

2011
CIVIL ENGINEERING (Paper - II)

105

Time allowed : 3 Hours }

{ Maximum Marks : 200

Note :

- (i) Solve any one question from each section.
- (ii) Do not reproduce any question. Write only question number against the answer.
- (iii) Number of optional questions up to the prescribed number in the order in which questions have been solved, will only be assessed and excess answers of the question/s will not be assessed.
- (iv) Figures to the right indicate the number of marks for the questions.
- (v) Assume suitable data if necessary and state-it clearly.
- (vi) Use of Non-programmable calculators is permitted.
- (vii) Use of I.S. Codes and Steel Table, is not permitted.
- (viii) Candidate should not write roll number, any name (including his/her own), signature, address or any indication of his/her identity any where inside the answer book otherwise the candidate will be penalised.

SECTION - "A"

1. (a) Discuss the temporary adjustment of Transit Theodolite. How would you measure the horizontal angle by repetition method ? 10
- (b) Determine the gradient from point 'P' to point 'Q' from the following observations made with a tacheometer fitted with an anallactic lens. The constant of instrument was 100 and staff was held vertically. 10

inst. station	staff station	Bearing	Vertical Angle	Staff readings		
				m	T	
P	A	130	10°32'	1.36	1.915	2.470
	B	220	5°6'	1.065	1.885	2.705

- (c) Two straight lines 'AB' and 'BC' are intersected by a line 'D₁D₂'. The $\angle B D_1 D_2$ and $\angle B D_2 D_1$ are 40° 30' and 36° 24' respectively. The radius of first arc is 600 m. and that of second arc is 800 m. If the chainage at point of intersection point 'B' is 8248. 10m. Calculate the chainage of Tangent Points and point's of compound curve. 10

P.T.O.

- (d) The following consecutive readings were taken with dumpy level and 4m leveling staff on a continuously sloping ground at a common interval of 30 m.

The elevation of point A was 520.45 m. make up a level book and apply usual checks. Also determine the gradient of line AB. The staff readings are as follows.

Staff reading on A = 0.585, 0.936, 1.953, 2.846, 3.644, 3.938, 0.962, 1.035, 1.689, 2.534, 3.844, 0.956, 1.579.

Staff reading on B = 3.016.

2. (a) The table gives the latitude and departure of sides of closed Traverse ABCDA. Calculate the independent co-ordinate of each station and the area of closed Traverse ABCDA. 10

Side	Latitude		Departure	
	N	S	E	W
AB	214.8		124.0	
BC		245.10	205.70	
CD		155.90		90.00
DA	186.20			239.70

- (b) Discuss the advantages and disadvantages of plane table surveying. 10
- (c) What do you mean by local attraction. Following bearings were observed on a closed Compass Traverse. Calculate the interior angle and correct it for observational error taking the bearing of line BC as correct. Find the corrected bearing of remaining sides of the closed traverse : 10

Line	F.B.	B.B.
AB	191° 15'	10° 15'
BC	120° 45'	300° 45'
CD	339° 5'	169° 00'
DE	339° 35'	160° 40'
EA	296° 00'	115° 00'

- (d) An Instrument set up at 'P' and angle of depression to a vane 2m above the foot of the staff held at 'Q' was 5° 36'. The horizontal distance between 'P' and 'Q' was known to be 3000m. Determine the R.L. of staff station 'Q' given that staff reading on a B.M. of elevation 456.050 was 2.865 m. 10

SECTION - "B"

3. (a) Give account of any three standard sizes for 23 cm bricks as prescribed by PWD in India along with mould sizes. 10
What is effect of presence of oxide of iron and alkali in brick earth on brick after burning ?
- (b) How is lime classified ? State suitability of each for application like masonry and plastering with reasons. 10
- (c) Compare Granite, Basalt, lime stone, and Laterite on the basis of suitability for construction type, geological classification, structure, and requirement of seasoning. 10
- (d) Explain various steps involved in preparation of surface of new wood work for painting, with reasons. 10
4. (a) How is built environment different from natural environment ? Why is an integrated approach essential in building planning ? 10
- (b) Explain essential climatic considerations in building planning with suitable examples. 10
- (c) Explain lighting and ventilation requirements for habitable room, sanitary annexe (WC and Bath), Stairway, and basement as per building bye laws. 10
- (d) What are precautionary measures to avoid acoustical defects in an auditorium. Also explain use of Sabine's expression to work out ORT for an auditorium. 10

SECTION - "C"

