B.TECH/ME/6TH SEM/MECH 3263/2017

MATERIALS HANDLING (MECH 3263)

Time Allotted : 3 hrs

Full Marks: 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and <u>any 5 (five)</u> from Group B to E, taking <u>at least one</u> 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:

 $10 \times 1 = 10$

(i)	The objective of an optimum materials ha (a) lowest capital cost (b) minimum material movement (c) efficient and safe movement (d) all of these.	indling system is
(ii)	In vibrating feeder, material is moved by (a) circular motion (c) hopping motion	(b) linear motion (d) reciprocating motion.
(iii)	As an unit load is moved by a Level Luffing crane, (a) may increase or decrease (c) decreases	the height of the load from ground (b) increases (d) remains at same level.
(iv)	Angle of repose of bulk material is used fo (a) mobility (c) flowability	or determination of its (b) fluidity (d) none of these.
(v)	Work envelop of a Cartesian coordinate r (a) conical (c) cylindrical	obot is (b) parallelepiped (d) sphere.
(vi)	Dollies" are multiple wheel hand trucks where a) the source of power is battery driven motor b) two handles are provided c) no handle is provided d) none of these.	
MECH 3263	1	

B.TECH/ME/6TH SEM/MECH 3263/2017

- (vii) Rope drum is used in a
 - (a) EOT crane
 - (c) Level Luffing crane

- (b) Gantry crane (d) all of these.
- (viii) Robot is better suited over an EOT crane for
 - (a) shifting of material from one place to another in a job shop
 - (b) handling of jobs of irregular sizes and varying weights
 - (c) accurate positioning and loading of components in a machine
 - (d) none of the above.
- (ix) The choice of appropriate type of pneumatic conveying system depends upon
 - (a) bulk density and particle size(b) flowability(c) abrasiveness(d) all of these.
- (x) Steel wire ropes are specified by
 - (a) weight of the wire per meter length
 - (b) nominal rope diameter in millimetres followed by number of strands and the number of wires in a strand
 - (c) breaking load in KN followed by diameter of strand in millimetre and number of wires in a strand
 - (d) none of these.

Group – B

- 2. (a) Explain the objectives and principles of Material Handling.
 - (b) What are the important technical & economic factors that should be considered in the choice of MH equipment?

6 + 6 = 12

3. List four (4) types of material handling equipment and for each equipment explain what kinds of material they can handle best and why. Draw a sketch of each equipment.

3 + 3 + 3 + 3 = 12

Group – C

- 4. (a) What are the main features of a fork lift truck? Explain with a sketch.
 - (b) What do you mean by the Rated Capacity of a FLT?
 - (c) Rated capacity of a FLT is 2000 kg and load centre is 500 mm. Distance between front wheel to heel of the fork is 400 mm. If the length of the fork is 1200 mm measured from its heel, what is the maximum load

B.TECH/ME/6TH SEM/MECH 3263/2017

the FLT can carry if the C.G. of the load passes just inside the tip of the fork.

4 + 2 + 6 = 12

- 5. Write short note with sketch on the following auxiliary equipment.
 (i) Vibratory feeder
 (ii) Screw feeder
 (iii) Chutes
 - (iv) Trough gate.

(3+3+3+3) = 12

Group – D

- 6. (a) Through a neat sketch, show the general arrangement of a belt conveyor system and label the different important parts.
 - (b) Name three (3) types of idlers that are used in a belt conveyor system. Explain with sketch where each is used and why.

6 + 6 = 12

- 7. (a) Discuss the advantages & disadvantages of Pneumatic Conveyor.
 - (b) Calculate the conveying capacity of a troughed belt conveyor if B = belt width = 500m, trough angle 30°, V = 1200mm/sec, γ = bulk density is 2 tonnes/m³, ϕ = static angle of repose= 45°.

6 + 6 = 12

Group – E

- 8. (a) Describe with neat sketch working of a Clamshell Grab. What are the types of material it can handle.
 - (b) Describe with a schematic diagram, working of a Level Luffing wharf crane. Why it is called Level Luffing.

6 + 6 = 12

- 9. (a) Define the term Robot? What are the classifications of Robots?
 - (b) Name the major components of a robot with their functions?

6 + 6 = 12