(REVISED COURSE)

(3 Hours) | Total Marks : 100

1) Question No. 1 is compulsory.
2) Attempt any three questions out of remaining six questions.
3) Assume any suitable data wherever required.
4) Figures to the right indicate full marks.

a) State and explain principal of prestressing. What is the difference between transfer   5
   and service stage ?

b) What is end zone in a post-tensioned PSC member ? Discuss about the stress   5
   distribution in end zone.

c) Explain various types of losses in post-tensioned and pre-tensioned work.   5

d) Explain in detail any one type of post-tensioning system.   5

2 (a) A prestressed concrete beam 200 × 400 mm deep, is prestressed with wires having   16
   area 550 mm², located at a constant eccentricity of 50 mm and carrying an initial
   stress of 1050 N/mm². The span of the beam is 12 m. Calculate the percentage
   loss of stress in wires if —
      (i) the beam is pre-tensioned and
      (ii) the beam is post-tensioned.
   Use the following data :
      E_s = 210 kN/mm², E_c = 35 kN/mm²
      Relaxation of steel stress = 5% of initial stress
      Shrinkage of concrete = 300 × 10⁻⁶ for pretensioning and
                              200 × 10⁻⁶ for post-tensioning
      Creep coefficient = 1·6
      Slip at anchorage = 1 mm
      Frictional coefficient for wave effect = 0·0015/m.

(b) Explain the concept of load balancing.   4

3. A continuous prestressed concrete beam ABC (AB = BC = 10 m) has uniform rectangular   20
   c/s having size 150 × 480 mm, the cable carrying an effective prestressing force of
   360 kN is parallel to the axis of the beam and located at 110 mm from the soffit.
   (a) Determine the secondary and resultant moment at the central support B.
   (b) If the beam supports an imposed load of 2·1 kN/m. Calculate resultant stress
       at top and bottom of the beam at 'B'.
   (c) Locate the resultant line of thrust through beam ABC.

4) (a) An Unsymmetrical I section beam is used to support an imposed load of 2·5 kN/m   10
   over a span of 8·5 m. The sectional details are top flange 400 mm wide and
   75 mm thick, bottom flange 200 mm wide and 75 mm thick. The thickness of

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the web is 75 mm and the overall depth of the beam is 400 mm. The effective prestressing force of 100 kN is located at 50 mm from the sofit of the beam. Estimate the stresses at the centre of span section of the beam for the following load conditions :—

    (i) Prestress + self wt.

    (ii) Prestress + self wt. + Imposed load.

(b) A symmetrical I section with flange width and depth of 200 mm and 60 mm   10 respectively having thickness of web 75 mm and overall depth as 450 mm is prestressed by a prestressing force of 1000 kN. Take $E_c = 38 \times 10^3$ N/mm². Determine initial deflection and check it with the permissible deflection.

5. (a) Design a post tensioned prestressed concrete two way slab 6 m × 9 m with   12 discontinuous edges to support an imposed load of 3 kN/m². Prestressing cables consist of six wires of 5 mm dia. carrying an effective force of 150 kN are available for use. Design the spacing of cables in two directions. Checks are not required. Assume $\alpha_x = 0.089$ and $\alpha_y = 0.056$.

  (b) A prestressed concrete beam having span of 12 m of rectangular size 125 mm × 350 mm   8 is axially prestressed by a cable carrying an effective force of 210 kN. The beam supports a total u.d.l. of 5 kN/m (including self wt.). Compare the magnitude of the principal tension developed in the beam with and without axial prestress.

6. A post-tensioned beam of c/s 250 × 800 mm, is simply supported on 15 m span. The beam is supporting an imposed load of 20 kN/m. Consider 15% loss in prestressing   20 force. The maximum permissible stresses in tension and compression are not to exceed 1.4 MPa an 22 MPa respectively.

  (a) Check the suitability of the section modulus provided.

  (b) Determine minimum prestressing force and corresponding eccentricity.

  (c) Locate safe cable zero. See that cable is within safe limits. If not, then suggest suitable changes.

  (a) Determine the profile of a load balancing cable for a prestressed concrete cantilever beam of if span 3.5 m which is carrying a u.d.l. of 5 kN/m inclusive of self weight.   10 If the prestressing force is 550 kN and c/s of the beam is 250 mm × 380 mm.

