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SE-7349

B. E. - IV (Sem. - VII) (Civil) Examination

April / May – 2011

Structural Design & Drawing - III

Time : 4 Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. - 4 (SEM. - 7) (CIVIL)

Name of the Subject :

☛ STRUCTURAL DESIGN & DRAWING - 3

☛ Subject Code No. : 7 3 4 9 ☛ Section No. (1, 2,.....) : Nil

Seat No. :

Student's Signature

(2) Assume suitable data if required and mention it clearly.
(3) Draw neat and clean sketches.
(4) Relevant IS code is permitted.
(5) Assume M20 and Fe415 grade of materials if that are not stated.
(6) Use of relevant I.S. code is permitted and use of interaction chart from SP=16 is permitted.
(7) Marks are indicated at the **right** of each question.

1 Explain 'Prestressed Concrete'. Differentiate pre tensioning and post tensioning in detail. **10**

OR

1 Explain the general principle of prestressed concrete. **10**

2 Design a RC combined rectangular footing for two columns located 3.6m apart. The sizes of column are 400mm × 400mm and 600mm × 600mm and loads on them are 1000kN and 1500kN respectively. The projection of the footing to the column A is limited to 590mm. SBC of the soil is 280 kN/mm^2. Use M20 and Fe415. **15**

OR

2 Design a RC combined rectangular footing for two columns located 4.0m apart. The sizes of column are 300mm × 300mm and 500mm × 500mm and loads on them are 1000kN and 1500kN respectively. SBC of the soil is 250 kN/mm^2. Use M_{20} and Fe415. **15**

3 The detail typical plan of multistoried building is shown in fig.1. Assume all beams of size of 230×560mm and column of 230×600mm. All external walls of 230 mm thick and internal walls of 115 mm. slab thickness of 120mm. use M_{20} and Fe415.

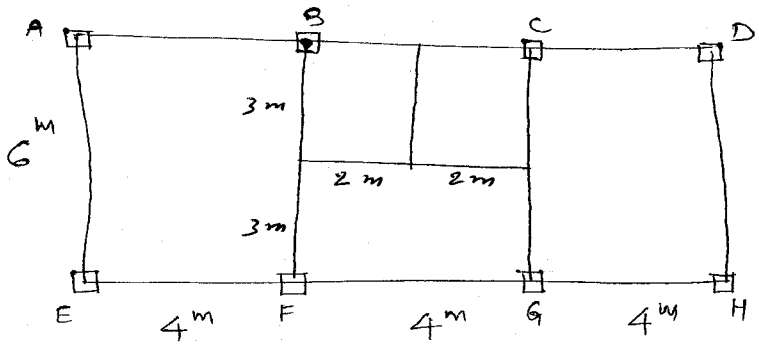

Fig. 1

(a) Design beam ABCD in detail. **13**

(b) Find out load on column 'F' at each floor level. **12**

4 A short column of size 400mm×400mm is subjected to an axial factored load 1800 kN and factored moment about one of the axis of 150 kN.m. Determine the reinforcement in the column if the moment due to minimum eccentricity is less than the applied moment. The materials are M_{20} grade concrete and HYSD reinforcement of grade Fe415. **10**

OR

4 A rectangular beam section of size = 300mm width × 400 mm overall depth, is reinforced with 2 no.10mm diameter bars at the top and 3 no. 16 mm diameter bars at bottom being tension reinforcement it is subjected to characteristic loads, shear force of 16 kN, a torsional moment of 1.4 kN.m. and a bending moment of 17 kN.m. Check for the torsion reinforcement. The materials are M_{20} grade concrete and HYSD reinforcement of grade Fe415. **10**

5 A Cantilever retaining wall to retain the earth 3.75 m high, The top surface is horizontal behind the wall but subjected to a surcharge of 17 kN/m^2. The soil behind the wall is well drained medium dense sand with following properties. Unit weight V=17 kN/m^3. Angle of internal friction $\phi = 30^o$. **25**

The material under the wall base is the same as above with safe bearing capacity of 150kN/m^2. The coefficient of friction between base and soil is 0.55. Design the stem and heel slab. Use M_{20} grade concrete and HYSD reinforcement of grade Fe-415.

6 For an intze tank container shown in fig.2. **15**

Design (a) Top dome (b) Top ring beam B_1 (c) Cylindrical wall. Give neat sketches of these components with reinforcement details.

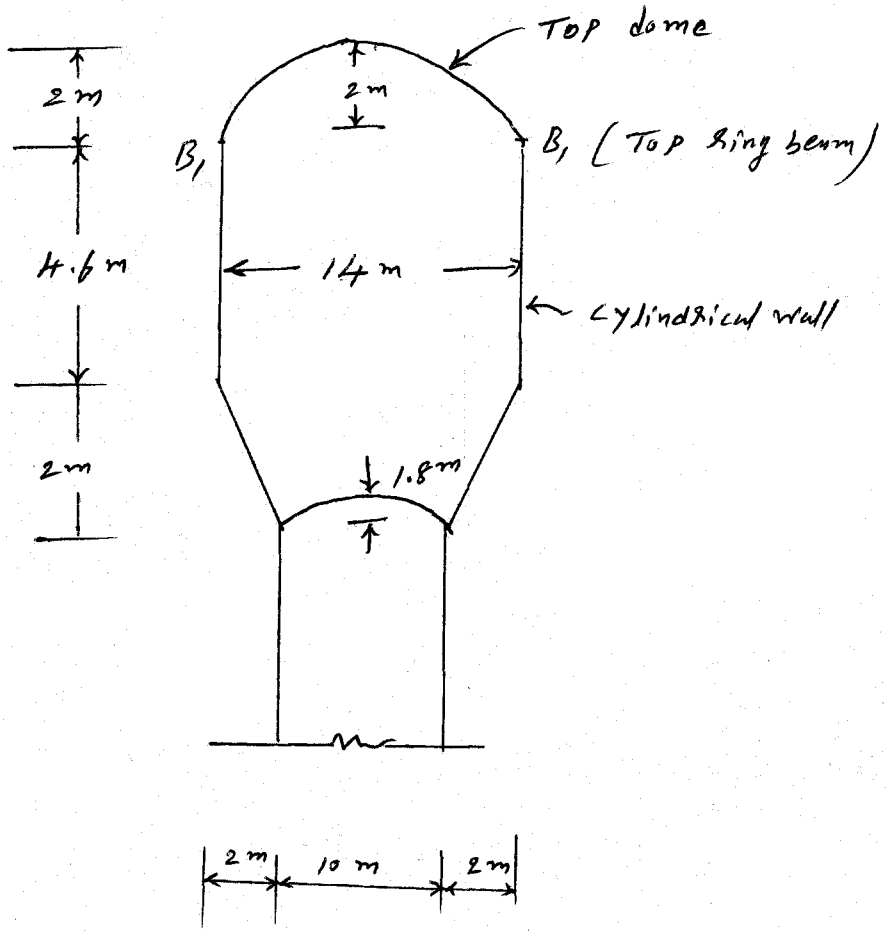

Fig. 2