

- N.B. : (1) Question No. 1 is compulsory.  
(2) Answer any four questions out of remaining six questions.  
(3) Figures to the right indicate full marks.  
(4) Assume any suitable data, if required.

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1. (a) Explain the method of tunnelling through hard rock by 'heading and benching' in detail. 10  
(b) Discuss different method of concreting under water. 10
2. (a) Determine owning and operating cost per hour for an excavator from the following data :- 12  
(i) Purchase cost = Rs. 20 lacs  
(ii) Useful Life = 10 years (2000 hrs/year)  
(iii) Engine capacity = 40 H.P.  
(iv) Salvage value = 10% of purchase cost  
(v) Investment cost = 12% of avg. annual investment.  
(vi) Lubrication cost = 20% of fuel cost.  
(b) Explain- 8  
'Diaphragm Concrete Wall'.
3. (a) What is mass concrete ? What precautions will you take for mass concreting ? Explain. 10  
(b) Draw neat sketches for :- 10  
(i) Stone column  
(ii) Sand drain.
4. (a) Which are various excavating equipments ? Explain any two. 10  
(b) A shovel is down for 4%, 7%, 9% and 12% of the time respectively in the first four years of use. The operating cost is Rs. 1000/hour. The shovel works for 2000 hrs. in a year. The avg. productivity factor is 0.8. Work out down time cost, cumulative down time cost and cumulative down time cost per hour. 10
5. (a) What is vacuum concrete ? Why it is necessary ? Explain the procedure step by step. 10  
(b) What is cofferdam ? Explain different types of cofferdam. 10
6. (a) Write a report on visit to a concrete road construction site. The road is 4 lanes and 20 km. long. Explain mainly :- 12  
(i) Pavement details  
(ii) Construction method  
(iii) Equipments on site.  
(b) Discuss the factors to be considered while selecting a construction equipments. 8
7. Write notes on following (any four) :- 20  
(a) Sheep foot roller  
(b) Tower crane  
(c) Double acting hammer  
(d) Explosive for blasting  
(e) Ready mixed concrete  
(f) Needle beam method.