  (b) (i) What is unilinear and bilinear method of calculation of deflection ? Which is more reliable ? Why ?   5

      (ii) Why are the flange sections preferred in prestressed concrete construction ?   5

Question No. 1 is compulsory.
Answer any four questions out of remaining.
Assume suitable data wherever necessary.
Draw neat and clean sketches wherever necessary

1. e any four :— 20
   (a) Write note on importance of irrigation in India. Describe also the present senario.
   (b) Describe the major, minor and medium irrigation schemes.
   (c) Describe various factors affecting runoff an a catchment area.
   (d) Distinguish between confined and unconfined aquifer.
   (e) State different types of galleries provided in the body of a gravity dam and their function.

2. a Discuss recording type rain guages. 6
   b Explain Isohytel method for computation of average rainfall over a basin. 4
   c Given below are the observed flows (cumecs) from a storm of 6 hour duration on 10
   a stream with a drainage area of 400 km². Assume constant base flow of 20 cumecs.
   Derive and plot 6-h unit hydrograph.

Time(h)	0	6	12	18	24	30	42	48	54	60	66	72
Flow (cumec)	20	113·2	254·2	198	150	113·2	67·9	53·8	42·5	31·1	22·74	17

3. a Explain the methods of calculating average annual rainfall. 10
   b A well penetrates fully, 15 m thick water bearing stratum of medium sage having 10
   coefficient of permeability of 0.005 m/sec. The well radius is 15 cm. and is to be
   worked under a drawdown of 4 m at the well face. Calculate the discharge from
   the well. What will be the percentage increase in the discharge if the radius of the
   well is doubled ? Take radius of drowdown as 300 m in each case.

4. a Describe neat sketch different zones of storage in reservoir. 10
   b Describe the gravity method of stability in case of gravity dam 10

5. a List out different types of spillway in gravity dam. Explain any one type of spillway 10
   with neat sketch
   b Explain what is pore pressure and its role during and after construction of earth dam. 10

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6. (a) What is meant by energy dissipator ? Write its necessity. Discuss various methods used for energy dissipation below spillway.

(b) (i) Design a practical profile of gravity dam. Given the following data—

   R.L   of the base of dam = 1350 m
   R.L   of the HFL = 1380·5 m
   specific gravity of concrete = 2·8
   safe compressive stress for concrete = 150 t/m² and Height of wave = 1.2m

   (ii) Explain the term 'phreatic line' in earthen dam.

7. (a) Write short notes on canal lining. (4)

   (b) Distinguish between aqueduct and super passage. (4)

   (c) Discuss canal alignment ? List types of canals according to alignment and distribution in each explain any one.   (6)

   (d) Discuss on Bandhora irrigation and modular gates. (6)
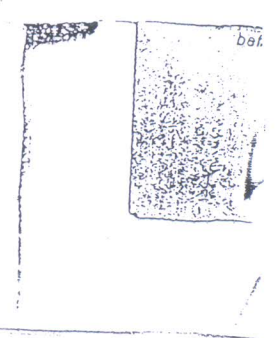
9538-13.   (REVISED COURSE)   GS–5617
                      (4 Hours) | Total Marks : 100

(1) Question No. 1 is compulsory.
(2) Attempt any four questions out of the remaining six questions.
(3) Assume suitable data wherever required.
(4) Draw neat sketches wherever required.

Figure (i) (Refer to Page No. 3) Shows the plan and sectional detail of a load bearing   20
residential building.
Calculate the quantities of items of work by referring the drawing.

  (a) UCR Masonry in CM (1:5)

  (b) Ist class Brick Masonry in CM :1:4) in super structure.

  (c) 2·5 an thick DPC (1:2:4).

  (d) Net quantity of 12 mm thick internal plaster in CM (1:4).

Prepare an abstract for all items in question No. 1.   6
Prepare Rate analysis for following item

    (i) Ist class brick masonry in CM (1:4)   7

    (ii) RCC work for columns (1:1½:3) with 1% steel.   7

Prepare an approximate estimate for a (G+3) RCC framed structure with 6 flats on   10
each floor having a carpet area of 80 sq m located in Central Mumbai City. Assume
suitable cost of construction.

Explain briefly the various methods of finding approximate estimate.   10

Draft a tender notice for construction of a foot over bridge on the Highway in suburban   10
Mumbai.

Explain in detail various types of tenders.   10

Q.5 Calculate the quantities of earthwork for portion of a road for a length of 300 m with   12
(a) the following data.

Chainage (m)	0	30	60	90	120	150
Grand Level	171·1	171·2	170·9	171·2	170·8	170·7
	180	210	240	270	300	
	170·6	170·4	169·1	169·5	173·7	

The formation level at chainage 'O' is 170·0 and the road is in a rising gradient of 1 in
150. The width of formation level is 10 m and side slop is 1·5:1 in embankment and
1:1 in cutting.

