

## CIVIL ENGINEERING PAPER - II

Time Allowed : 3 hours

Full Marks : 100

*Figures in the margin indicate full marks for the questions.*

*Attempt any 5 (five) questions taking not more than 3 (three) questions from each Part.*

### PART - A

1. (a) List out the characteristics of good timber. What is meant by seasoning of timber? Why is it necessary? (10)  
(b) Enumerate various factors which determine the thickness of brick walls. Give the characteristics of good bricks and name the tests that are carried out to determine them. (10)
2. In a construction project, events have been identified as A, B, C, D, E, F, G, H, J, K, L and M. A is the start event. B occurs after A; C succeeds B and precedes L but restrains the occurrence of G; D occurs after B, before K and restrains C; F succeeds C, precedes H and restrains E; E succeeds B but precedes J; G succeeds F and precedes H; H precedes L and restrict J; L occurs after J but before K; M succeeds K. Draw a PERT network. Number the events according to Fulkerson's rule. (20)
3. (a) State the advantages and disadvantages of Plane Table Survey over other type of survey. Describe the method of orienting Plane Table by back sighting. (10)  
(b) What is super-elevation, when and why it is provided? On what factors does super-elevation depend? Describe in brief the changeover of cambered surface to that of super-elevated surface. (10)
4. (a) What do you understand by the term 'station yard'? What are the different types of yards? (10)  
(b) What is meant by end overlap and side overlap in aerial photographs and why they are provided? (10)

### PART - B

5. (a) State Dupuit's assumptions for obtaining general equations governing ground water flow. Derive an expression for confined aquifer. How can the expression be used to evaluate the aquifer permeability? (10)  
(b) Define unit hydrograph. What are the assumptions made in the development of unit hydrograph theory? State the limitations. (10)

6. (a) What is meant by 'canal lining' and what are its advantages? Enumerate the different types of canal linings and discuss the design and construction features of concrete linings. **(10)**
- (b) What are the possible causes of water losses in a canal? What are the methods adopted for reducing such losses? **(10)**
7. (a) What is the efficiency of a sewer treatment plant that has an influent BOD of 240 mg/L and an effluent BOD of 10mg/L? If the flow rate is 15ML/d, how many kilograms of BOD is the plant discharging into the receiving stream? **(10)**
- (b) Design an oxidation pond for treating domestic sewage of 10,000 persons with 200 litres per capita per day. The BOD and the suspended solids are each of 300 mg/litre.
8. Give a brief definition of air pollution. What is meant by the term anthropogenic air pollution? What are the major gaseous constituents of fresh air? **(20)**

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