

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

**Term-End Examination**

00411

**December, 2015**

**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 allowed.*

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1. (a) Explain the meaning of the following :

- (i) Bank measure volume
- (ii) Fill volume
- (iii) Swell
- (iv) Shrinkage

(b) What excavating machine would you use for making foundation hole of piers ? Explain the reasons of unsuitability of this machine for excavation of large volume of earth. 6+4=10

2. A construction equipment was procured at ₹ 20,000 considering 2000 hours of operation in every year. Its salvage values at the end of 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> years are ₹ 15,000, ₹ 12,000 and ₹ 10,000 respectively. Find the cumulative cost per hour of the equipment at the end of 3<sup>rd</sup> year, considering the increase in replacement cost per year is ₹ 1,000. 10
3. (a) What is Depreciation ? Why is a construction equipment depreciated ?
- (b) A construction equipment was procured for ₹ 12,000. Its expected life is 5 years and salvage value is ₹ 2,000. The equipment is expected to work for 2000 hours in a year. Using straight line method of depreciation, find the cumulative depreciated amount and book value of the equipment at the end of its useful life. 2+8=10
4. What are the basic parts of a Power Shovel ? Draw a neat sketch of a Power Shovel labelling its basic parts. On what factors does the selection of type and size of a Power Shovel depend ? 10
5. What is a Crawler Crane ? For what purpose is it used ? Draw a neat sketch of a Crawler Crane. How does it differ from a Truck Crane ? 10

6. The carrying capacity of a troughed 4 ply 900 gm weight conveyor belt of length 152.97 m at a speed of 100 m/min for unisized gravel is 247 tph. The maximum speed of the belt of 500 mm width is 105 m/min. The spacing of the idlers is 1425 mm for 2000 kg/m weight of material handled. Take friction factor of 0.036 at the idlers. Find the total power required to run the belt for transporting 250 tph of material horizontally at full speed of the belt taking pulley friction and drive losses as 5% and 10% of net power without losses.

10

7. On an embankment dam what type of earth compactor would you recommend ? Explain its working principle. How does a vibrating compactor differ in the working principle of a static weight vibrator ?

10

8. What are the various methods of cooling aggregate ? Briefly describe the components of post-cooling systems for the control of concrete temperature.

10

9. Why is vibrator necessary for a concrete work ?  
Classify concrete vibrators. Describe the working  
of a needle vibrator and a surface vibrator.  
Mention the working limitations of a surface  
vibrator.

10

10. (a) What are the different types of hand-held  
drills ? Explain their working principles  
and main uses.

(b) Explain the different types of cuts used in  
tunnel excavation.

5+5=10

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