VII (Rev) May-June-15

Sub:- EE-II Date: 15-5-15

Civil

QP Code : 8386

(REVISED COURSE)

(3 HOURS) **[TOTAL MARKS: 100]**

N.B.: **(1) Question No. 1 is compulsory.**

(2) Attempt any four questions from remaining six questions.

(3) Assume any suitable data but state the same.

(4) Illustrate answer with sketches wherever necessary.

Q1. A. Explain design parameters of grit chambers and its significance in treatment process 5

B. Define population equivalent. How it is implemented in sewage treatment process. 5

C. Draw a neat sketch of oxygen sag curve. 5

D. What is BOD and COD? Role of BOD in design of sewage treatment units. 5

Q2.A. A city on with 2 lakh population produces sewage at the rate of 200 lpcd and the sewage treatment plant effluent has a BOD_5 of 30 mg/l at 20° C and a D.O of 1.7 mg/l. The effluent is discharged into a stream having a flow of $5m^3$/sec. at a velocity of 40 cm/sec. the stream temperature remains unchanged at 20° C after the discharge of the effluent, the stream which is 90% saturated with D.O has a BOD5 of 1.0 mg/l, a self purification factor f =2.25 at 20° C with k_1 =0.1/day. The saturation D.O at 20° C is 9.2 mg/l. Assume data necessary. Determine:

1) The value of initial D.O deficit for the stream just below the point of plant discharge.

2) The distance downstream of the river at which the D.O is minimum.

3) The magnitude of Dc. 15

B. Write a detailed note on laying of sewers. 5

Q3. A. Design sedimentation tank for 15 MLD and check for SOR. Assume necessary data. 10

B. Write a note on types of sewer and sewer appurtenances. 10

Q4. A. Design septic tank for 150 people. Assume necessary data. 10

B. Write a detailed note on self purification of natural streams. What are actions involved in it. 10

Q5. A. What are types of aeration tanks. What is role of aeration in activated sludge process? 10

B. Explain with a neat sketch working and operational troubles of trickling filter. 10

Q6. A. Write a note on sludge dewatering and sketch sludge drying bed. 10

B. Compare oxidation pond and oxidation ditch. 10

Q7. Write short note on any four. 20

A. Plumbing Systems

B. Sludge Digestion

C. SVI and F/M ratio

D. Aerated Lagoon

E. Imhoff tank

F. Testing of sewer lines.

B.E(Civil), Sem: VII (Rev), Sub: IE

Civil Sub:- IE Date:- 21-5-15

QP Code : 8451

Maximum Marks: 100

Duration : 3 Hours

N.B. (i) Question **No. 1** is compulsory

(ii) Attempt any **Four** Questions out of **Six** Questions

(iii) Illustrate with figures wherever necessary

(iv) Assume suitable data if necessary and state it clearly

Q1. Explain the following: (20)

i) Determination of average rainfall over a catchment
ii) Ill effects of irrigation
iii) Well development
iv) Relation between duty and delta

Q. 2a) The culturable commanded area of water course is 120 hectares. Intensities of sugarcane and wheat crops are 20% and 40% respectively. The duties for the crops at the head of water course are 730 ha/ cumecs and 1800 ha/ cumecs respectively. Find (i) the discharge required at head of the water course , (ii) determine the design discharge at the outlet assuming a time factor of 0.8 (10)

b) A 3-hour storm produced a flood hydrograph and the observations were at 3-hour intervals, staring from zero hour.The observed discharges (cumecs) are 4, 9, 12, 18, 20, 16, 20, 10, 8, 6, 4. Assume constant base flow 4 cumecs, determine unit hydrograph ordinates. The catchment area is 50 sq.km (10)

Q. 3a) Derive the equation for discharge from well in an unconfined aquifer. (10)

b) A 30 cm dia well penetrates 20 m below the static water table. After 24 hours of pumping at a rate 5000lt/minute , the water level in a test well at 100m is lowered by 0.5 m and in a well 30 m away the drawdown is 1.00m. what is the transmissibility of the aquifer? Also determine the drawdown in the main well. (10)

Q. 4a) Explain the foundation treatment for gravity dams.. (10)

b) a concrete dam can be assumed to be trapezoidal in section having top width 2m and bottom width 10 m. height of dam 15m and its u/s face has a batter of 1: 10. Check the stability of dam in the full reservoir condition assuming no free board allowance. Consider uplift pressure with intensity factor 100%. Also determine stresses at toe and heel. Assume weight of concrete 24 KN/m^3, unit shear strength of concrete 14 Kg/ m^2, and coefficient of friction between concrete and foundation soil is 0.7. (10)

Q. 5a) Explain different types of spillway gates. (10)

b) Draw the elementary profile of gravity dam and explain the procedure for determining base width of elementary profile of a gravity dam. (10)

Q.6a) Explain the various causes of failure of earth dam. (10)

[TURN OVER

BE sem-VII (Rev) May-June-15

Sub:- LSMRCS Date: 27-5-15

Civil

QP Code : 8510

(3Hrs) Maximum Marks-100

N.B.-

1. Question no. 1 **is compulsory**. Attempt **any four** out of remaining **six** questions.
2. Assume suitable data **if necessary** but justify the same.
3. Draw neat sketches **wherever needed** to support your solution.
4. Figures to the right indicate full marks.

