

Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech/CE(NEW)/SEM-6/CE-605C/2013

2013

MATERIAL HANDLING

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

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

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) Bulk materials are generally handled by

- | | |
|---------------|---------------|
| a) skip hoist | b) under shed |
| c) cranes | d) silos. |

- ii) Stability of forklift truck is achieved by providing

- | | |
|-------------------|------------------|
| a) Fork arms | b) Chassis |
| c) Counter weight | d) Driving axle. |

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- iii) In air-activated gravity conveyors (Air slide)
- a) water and air are used to acquire fluidity
 - b) lubricating oil is used to acquire fluidity
 - c) air is used to acquire fluidity
 - d) water is used to acquire fluidity.
- iv) Static angle of repose of rice is 20 degrees, which is being conveyed by a belt conveyor of width 500 mm. The cross sectional area of load on flat belt is
- a) 0.00245 m^2
 - b) 0.00345 m^2
 - c) 0.00445 m^2
 - d) none of these.
- v) Screw conveyors are particularly suitable for
- a) viscous material
 - b) pulverized material
 - c) sticking material
 - d) abrasive material.
- vi) The power trucks have been classified groups with BIS specification number as
- a) IS 7117 : 1990 and IS 4660 : 1993
 - b) IS 7217 : 1990 and IS 4660 : 1993
 - c) IS 7317 : 1990 and 4660 : 1993
 - d) IS 7117 : 1990 and IS 4560 : 1993.

CS/B.Tech/CE(NEW)/SEM-6/CE-605C/2013

- vii) EOT Crane has
- a) both lifting and slewing arrangement
 - b) lifting arrangement
 - c) only slewing arrangement
 - d) none of these.
- viii) Belt conveyer are generally employed for
- a) discontinuous flow of material
 - b) continuous flow of material
 - c) only single material
 - d) none of these.
- ix) Hydraulic conveyors are used for
- a) Construction projects for land filling
 - b) Material handling at work place
 - c) Conveying unit loads like barrels, drums, boxes etc
 - d) heavy process plant like rolling mills.
- x) Type of Haulage conveyer is
- a) Flight conveyers
 - b) Pan conveyers
 - c) Arm conveyers
 - d) Apron conveyers.

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xi) Toplis mechanism is applicable in

- a) EOT Crane
- b) Level luffing Crane
- c) Jib Crane
- d) Grantry Crane.

xii) Robotic handling system is

- a) 4-wheel hand Robot
- b) Good material Robot
- c) Specially designed Robot
- d) Marching cell Robot.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- 2. What is the function of gate in bulk material storage hoppers or silos. Explain operation of slide gate and trough gate schematic diagram. 5
- 3. What is Robot ? Explain its classification. 5
- 4. What is the purpose of winch ? What are its components ? Draw a hand operated winch marking all its components. Write down the specification of a powered winch which you intend to order for your factory. 5

CS/B.Tech/CE(NEW)/SEM-6/CE-605C/2013

5. Name various motions of a wharf crane ? What is level luffing ? Why is this done ? 5

6. State where EOT crane is generally used. Draw a schematic diagram. What are its major specifications ? State three advantages for selecting this type of crane. 5

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. A screw conveyor has following particulars :

Screw dia (D) : 300 mm

Max. rpm : 120

Inclination angle factor $C = 1.0$

Pitch $S = 0.8D$

Material being conveyed : free flowing non-abrasive grain, $\phi = 0.4$

Bulk density of material $\rho = 720 \text{ kg/m}^3$

Length of screw $L = 10 \text{ m}$

Length of material movement in conveyor $L^1 = 8 \text{ m}$

Progress resistance coefficient $\lambda = 2$

Height conveyed $H = 10 \text{ m}$

CS/B.Tech/CE(NEW)/SEM-6/CE-605C/2013

Calculate the following :

- (i) Tonnage capacity (T/hr)
- (ii) Power required for conveying material (kW)
- (iii) Drive power at no load (kW)
- (iv) Power due to inclination (kW)
- (v) Total power (kW)

8. What is the function involved in material handling ? Define 'Feeders'. Describe all kinds of Feeders.

9. a) Name various parts of a belt conveyor with one line description of each one. 8

b) Why flexible steel wire ropes are preferred for hoisting machinery ? Draw cross-section of a 40 dia, 6×19 flexible steel wire rope with fibre core. What is factor of safety of a rope ? What factor of safety is generally considered power operated crane and hoists ?

7

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10. Write short notes on the following : 5 × 3

- a) Bucket Conveyors
- b) Pipeline Conveyors
- c) Steel Wire Ropes and Drums
- d) Winches
- e) Lifts.

11. Write down the specification of a Forklift truck you intend to purchase. What is capacity rating of FLT ? Draw a neat sketch showing turning radius turning radius of FLT and corresponding axle width. Where is a driving wheel located ? 15

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