

## NOTE:.

- i) Question No. 1 is compulsory.
- ii) Attempt any four out of the remaining six questions.
- iii) Figure to the right indicates full marks
- iv) Assume any suitable data and clearly state the same.

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- Q.1 A) Describe the various types of tunneling machines which have been developed in recent years. Describe the operation of one of these machines. Compare the use of moles with conventional tunneling method. 10  
 B) Classify cranes on the basis of broad construction features. Explain the application of each type and its method of operation. 10
- Q.2 A) Determine owning and operating cost per hour for two equipments from the following data: Assume other suitable data. 10  
 Purchased cost = Rs.30 lacs (first equipment purchased 5 years ago and second today.)  
 Operating factor = 0.70 for old and 0.85 for new equipment  
 Useful life = 10 years (2000 hours/year)  
 Engine capacity = 60 HP  
 Salvage value = 10% of purchase cost  
 Investment cost = 12% average annual investment  
 Lubrication cost = 20% of fuel cost  
 B) Enlist commonly used soil compacting equipments in construction industry indicating suitability? Explain any one with neat sketch. 10
- Q.3 A) What are the different types of crushers used for production of aggregate? Explain any one with neat sketch. 10  
 B) Enlist the different types of drilling equipments. Explain in detail any one with neat sketch. 10
- Q.4 A) What is meant by ground improvement? Discuss the ground improvement technique by Sand Drain with a neat sketch. 10  
 B) Enlist the different types of pile driving hammers. Explain in detail Double Acting Hammer with neat sketch. 10
- Q.5 A) Enlist the various modern forms for concrete construction. Explain in details the slip form with sketch. 10  
 B) Explain the different methods of foundation grouting with sketches. 10
- Q.6 A) What is liner plate? Sketch the types of liner plates used in tunnel work and state the advantages of using liner plates. 10  
 B) Define mass concrete? What are the problems generally faced during mass concreting? What precaution will you take for mass concreting? Explain. 10
- Q.7 Write short notes on any four 20  
 i- Types of Cladding  
 ii- Use of geo-textiles in soil stabilization  
 iii- Stemming  
 iv- Balancing of equipment  
 v- Shaft in tunnel
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