Final Part Time B.E (Mech.) Examination

Mechanical Handling of Materials

Time:3 Hours **(2nd. Semester Examination)** **Full marks-100**

Answer any FIVE questions

1. (a) How material handling system is being classified on the basis of unit load and bulk load? 10
   (b) How bulk load and unit load are characterized ? How does bulk weight of a bulk material differ from its specific weight? What is static and dynamic angle of repose? 10

2. (a) Draw a neat sketch of Electric Over Head Traveling Crane mentioning different parts. 10
   (b) Explain different types of jib crane used in ware houses , machine shop , construction site and ship yard in detail. 10

3. (a) A horizontal belt conveyor with 3-roller troughing arrangement handles coal at the rate of 200t/hr. at a speed of 0.3m/sec. The side troughing idlers are set at an angle of 20° with respect to the axis of the central idler. If the bulk weight of the material is 1.2 t/m³, static angle of repose of the load is 45° and tension factor is 1 then find out the width of the belt. 12
   (b) State different systems of discharge arrangements at an intermediate position of a belt conveyor. Make a neat sketch of single sided discharge plough. Label the diagram. 8

4. (a) Draw a schematic diagram of a screw conveyor and label the diagram . 10
   (b) A screw conveyor system is used for transporting molding sands at an inclination of 10° with the horizontal. The required capacity is 50T/hr and length of conveyor is 30 m, Bulk density is around 1.2 T/m^3 assume loading efficiency 0.2 and the speed of the screw shaft is 50 r.p.m Find the nominal diameter of the screw 7
   (c) Explain the typical applications of screw conveyor 3

5. (a) What are the different types of bucket elevators used in industry. 6
   (b) Draw different types of buckets used in bucket elevator with specifications 6
   © A bucket elevator lifts dry powdered coal to a height of 50m. Calculate the handling capacity of the elevator on the basis of the following data:
      i) effective bucket capacity = 2.0 liters.
      ii) bucket spacing = 500mm.
      iii) bulk weight of coal = 0.8t/m³
      iv) drive pulley diameter = 1.6m.
      v) polar distance= 1.4m. 8

6.(a) What is pneumatic conveyor? Discuss the advantages and disadvantages of pneumatic conveyor. On which factors the choice of pneumatic handling system depends ? 4 + 4 + 4 = 12

(b).How pneumatic conveyor system can be classified on the basis of air pressure? Draw a schematic diagram of a negative pressure pneumatic conveyor system. 4 + 4 = 8

7. Write short notes on : (any two) 10 x 2 = 20

(a) Applications of robots in dustry
(b) Cyclone type separator
(c) Robot configurations and drive system
(d) Major Components of Robot system