Also calculate the cost of this earthwork in banking and cutting.

Assume suitable rates and also draw the profile diagram.

Q.5(b) Draft the detailed specification for send faced external plaster.   8

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6. (a) A person has purchased a plot of land costing 20 lakhs and is constructing a building there on at the cost of 1 Cr. Allowing a net return of @ 8% on cost of land and @ 7% on cost of construction. Work out the standard rent of the property with the following data –

   (i) Sinking fund on 4% basis for future life of 75 years = 0·0022

   (ii) Annual maintenance @ 1·5% of cost of construction

   (iii) Municipal taxes and other outgoings @ 25% of gross rent.

   (b) Explain briefly with help of net sketches –

   (i) CBRI Method

   (ii) Belting Method.

7. Write short notes (any five) :–

   (a) Workmen Compensation Act

   (b) Role of Quantity Surveyox-

   (c) Prebid conferance

   (d) Bar Bending Schedule

   (e) Free Hold and Lease Hold property

   (f) Mass Haul diagram.

3

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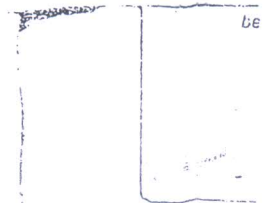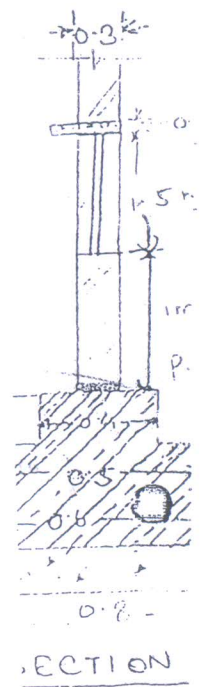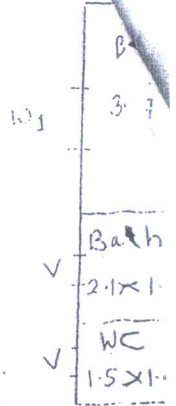
Sem VII - CE

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May 2013 (R)

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(REVISED COURSE)

(4 Hours)

CE

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52/90

[Total Marks : 100

N.B. (1) Question No. 1 is **compulsory**.
   (2) Attempt any **four** out of the remaining six questions.
   (3) **Figure** to the **right** indicates **full** marks.
   (4) Assume suitable **data** if **required**.

1. Work out the quantities of following items from given plan and section. (Figure 1) :— 20
   (a) Concrete in footings
   (b) Brick work in super structure of ground floor
   (c) Flooring and skirting
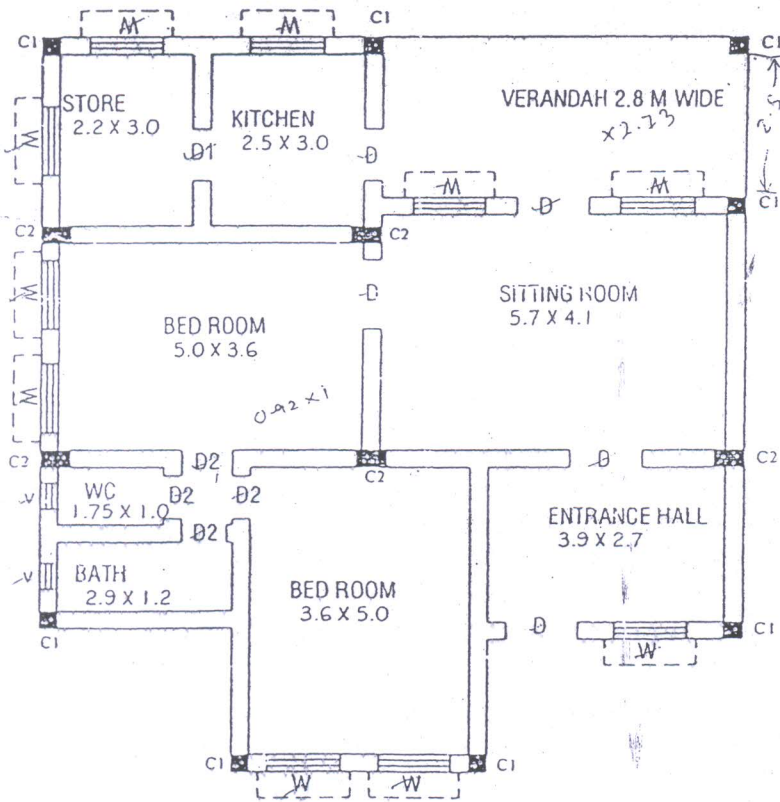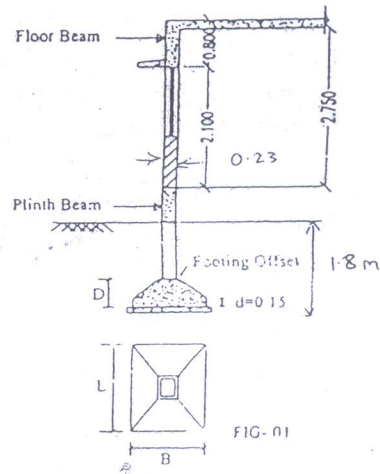   (d) 12 mm thick Internal plastering in C : M 1 : 5

