

Register Number.....

M.E. DEGREE EXAMINATIONS: OCTOBER/NOVEMBER - 2008

Third Semester

CAD / CAM

PO7CCE 11: Design Of Material Handling Equipments

Time: Three hours

Maximum Marks: 100

Answer ALL Questions: -

PART - A (20x1 = 20 Marks)

01. Welded chains are used
(a) Low capacity (b) Medium capacity
(c) High capacity (d) Very high capacity
02. Welded chains are manufactured
(a) Forge welding (b) Electric resistance welding
(c) Arc welding (d) Gas welding
03. Rollar chains consists of
(a) Plates (b) Rods
(c) Belt (d) Rope
04. Hemp ropes are selected only on the basis
(a) Tension (b) Compression
(c) Load (d) Stress
05. Steel wire ropes are extensively used due to
(a) Lighter weight & less sustainability (b) Low cost
(c) Fitting easy (d) Low life
06. Rope life calculated based on
(a) No. of bends (b) No.of wires
(c) Load (d) Operating hours
07. Which one is best pulley system
(a) Single (b) Without pulley
(c) Double (d) Multiple
08. Rope drums are manufactured
(a) Cast iron (b) Stainless steel
(c) Aluminum (d) Copper
09. Advantage of friction drums
(a) Raise load to great weight (b) Lift heavy load
(c) Lift low load (d) Raise load fastly

10. Unit stress in the saddle of the hook can be found by
 (a) $\sigma = Q/F + m / Fr + m/Fr \cdot 1/x \cdot y/y+r$ (b) $\sigma = Q/F + m / Fr$
 (c) $\sigma = Q/F$ (d) $\sigma = Q/F + m / Fr + m/Fr \cdot X \cdot 1/x$
11. Capacity of drum ladles is
 (a) 0.5 to 5 tons (b) 5 to 10 tons
 (c) 10 to 50 tons (d) Above 50 tons
12. What is the permissible temperature for brake wheel
 (a) 200°C to 300°C (b) Upto 100°C
 (c) Upto 500°C (d) 100°C to 500°C
13. Which drive is best suited for material handling
 (a) Electric drive (b) Hydraulic drive
 (c) Steam drive (d) Pneumatic drive
14. To lift powdered material which type of material handling equipment used
 (a) Bucket elevator (b) Pneumatic conveyor
 (c) Screw conveyor (d) Belt conveyor
15. To discharge at different placed which one is best
 (a) Bucket elevator (b) Pneumatic conveyor
 (c) Screw conveyor (d) Belt conveyor
16. Lift in the buildings belongs to
 (a) Elevator (b) Conveyor
 (c) Hoisting equipment (d) Cranes
17. Pneumatic conveyor conveys
 (a) Dry powdered material (b) Big Grains
 (c) Big lumps (d) Irregular lumps
18. Speed of screw conveyor depends on
 (a) Screw diameter (b) Load
 (c) Material conveyed (d) Conveying distance
19. Vibrating conveyors are used for
 (a) Small size Grains (b) Powdered materials
 (c) Big lumps (d) Irregular lumps
20. Different types buckets
 (a) Deep (b) Vee
 (c) Shallow (d) All the above.

PART – B (5 x 16 = 80 Marks)

21. (a) Design a cog wheel drive for the slewing mechanism of a crawler tractor. The diameter of the cog wheel can be assumed as 2.6 m and the transmitted torque is 16,000 Nm. (16)

(OR)

(b) It is proposed to design an electric hoist of capacity 10 ton. The hoisting speed of the load is 8 m/min.

- i). Calculate the required horse power of hoist motor (4)
- ii) Select a suitable steel wire rope and sheave assembly (6)
- iii). If the load is to be lifted to a height of 10 m, estimate the length of the rope drum (6)

22. (a) A conveyor is required to carry starch powder whose density is 1.5 kg/m^3 at the rate of 3 tones/ hour. The length of the screw is 20 meters: weight of the screw = 200 N/m; speed of the screw = 60 rpm; trough efficiency = 0.28; ratio between screw pitch and diameter = 0.8; the coefficient of friction between the material of the through and the screw flight is 0.6.

Determine:

- i) The main dimensions of the screw
- ii) Horse power of the driving motor
- iii) The shaft size of the screw
- (iv) Sketch the arrangement. (16)

(OR)

(b) Explain the following types of vibratory conveyors with neat sketches. (16)

- i) Conveyors with constant load pressure on the trough
- ii) Conveyors with varying load pressure on the trough
- iii) Discuss with suitable expressions the conditions of no slip during upward motion of the trough and contact less displacement during return stroke, in the conveyors.

23. (a) (i) Sketch and explain the various methods of feeding and discharging bulk materials in different types of bucket elevators. (8)

(ii) Explain with a neat sketch the motion of a loaded bucket on the ascending strand and on the upper pulley of a bucket elevator. (8)

(OR)

(b) (i) Sketch and explain the function of a cage elevator. (8)

(ii) Discuss the design features of the different elements of a cage elevator. (8)

24. (a) The following data pertains to a belt conveyor carrying material down a slope.

Belt width	= 800 mm
Conveyor capacity	= 400 t / hour
Elevation	= 30 m
Spacing of carrying idlers	= 1.5 m
Velocity of belt	= 2 m /sec
Length of the conveyor	= 500 m
Mass of belt	= 2 kg / m
Spacing of return idlers	= 3 m
Revolving weight of troughed idler	= 300 N
Revolving weight of return idler	= 200 N

Calculate the horse power when

- (1) The conveyor is running empty (8)
- (2) The material is conveyed. (8)

(OR)

- (b) (i) What are the basic considerations in the design of pneumatic conveyors? (8)
- (ii) Explain the safety devices used in vibratory conveyors. (8)

25. (a) A bucket elevator is to lift phosphate fertilizer at a rate of $25 \text{ m}^3/\text{Hr.}$ through a vertical height of 3 m. The bulk density of the lumped material is $1,200 \text{ kg} / \text{m}^3$.

- (i) Design the elevator using a belt drive and specify the buckets, pulleys and the motor. (8)
- (ii) Sketch the elevator scheme and show the feeding and discharge arrangements. (8)

(OR)

(b) Write brief notes on the following. (16)

- i). Revolving supporter of slewing jib crane
- ii) Pneumatic conveyors
- iii) Fork lift truck.
- iv) Cage Elevators.
