

**MECHANICAL HANDLING OF MATERIALS
(MECH 4281)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 5 (five) from Group B to E, taking at least one from each group.*

Candidates are required to give answer in their own words as far as practicable.

**Group – A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**

- (i) A truck is used to move
 - (a) unit load
 - (b) bulk load
 - (c) both unit load and bulk load
 - (d) stack of unit load.
- (ii) One of the disadvantage of material handling system
 - (a) cut down labour cost
 - (b) improve efficiency of production
 - (c) minimize accident
 - (d) additional capital cost.
- (iii) All of the following are free flowing materials except:
 - (a) Wheat
 - (b) Soda ash
 - (c) Mica, pulverized
 - (d) Lead salts.
- (iv) Reactive and corrosive materials are generally carried by
 - (a) flat belt conveyor
 - (b) troughed conveyor
 - (c) closed conveyor
 - (d) bucket conveyor.
- (v) A pulley with larger than desirable groove radius will have following effect
 - (a) the wire rope will slip
 - (b) the wire rope will flatten
 - (c) the pulley groove wears at two zones
 - (d) no appreciable effect.
- (vi) Which one is not the part of speed factor?
 - (a) Lump size factor
 - (b) Slip factor
 - (c) Air borne factor
 - (d) Abrasiveness factor.
- (vii) Sprocket is a part of
 - (a) chain conveyor
 - (b) belt conveyor
 - (c) Screw conveyor
 - (d) hydraulic conveyor.
- (viii) For lifting the load vertically, the type of chutes that can be used is
 - (a) Spiral chutes
 - (b) trough chutes
 - (c) transfer slides
 - (d) all of the above.

- (ix) During welding which positioner can be used
(a) welding positioner (b) elevating platform
(c) both (a) and (b) (d) magnetic bench positioner
- (x) Material Handling inside a medium sized gear box plant is usually done by
(a) gantry crane (b) level luffing crane
(c) chain-pulley block (d) EOT crane.

Group – B

2. (a) Briefly describe the unit load in a container and unit load on a platform in the context of proper utilization of load.
(b) Describe the essential requirements of a good materials handling system.
6 + 6 = 12
3. (a) Describe Planning Principle and Material Flow Principle with respect to material handling system.
(b) Discuss the applications of the following conveying systems:
Trough Belt Conveyor, Screw Conveyor, Pneumatic Conveyor.
6 + 6 = 12

Group – C

4. (a) Find out the belt used for carrying 25 tonnes/hr of wheat through a troughed belt conveyor. The belt speed and inclination angle is 2.5 m/s and 20° respectively. The static angle of friction of the material is 34°. The bulk density of wheat is 7900 kg/m³.
(b) Write down the name of any four major components of a chain conveyor and briefly describe different types pulling chain used in chain conveyor.
6 + (2 + 4) = 12
5. (a) Find the nominal diameter of a screw for a conveyor which convey wheat at the rate of 10 tonnes/hr horizontally. The pitch of the screw is 0.9 times the diameter of the screw. The flowability of grain is 0.4 and the bulk density of the material is 7900 kg/m³. The speed of the motor is 450 rpm.
(b) Discuss the method of power calculation of an inclined screw conveyor.
8 + 4 = 12

Group – D

6. (a) What are the advantages of using the steel wire rope compared to chains?
(b) Discuss working principle of wharf crane with a neat sketch.
5 + 7 = 12

7. (a) Explain the constructional features of a 6 × 7(6-1) CF steel wire rope with a cross sectional view.
- (b) Explain centrifugal discharge elevator and positive discharge elevator.
- 5 + 7 = 12**

Group – E

8. (a) Explain with suitable example, the capacity rating of forklift truck.
- (b) Mention the important features of FLT.
- 6 + 6 = 12**
9. (a) Describe apron feeder and belt feeder with sketch.
- (b) How are troughs and spiral chutes used as auxiliary equipment?
- (4 + 4) + (2 + 2) = 12**

Department & Section	Submission Link
CE	https://classroom.google.com/c/Mjk5MzA4MzYyMDcw/a/MzU3NjMyMjEwNDU1/details