

CENTRAL PUBLIC WORK DEPARTMENT
DEPARTMENTAL EXAMS FOR AEE'S

DECEMBER 2017

Civil Engineering Paper-II

(With Books)

Time: 3 Hours

Maximum Marks: 100

Attempt all questions

1. Explain use of surveying? Distinguish between plane surveying and geodetic surveying.
(2+3)
2. What is Back Sight (BS) reading, Fore Sight(FS) reading and Reduced level(RL) and also explain various types of leveling operations.
(3+7)
3. The following consecutive readings were taken with a dumpy level along a chain line at a common interval of 15 meter. The first reading was at a chainage of 265 meter where RL is 98.085. The instrument was shifted after the fourth and ninth readings. Find RLs of all points by collimation and rise and fall system-
(10)
3.150, 2.245, 1.125, 0.860, 3.125, 2.760, 1.835, 1.470, 1.965, 1.225, 2.390, and 3.035 meter.
4. The radius of a horizontal circular curve is 80 m. The design speed is 45 kmph and the design coefficient of lateral friction is 0.15. Calculate the super elevation to be provided if full lateral friction is assumed to develop. What is the coefficient of lateral friction needed if no super-elevation is provided?
(5)
5. What are different methods of determination of soil strength? Explain any one.
(1+4)
6. Describe California Bearing Ratio Test. What are its drawbacks? In a field determination of the in-situ density of a compacted soil layer, the following results were obtained-
Weight of pouring cylinder and sand before test = 12021 gm
Weight of pouring cylinder and sand after filling the hole = 9816 gm

The bulk density of sand was determined by filling it in a cylinder of 1000 cc capacity. The weight of empty cylinder was 932 gm and the weight of cylinder filled with sand was 2534 gm. Determine the bulk density of the soil. If moisture content is 10.5 percent, what is the dry density of compacted layer?
(5+5)

7. Discuss advantages of Pre-stressed Concrete. A simply supported pre-stressed concrete beam of cross-section 400mmX600mm covers a span of 10 meter. It is subjected to a uniformly distributed load of 30 KN/M in addition to its self weight and is pre-stressed with a force of 1740 KN with pre-stressing cable of parabolic profile. The cable is anchored at the center of gravity of the cross section at support section and has a dip of 160 mm at the middle cross-section. Analyze the beam for the effects of pre-stressing and the load at mid section using the philosophy of stress concept. Unit of concrete is 24 KN/M³ (Calculate stresses at top and bottom for all condition).

(5+10)

8. What are the permissible limits of solids in water to be used for mixing concrete.

(5)

9. What are various types of filter? Describe pressure filter and its advantages.

(5+5)

10. Define Break point chlorination.

(5)

11. The surface of a district on which rainfalls is classified as follows-

(5+5)

- (i) 25% of area consists of roof (C=0.80)
- (ii) 25% of area is paved (C=0.85)
- (iii) 15% of area is macadamized road (C=0.32)
- (iv) 10% of area is gravel road (C=0.20) and
- (v) 20% of area is unpaved streets (C=0.15)

The rest of the area is occupied by lawns and gardens for which the value of C is 0.2. Determine the value of C for the entire district. If total area considered is 12 hectares and time of concentration for the area is 15 minutes, What is runoff of the catchment? Use $R = 76.2 / (t + 10)$

12. Write short note on gully trap.

(5)

13. What are the advantages of concrete block paving.

(5)