

**B.Tech. Civil (Construction Management) /  
B.Tech. Civil (Water Resources Engineering)**

**Term-End Examination**

00920

**June, 2016**

**ET-581(F) : MECHANICAL EQUIPMENT IN  
CONSTRUCTION**

*Time : 3 hours*

*Maximum Marks : 70*

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**Note :** Attempt any **seven** questions. All questions carry equal marks. Use of calculator is permitted.

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1. (a) Why do volume and density of earth undergo changes during excavation, hauling, placement and compaction ?
- (b) The undisturbed density of earth on a piece of land was  $700 \text{ kg/m}^3$ . The same earth on excavation, hauling, placement and compaction was found to be  $800 \text{ kg/m}^3$ . The loose earth was found to be  $600 \text{ kg/m}^3$ . Find the percentage Swell and Shrinkage Factor of the soil.

4+6=10

2. Explain how the following factors influence the selection of construction equipment : 10
- (a) Engagement of local labour
  - (b) Standard equipment
  - (c) Availability of spare parts
  - (d) Chances of future use of the equipment
  - (e) Unit cost of procurement of the equipment
3. A construction equipment costs ₹ 5.0 lakh and its useful life is 5 years with the salvage value of 20% of the procurement value. What is the book value of the asset after 4 years and cumulative depreciation amount at the end of its useful life ? Use straight line method of depreciation. 10
4. What are scrapers ? What are the different types of scrapers available ? How is the capacity of a scraper determined ? What are the practical ways of increasing the production of scrapers ? 10
5. What mechanical equipment would you recommend for loading stockpile material into a carrier for transporting ? How are they propelled and mounted ? Describe briefly the mode of working of the equipment you recommend. Is there any type variation of the equipment you recommend ? If so, what are they ? 10

6. What is overlap of compacting rollers ? For a 2-drum roller of 1.2 m width and overlap width of  $\frac{1}{4}$  drum, find the overlap fraction. If the above roller travelling at 75 m/min with rolling time of 45 min is used for compacting earth layer of 400 mm in 5 numbers of passes, find the quantity of earth compacted. 10
7. What are the different types of concrete buckets ? How would you define mass concrete ? State the practices to reduce the placement temperature of concrete. 10
8. How would you estimate the capacity of a refrigeration plant for pre-cooling of concrete ? Briefly give an account of control of temperature of concrete. 10
9. What is a concrete batching and mixing plant ? How is water measured in a concrete batching and mixing plant ? 10
10. Briefly give the design aspects of the following : 10
- (a) Slide Gate
  - (b) Radial Gate
  - (c) Flap Gate
  - (d) Butterfly Valve
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