wire rope. Take factor of safety of 6 and Young's modulus of wire rope as 80 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 wire rope diameter. (Take dw = 0.063 d) 14

SECTION B

6. (a) What are the reasons for rapid wear of pneumatic pipelines in pneumatic conveyors? What should be done to decrease the degree of abrasion in the pipeline ? 7

(b) With the help of a neat sketch describe a vacuum type pneumatic conveyor with multiple pick-up points. 6

7. (a) What are different components of a belt conveyer ? Explain the design procedure for a belt conveyor system. 7

(b) With the help of a neat sketch explain briefly various vibrator feeders design types. 6

8. (a) What are various grabbing attachments used in material handling ? State their use. Draw neat sketches. 7

(b) What are various types of braking arrangements used for hoists etc. in material handling ? Explain any one with the help of a neat sketch. 6

9. (a) What are the advantages and disadvantages of hydraulic and pneumatic conveyors? 7

(b) Explain with the help of neat graph how natural frequency of the conveyor system is effectively used in a vibratory conveyor. 6

10. With the help of a typical layout of a complete belt conveyor write the complete design procedure for deciding the power required for a belt conveyor system. [Also write all the formulae involved in the procedure]. 14