

If the questions attempted are in excess of the prescribed number, only the questions attempted first up to the prescribed number shall be valued and the remaining ones ignored.

Answer may be given either in English or in Bengali but all answer must be in one and the same language.

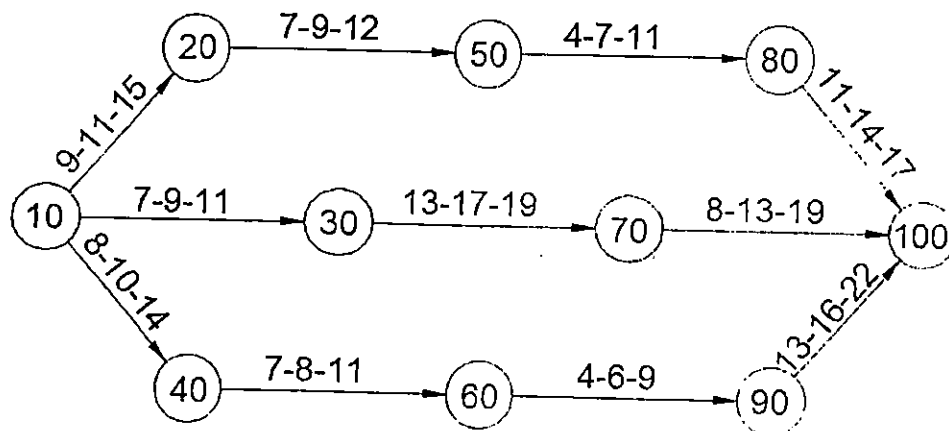
All notations / symbols have their usual meanings, unless otherwise specified.

GROUP – A

Answer any Four questions

32 x 4 = 128

1. a)



In the given Network, the optimistic, the most likely and the pessimistic time estimates are given for each activities. If 10 and 100 are the START and the END events respectively, find the Critical path through the Network. ----- 16

b) Explain under what condition, Non – destructive Tests of Concrete structure become necessary. Mention at least Five types of NDT and their procedures including the parameters obtained from those tests. ----- 16

2. a) What is Chain Survey? When Chain Survey is Preferred? ----- 4

b) In a closed traverse ABC, following readings are taken ----- 8

Line	Fore Bearing	Back Bearing
AB	20°	201°
BC	101°	178°
CA	278°	50°

c) A levelling staff is held vertical at a distance of 100 m. and 300 m. from the axis of a Tacheometer and the staff intercept for the horizontal sight are 0.99m and 3.00m. respectively. Find the Constant of the Instrument.

The instrument set up at a station A and the staff held vertical at Point B. With the telescope inclined at a depression angle 10° to horizontal, the reading on the staffs are 2.67m, 1.835m, 1.0m. Calculate the RL of B and its horizontal distance from A.

Given – Height of Instrument = 1.42m. and RL of A = 450.5m. ----- (7+7)

d) What is Remote Sensing. Briefly explain the components of a remote sensing system. 6

3. Explain why width of Roads in Horizontal Curves require Widening ----- 6
 Define Traffic Volume and Establish the expression for Traffic Density. Establish the expression for Traffic Capacity of Roadway. -----6+5

Describe various types of Traffic Signals and their Applications -----8
 Draw a sketch for Cross Section of a Highway, mentioning and defining various Layers of Construction. ----- 7

4. a) Define: -----6

- i) Direct Run – off
- ii) Rainfall Excess
- iii) Effective Rainfall

- b) Describe various types of reservoirs. Find out expression for reservoir capacity by various methods. -----6

- e) An irrigation channel is to carry a full supply discharge of 30 cubic meter per second at a velocity of 1.7 m/sec. The side slopes are to be 1 Horizontal : 1 Vertical. The ratio of full supply depth to bed width is to be 1: 6. Assuming the Manning's 'n' as 0.018, the full supply depth, bed width and bed slope of the channel. ----- 10
- f) A 200 mm. diameter well fully penetrates a confined Aquifer of 30m. depth. For pumpage of 35 litres / second, the steady drawdown at 100 m. and 300 m. distance from the well are observed as 3.2 m. and 2.5 m. respectively. Estimate the co-efficient of Permeability in m / day and transmissibility of the aquifer in m^2 / day. -----10

5. a) Describe types of undesirable organisms found out in consumptive water, causing infections to Human and are harmful. -----6
 b) Mention various impurities found in untreated naturally resourced water. Also mention their effect, if consumed. -----6
 c) Describe the commonly employed water treatment methods. Also elaborate each process. -----10
 d) Design a rectangular sedimentation tank to remove spherical particles of size equal to and greater than 50 μm (micro meter) with a specific gravity of 2.3 from 100MLD (Million litres per day) of turbid water, Also determine the detention time of the tank.--10

Assume:

- i) Stoke's Law of sedimentation is applicable
- ii) Length to width ratio is 3:1 for the tank
- iii) Depth of Tank is 3.0m.
- iv) Kinematic Viscosity of water is $1.01 \times 10^{-6} m^2/sec$

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6. a) What is an 'ELECTRO STATIC PRECIPITATOR'? Where it is used? -----6
b) Explain various sources of Noise Pollution generation and also mention the mitigation procedures -----8
c) Describe methods of Remote Sensing. What are the important usage of Remote Sensing – Write an overview of GPS system -----10
d) Estimate the basic capacity of a traffic lane at a speed of 60kmph and assume the following ----- 8
i) All vehicles are of average length of 6.1m.
ii) Average reaction time is 2.5 sec.
iii) Co-efficient of longitudinal friction is 0.35.
iv) There is no Gradient.

GROUP – B

Answer any Two questions

36 x 2 = 72

7. a) Mention the important steps (At least Five) involved in optimization of Cost in a project -----6
b) Explain the importance and frequency of updating in completion of a project – (5+5)
c) 20 kgs. Of Coarse aggregate were taken for sieve analysis. Weight retained on 80mm, 40mm., 20mm., 10mm., 4.75mm. sieves are 1, 5, 10, 12 and 8kgs respectively. Find the Fineness Modulus. -----10
d) Write short notes on-----5x2 = 10
i) Rapid Hardening Cement
ii) Low Heat Cement
8. a) Classify the solid wastes, including suitable example for each of them -----10
b) Explain different methods of disposal of above category of solid waste -----10
c) What do you understand by Air Pollution. Describe the effects of Air Pollution on Human, Plant and materials -----10
d) Name different methods for removal of temporary and Permanent hardness of water – 6

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9. a) What are the various method of doing Theodolite Traversing -----6
- b) Define Contour, Contour interval. Discuss various factors affecting the choice of contour intervals -----4+6
- c) Define: -----3x2 =6
- i) Water bound Macadam (WBM)
- ii) Super Elevation
- d) Derive the relation between Super Elevation and speed of Vehicle on Horizontal Curve -----6
- e) Design the rate of Super elevation from a horizontal curve of a radius 66m. and speed of 120 km / Hr. -----8
- 10 a) What is the difference between PERT and CPM -----8
- b) What is Float? Explain different type of Floats -----8
- c) Describe various types of Dams -----8
- d) Write a short note on Consumptive use of water. Enumerate the assumptions made in Lacy's theory of Canal design ----- (5 + 7) = 12
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