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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
END SEM EXAMINATION - May 2015
M.Tech CM II Semester

COURSE CODE: 10M11CE212 MAX. MARKS: 45
COURSE NAME: Heavy/Civil Construction Equipment
COURSE CREDITS: 3 MAX. TIME: 3 HRS

Note: *All questions are compulsory. Please construct neat sketches wherever necessary.*

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1. The original cost of bulldozer power shovel is Rs. 4 lacs and its salvage value is 8% of the original cost. The bulldozer is used for 1200 hours per year and its life is 4 years. The hiring charges for the bulldozer including maintenance and repairs are Rs. 20000/- per month. Suggest whether the bulldozer should be purchased or hired. (7 marks)

2. A concrete dam is to be constructed. It will require 1.5 million tonnes of stone aggregates. The estimate for constructing a temporary road is of Rs. 45 lacs. Hauling charge of stone aggregates is Rs. 10/- per tonne for truck. The original cost of belt conveyor is Rs. 70 lacs. Its salvage value is 20% of the original cost of belt conveyor. The maintenance and repair charges are 30% of depreciated value and electrical power consumption is 60% of original cost.
Which is the best alternative for hauling of stone aggregates – trucks or belt conveyor? (7 marks)

3. True or false? (3 marks)

1. For coarse-grained soils we use vibratory rollers. _____
2. For fine-grained soils, we use pneumatic rubber tyre or sheepfoot rollers. ____
3. There is no difference between the padfoot and sheepfoot rollers._____
4. Vibratory rollers can compact in either dry or saturated state. _____
5. Vibration can be induced in static types by installing rotating eccentric mass within the roller. _____
6. Presence of "fines" has no effect on the effectiveness of vibrations in compacting soils.____

4. What are required functions of a shield tunneling machine? List essential components of such machines with a neat sketch. (4 marks)

5. What are different types of shield tunneling machines? Explain each type with a neat sketch. (4 marks)

P.T.O.

6. Match the following: (4 marks)

(i)	(a) Non-displacement pile	A. Driven tubular steel pile
	(b) Low-displacement pile	B. Driven steel pile
	(c) High-displacement pile	C. Driven precast concrete pile
	(d) Low or high displacement pile	D. Bored cast-in-situ concrete pile
(ii)	(a) Helmet	A. Percussion drilling
	(b) Detachable shoe	B. Hammering
	(c) Bailer	C. Driven cast-insitu-pile
(iii)	(a) Mandrel	A. Enlarged base
	(b) Tremie Pipe	B. Removal of cobbles and boulders
	(c) Grab	C. Concreting
	(d) Under-reamer	D. Hammering
(iv)	(a) Micropiles	A. 300 to 1500 mm diameter
	(b) Auger cast piles	B. Upto 450 mm diameter
	(c) Bored piles	C. 300 to750 mm diameter
	(d) Precast driven piles	D. 150 to 300 mm diameter

7. How are explosives classified? Discuss low and high explosives. Which is the most used explosive in rock blasting? (4 marks)

8. Explain the following terms:
   1. Blast hole drill
   2. Jackhammers
   3. Drifter drills
   4. Wagon drills (4 marks)

9. What does an asphalt paver consist of ? What is the function of screed? Define the term, "Screed angle of attack" with a neat sketch. (4 marks)

10. Complete the following sentences/paragraphs: (4 marks)
    1. Cranes are a broad class of construction equipment used to _____
    2. Construction cranes are generally classified into two major families: _____
    3. Common mobile crane types include _____
    4. Common tower crane types include _____
    5. Some mobile cranes in their basic configuration can have different front-end operating attachments that enable the unit to be used as _____
    6. The gantry cranes are used for _____
    7. The hoist is used as _____
    8. The hoist are basically of two forms: _____