Fig.01

FIG-01

O = 1 X 2.1 M
D = 1 X 2.1 M
D1 = 0.9 X 2.1 M
D2 = 0.75 X 2.1 M
W = 1.2 X 1.2 M
V = 0.5 X 0.75 M
COLUMN C1= 0.23 X 0.23
COLUMN C2= 0.23 X 0.30
FOOTING F1=1.2 X 1.5 X 0.40 / 0.15
FOOTING F2=1.2 X 1.8 X 0.50 / 0.15
FOOTING OFFSET=0.075
PLINTH BEAMS = 0.23 X 0.60 M
FLOOR BEAMS = 0.23 X 0.80 M
SLAB = 0.15 M
WALL TH = 0.23
PCC OFFSET FOR FOOTING =0.1
EXCAVATION DEPTH = 1.8 M
CHAJJA PROJECTION = 0.45 M
CHAJJA BEARING = 0.15 M

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2. (a) Explain the factors affecting the rate of an item. Prepare rate analysis for Brick   10
masonry in C : M 1 : 6 for foundation and plinth.

   (b) Define specification. What are the purposes of specification ? Write the various   10
principles of specification writing.

3. (a) Prepare an approximate estimate of cost for (G + 1) RCC framed Row Hose, having   8
total carpet area of 90 sqm. in a sub-urban area. Consider cost of construction
of super structure = Rs. 7,500/- sqm. Assume other required data.

   (b) Explain in detail the procedure of submission and opening of tender.   12

4. (a) Explain — (i) importance of mass diagram (ii) role of Quantity surveyor in ⑩
construction industry.

   (b) A person has purchased an old building in vacant possession on a land measuring   10
170 sqm having total plinth area 110 sqm for an amount of Rs. 11,00,000. From
records, it is proved that the age of building is 45 years. If the present value of
land is Rs. 3200 per sqm and present plinth area rate to construct such a building
considering the point obsolescence be Rs.9,000/- per sqm including the cost of
water supply, sanitation and electric connections, work out your valuation to compare
the above purchase value with the above data.

5. (a) A single line broad gauge railway track is to be at a uniform down gradient 10
from point 'A' with formation level of 118·90, to a point 'B' with formation
level of 118·10. Distance between two point is 320 m. the ground level at different
chainages are —
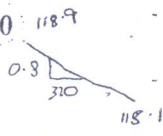
G.L.	120·5	120·10	119·70	119·20	118·50	118·20	117·70	117·30	117·50
Chainage	0	1	2	3	4	5	6	7	8
	A								B

Estimate the cost of earthwork involved, given that formation width in cutting
5·5 m and in banking 6·0 m, side slope in cutting 1·5 : 1 and in banking 2 : 1.
Take rate of earthwork Rs. 120 per cum in cutting and Rs. 125 per cum in filling.

   (b) What is contract ? What are the different types of civil engineering contract ? ⑩
Write in detail about BOT contract.

6. (a) What are different methods for valuation of land ? Explain Belting method of ⑩
valuation for land with an example.

   (b) Work out the quantities of different materials (cement, sand, aggregate and steel)   10
in a 7·0 m long beam of size 300 × 700 mm overall. Bottom bar : 4-20 dia out
of which two bar are bent up, anchor bar : 2-12 dia, stirrups 8 dia @ 200 c/c
throughout the length of beam. Grade of concrete is M20.

7. Write short notes on (any **four**) :—   20
    (a) Pre-bid conference   (d) Depreciation
    (b) Defect liability period   (e) Valid contract.
    (c) BBS