

# CSM : 14

## CIVIL ENGINEERING PAPER - II

Time Allowed : 3 hours

Full Marks : 100

*Marks for each question is indicated against it.*

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

### PART A

- Name the four important constituents of cement and state the role of each in achieving its properties. (10)
  - Prepare a detailed estimate for earthwork for a portion of a road from the following data:

Distance in m	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	
RL of Ground	114.50	114.75	115.25	115.20	116.10	116.85	118.00	118.25	118.10	117.80	117.75	117.90	117.50	
RL of Formation	115 upward gradient 1 in 200 up to 600 m							Downward gradient 1 in 400						

Formation width of road is 10m. Side slope 2:1 banking and 1.5:1 cutting. Adopt suitable rates. (10)

- For an activity of casting a raft foundation of a high rise building, three engineers X, Y and Z have given the time estimates as follows. State who is more certain about the time of completion of job. Also calculate expected time of completion of each engineer. (20)

Engineer	Times in a week		
	Optimistic	Most Likely	Pessimistic
X	05	07	09
Y	04	06	07
Z	03	05	08

3. (a) Explain the effect of curvature and refraction in leveling. Show that the reciprocal leveling eliminates the effect of earth's curvature and atmospheric refraction. **(10)**
- (b) Show with neat sketches the characteristic feature of contour lines for the following  
(i) Pond (ii) Hill (iii) Ridge (iv) Valley (v) Vertical cliff **(10)**
4. (a) What are points and crossings in railways? What is a turnout? Give a neat sketch of a crossing and write down names of its various parts. **(10)**
- (b) Draw a neat dimensioned cross section of a double line B.G. track in embankment, showing different parts of the track including the drains. Also mark the width of the permanent land. **(10)**

### **PART B**

5. (a) Define "infiltration". What are the factors which affect infiltration? Explain the different methods of measuring infiltration. **(10)**
- (b) What is mass curve? Describe the procedure for determining the maximum yield and storage capacity of a reservoir by mass curve method. **(10)**
6. (a) What is meant by 'Duty' and 'Delta' of canal water? Derive a relationship between duty and delta for given base period. Also discuss the factors that affect duty of canal water. **(10)**
- (b) What is meant by "regime of a channel"? Describe briefly the observations of Lacey on the regime of a channel. Design a channel using Lacey's theory to carry a discharge of 100 cumec. Assume silt factor as 1.0. **(10)**
7. (a) Write short notes on the following:  
(i) Anaerobic process (ii) Aerobic process (iii) Nitrogen cycle (iv) Carbon cycle. **(10)**
- (b) Circular sewer of 0.5m diameter is laid at a gradient of 1 in 300. Calculate the velocity of flow and discharge in the sewer when the sewer is running half full. Use Manning's  $N=0.0125$ . **(10)**
8. Describe various parameters which need to be considered for environmental impact assessment for a river valley project. **(20)**