

2009

106328

CIVIL ENGINEERING (Paper II)

Time allowed : 3 Hours]

[Maximum Marks : 200

Note :

- (i) Solve one question from each section.
- (ii) If more than one questions are attempted in a section, the excess will be ignored.
- (iii) Figures to the right indicate the number of marks for the question/sub-question.
- (iv) Make suitable assumptions, if necessary and state the same.
- (v) Use of log-tables, non-programmable calculators is permitted.
- (vi) Use of any kind of I.S. Codes and Steel Table Codes is NOT permitted.
- (vii) Candidate should not write roll number, any name (including their own), signature, address or any indication of their identity anywhere inside the answer book otherwise he/she will be penalised.

SECTION - A

- 1. (a) State the advantages and disadvantages of plane tabling. 10
(Minimum five points for each)
- (b) State and explain the applications of aerial photo interpretation. 10
- (c) Due to some problems with the equipment, the bearings and two sides were not taken for a closed traverse ABCDEA. From the available data compute the bearings of the two sides. 14

Line	AB	BC	CD	DE	EA
Length (m)	230.5	250.2	210.8	240.3	265.4
Bearing	N 36°45'E	S 82° 48'E	S 10°10'E	Missing	Missing

- 2. (a) What are reverse curves ? What is the necessity of providing reverse curves ? 10
What are the disadvantages of a reverse curve ?
- (b) Explain the principle of triangulation. What are the purposes of triangulation surveys ? 10

P.T.O.

- (c) A 50 metre long tape has been standardised at 25°C under a pull of 100 N. During the field measurements the tape was supported at two points A and B. The elevations of A and B were 110.385 m and 110.120 m with respect to a local bench mark. Elevation of A above mean sea level is 1163.853 m. The temperature and pull during the measurement were 42°C and 150 N respectively. Find the corrected length of a tape length reduced to mean sea level.
- [Consider radius of earth = 6370 KM,
 Coefficient of linear thermal expansion = $11 \times 10^{-6}/^{\circ}\text{C}$
 Elasticity modulus of tape = 2×10^{11} N/m²]

SECTION - B

3. (a) What are the various ingredients of Portland cement ? Discuss the function played by each in imparting specific properties to it. 14
- (b) What are the characteristics of good brick earth ? 10
- (c) What is plastering ? What are the objectives of plastering ? 10
4. (a) Inside dimensions of a stair in a residential structure are 2.5 m × 5.0 m and height of the room is 3.6 m. Design a dog-legged staircase with a rise of 15 centimeter. 14
- (b) Write short note on acoustical defects. 10
- (c) What are traps ? Draw neat sketches for P-trap, Q-trap and S-trap. 10

SECTION - C

5. (a) Differentiate between load bearing structure and frame structure. 13
- (b) State the advantages of steel trusses over timber trusses. 10
- (c) State various methods used for dewatering of foundation trenches. Explain with a sketch, the well-point system. 10
6. (a) Prepare an approximate estimate of a residential building with following details. 13
- RCC frame (G + 4 Storeys)
 - Plinth area (on each floor) = 500 m²
 - Plinth area rate _____ = Rs. 1,00,000 per m²
 - Cost of electrification, plumbing etc., 15% of building cost.
 - Provide 5% for contingencies and 2% for work-charged establishment of total cost.

- (b) What is an estimate ? Explain the difference between revised estimate and supplementary estimate.
- (c) What do you mean by depreciation ? Differentiate between depreciation and obsolescence. **10**

SECTION - D

7. (a) What do you mean by consistency of soils ? State the uses of consistency limits. **10**
- (b) A load of 1200 kN acts as a point load at the surface of a soil mass. Determine the stress at a point 4 m below and 3 m away from the point of action of load by Boussinesq's formula. Compare the value with that obtained from Westergaard's theory, considering poisson ratio = 0. **10**
- (c) Under certain loading, a layer of clay is expected to undergo full settlement of 18 centimeters. Also, it is expected to settle by 5 centimeters in the period of 2 months of loading. Find the time required for the clay layer to settle by 10 centimeters. **13**

$$\left[\text{for } U < 60\%, \text{ time factor} = \frac{\pi}{4} \left(\frac{U}{100} \right)^2 \right]$$

8. (a) Distinguish between consolidation and compaction. Also calculate the compactive energy applied to soil during stand Proctor test. **10**
- (b) What are the limiting values of lateral earth pressure at a depth of 3 m in a uniform sand fill with unit weight of 18 kN/m³ and $\phi = 32^\circ$. The ground surface is level. **10**
- If a retaining wall with a smooth and vertical back is interposed, determine the total active and passive thrusts which will act on the wall.
- (c) Distinguish between : **13**
- (i) General shear and punching shear failures.
 - (ii) Deep foundation and shallow foundation.
 - (iii) Finite and infinite slopes and causes of failure of slopes.

SECTION - E

9. (a) What are the objectives of construction management ? State and describe the functions (like planning, organising...) of construction management. 10
- (b) Describe the importance of safety in construction. What are the various safety measures adopted at the time of demolition of a building ? 10
- (c) Write detailed note on quality control of following construction items : 13
- (i) Concrete (ii) Steel
- (iii) Form-work (iv) Sanitary and water supply
10. (a) What are the principles normally adopted in storing materials ? 10
- (b) Define and explain the following : 10
- (i) Event (ii) Activity
- (iii) Dummy (iv) Float
- (c) State the different methods of estimating depreciation of construction equipment. 13
- Explain double decline balance method of depreciation with the help of following example.
- Cost of equipment = Rs. 12 lakhs.
- Estimated life of equipment = 5 years.
- Estimated salvage value = Rs. 2 lakhs.
- Calculate depreciation and book value for each of the five years life.

SECTION - F

11. (a) What is fold ? With the help of neat sketches describe various parts of a fold. 10
- (b) What are the factors of metamorphism ? Write five structures of the metamorphic rock with neat sketches. 10
- (c) What is a dam ? Describe the types of dam and suitable rock types of site in their selection. 13

P.T.O.

12. (a) State the advantages of circular section and horse-shoe section of tunnels. Explain the various parameters considered to arrive at dimensions to be given to a tunnel section.
- (b) Explain with the help of neat sketch the central drift method of tunnelling in rock. State the advantages and disadvantages of this method. 10
- (c) What are the requirements of ventilating system in a tunnel ? Explain the natural and mechanical methods of ventilation. 13

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