5. (a) Describe the procedure for empirical design of shallow stepped foundation for load bearing wall. 10
- (b) Explain in brief the points to be observed in supervising brick work. 10
- (c) Enlist and explain the contract documents. 10
- (d) Find out the book value, after 40 years, of an asset costing Rs. 4.0 lakhs, assuming 100 years as life of the asset and the salvage value of Rs. 20,000/-. What would be the book value after 30 years of life if the salvage value is nil ? (Assume straight line depreciation). 10
6. (a) Explain the difficulties faced and precautions to be taken for foundations of buildings in black cotton soils. 10
- (b) Draw a roof plan for pitched roof and explain the components and technical terms in pitched roof. 10

- (d) A construction project consists of 10 activities as shown below :

Activity	Duration	Activities which immediately	
		Precede	Follow
A	8 days	NIL	A, B
B	8 days	NIL	E
C	8 days	A	F
D	10 days	A	G, H
E	8 days	B	G, H
F	8 days	C	I
G	10 days	E, D	I
H	8 days	E, D	J
I	8 days	F, G	NIL
J	8 days	H	NIL

Draw Network diagram and find out all critical activities. Also show activity wise float in tabular form.

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- (c) Compare in detail the item rate contract and percentage rate contract.
- (d) Prepare an approximate estimate for a G + 3 RCC framed structure. The built up area on ground floor is 500 m^2 , and on every successive floor it is reduced by 10% of ground floor built up area. The built up area rate for ground floor is Rs. 10,000/- per square meter, and for every higher floor there is a hike of Rs. 1000/- in this rate. Cost of electrification and plumbing is 15% of building cost. Provide 5% of total cost for contingencies and work - charged establishment. 10

SECTION - "D"

7. (a) Draw a neat sketch of plasticity chart suggested by IS 1498 and explain how it is used to classify soils. 10
- (b) List out assumptions made by Boussinesq for stresses induced in a soil mass due to concentrated point load and write Boussinesq equation for stress due to point load in a soil mass. Give meaning of all the terms in the equation. 10
- (c) Define optimum moisture content and explain how the compaction of soil is controlled in the field. Also list out the factors which affect compaction. 10
- (d) Explain plate load test with a neat sketch and explain what are its limitations. 10
8. (a) A retaining wall 4 m high, has a smooth vertical back. The backfill has a horizontal surface in level with the top of the wall. There is uniformly distributed surcharge load of 36 KN/m^2 intensity over the backfill. The unit weight of the backfill is 18 KN/m^3 , its angle of shearing resistance is 30° and cohesion is zero. Determine the magnitude and point of application of active earth pressure per metre length of the wall. 10
- (b) An undisturbed sample of soil has a volume of 100 cm^3 and mass 190 g. On oven drying for 24 hours, the mass is reduced to 160 g. If the specific gravity of soil particles is 2.68, determine the water content, voids ratio and degree of saturation of the soil. 10
- (c) With necessary sketches explain sand replacement method to find field density of soil in the field. 10
- (d) A normally consolidated clay stratum of 3 m thickness has two permeable layers at its top and bottom. The liquid limit and the initial void ratio of the clay are 36% and 0.82 respectively, while the initial overburden pressure at the middle of the clay layer is 2 kg/cm^2 . Due to the construction of a new building this pressure increases by 1.5 kg/cm^2 . Compute the probable consolidation settlement of the building. 10

P.T.O.

SECTION - "E"

9. (a) What is meant by Scientific management ? How are the methods of Scientific management adopted for the construction jobs ? 10
- (b) A construction project carries out seven activities as shown below : 10

Activity	Dependency	Duration
A	Initial Activity	5 days
B	Initial Activity	5 days
C	Depends upon Activity A	5 days
D	Depends upon Activity B	10 days
E	Depends upon Activity B	5 days
F	Depends upon C and D	10 days
G	Depends upon Activity E	10 days

Calculate EST, EFT, LST, LFT, by drawing Network diagram. Also show critical path.

- (c) (i) Using the straight line method of depreciation, determine the annual cost of depreciation for a tractor whose initial cost is Rs. 17,50,000/- if the assumed life is 7 years with an Estimated Salvage Value of Rs. 22,000/- 5
- (ii) Explain in brief the causes of Accidents. 5
- (d) What do you mean by Store Management ? What principles are normally adopted to store construction material ? 10
10. (a) Draw a neat sketch showing the basic parts of "Drag line." 10
- (b) What are the important features of ABC Analysis ? 10
- (c) Define : 10
- (i) Accident Cost
- (ii) Injury frequency rate
- (iii) Injury Severity rate
- (iv) Safety equipments in construction industry

P.T.O.