Q.1 (a) Explain the terms primary tension failure and primary compression failure. (4)
(b) State the limit state of serviceability for deflection and cracking. (4)
(d) Draw the stress distribution diagrams for concrete (in flexure) used in ULM and LSM. (4)
(c) Define the terms characteristic load and partial factor of safety. (4)
(e) Explain the procedure to design an axially loaded long RCC column using LSM. (4)

Q. 2(a) A RC beam section of size 250 mm x 500 mm is subjected to a factored moment of 135KNm. Determine 'A_{st}' that can be placed at an effective cover of 40 mm. Use LSM and Adopt M20 & Fe415. (8)

Q. 2(b) A RC beam of rectangular c/s 200 mm x 500 mm is reinforced with 3-20mm ϕ (Fe250) in compression zone. Calculate the amount of tension steel grade of Fe415 for the section to be fully effective. Adopt M20 concrete and effective cover to both steel as 50 mm. Also find the safe UDL the beam can carry over a simply supported span of 5 m. (12)

Q.3 (a) What is Tee beam action? How will you find effective flange width 'b_f' for flanged beams? (5)

Q.3(b) Explain the concept of equivalent flange thickness as per LSM (5)

Q. 3(c) Find M_u moment and tension steel 'A_{st}' required for a RC T-beam section having following details-
Flange width (effective) =1000 mm, width of web = 300 mm, depth of flange =100 mm and effective depth of beam is 600 mm. Use M20 & Fe415. (10)

Q. 4(a) A RC beam of size 300 mm x 500 mm (overall) is reinforced with 3 bars of 20 mm dia (Fe250) out of which one bar is bent at 45° nearer to support and taken to the compression side. Design the shear reinforcement if the beam section is subjected to a working shear of 100 KN. Use M20 concrete. Refer table. (14)

Q.4 (b) Write the basic steps used in LSM to design a RCC beam section subjected to shear force, bending moment and torsional moment. (6)

TURN OVER

RJ-Con. : 11072-15.

Q.5 (a) Using ULM find the moment capacity of a RC beam section of size 250 mm x 500 mm reinforced with 4 bars of 20 mm diameter and placed at an effective cover of 50 mm. Use M20 and Fe415. (7)

Q.5 (b) Design a simply supported RCC slab over a room of size 3 m x 7 m. The thickness of supporting wall is 300 mm and the slab carries 75 mm lime concrete at its top, the unit weight of which is 20 KN/m^3. The live load on slab may be taken as 2 KN/m^2.
Use M20, Fe415 &LSM. Apply necessary design checks and draw neat sketches showing details of reinforcement. (13)

Q. 6(a) A short column of size 230 mm x 350 mm is subjected to a factored load of 1500 KN. If the unsupported length of column is 3.2 m. find the design moment if any due to minimum eccentricity. Comment on the result you obtain. (8)

Q.6(b) Design a helically reinforced short circular column to carry an axial load of 1200 KN at service condition. Use concrete M20 and steel Fe415. Also design the helical reinforcement using Fe250 steel. (12)

Q. 7 Design a combined rectangular footing connecting two columns 'A' and 'B' 4 m c/c apart and carrying factored axial load 1200 KN & 1400 KN respectively. The property line is 400 mm away from the outer face of column 'A'. Sizes of columns A & B are 300 mm x 300 mm and 400 mm x 400 mm respectively. Use M20 and Fe415. Adopt SBC of soil as 150 KN/m^2.
Draw neat sketches showing details of reinforcement. (20)

Table for design shear strength 'τ_c' (N/mm^2) in concrete.

$p=100A_s/bd$	0.25	0.50	0.75	1.00	1.25
τ_c	0.36	0.48	0.56	0.62	0.67

Be sem-VII (Rev) May-15

Sub:- QSEV (Civil)

Date: 2/6/15

QP Code : 8590

civil

(REVISED COURSE)

(4 Hours) **[Total Marks : 100**

1) Question No 1 is compulsory.
(2) Attempt any four questions out of remaining six questions.
(3)Assume suitable data if required and specify the same clearly.
(4) Figures to the right indicate full marks.

Q.1)
Work out the quantities of the following items of work by referring Plan & Section Shown in Fig.1. ---20M
a) Excavation for foundation.
b) P.C.C (1:4:8) in foundation.
c) Ist Class brickwork in foundation in C.M (1:4).
d) 12 mm.thick internal plaster in C.M (1:5)

Q.2)
a) Prepare an approximate estimate for (G+4) R.C.C building. Bldg.consist of 4 flats on each floor & each flat has carpet area of 100 m^2.Assume area occupied by walls & columns etc.as 10% of built up area & area of circulation as 20% of built up Area. Assume cost of construction as Rs.12000/m2. ----10M.
b) Prepare abstract of cost for the items in Q.no.1. ----06M.
c) What is Tender Notice? Mention main inclusions of it. ----04M.

Q.3)
a) What is Contract? Explain the types of contract with their suitability. ---- 12M.
b) Prepare rate analysis for Ist class brickwork in superstructure in C.M (1:4). ---- 08M.

Q.4)
a) Work out the volume of earthwork for a portion of a road by using Prismoidal formula. ---- 12M.
1) Top width of formation = 10 m.
2) R.L of formation at zero chainage = 108.00 m.
3) Road has no slope in longitudinal direction.
4) Side slope: - 2:1 (Banking)
1.5:1 (Cutting)

Chainage	0	20	40	60	80	100	120
R.L of Gr.(m)	107.20	107.90	108.00	108.80	109.00	110.80	109.10

b) Explain: - ---- 08M.
1) Mass Haul Diagram.
2) i) Trapezoidal formula. ii) Lead & lift

Q.5)
a) Explain: - ---- 12M.
1) Price variation clause
2) Liquidated damages & unliquidated damages.
3) Role of quantity surveyor.

b) Explain Belting Method of valuation in detail. ---- 08M.

TURN OVER

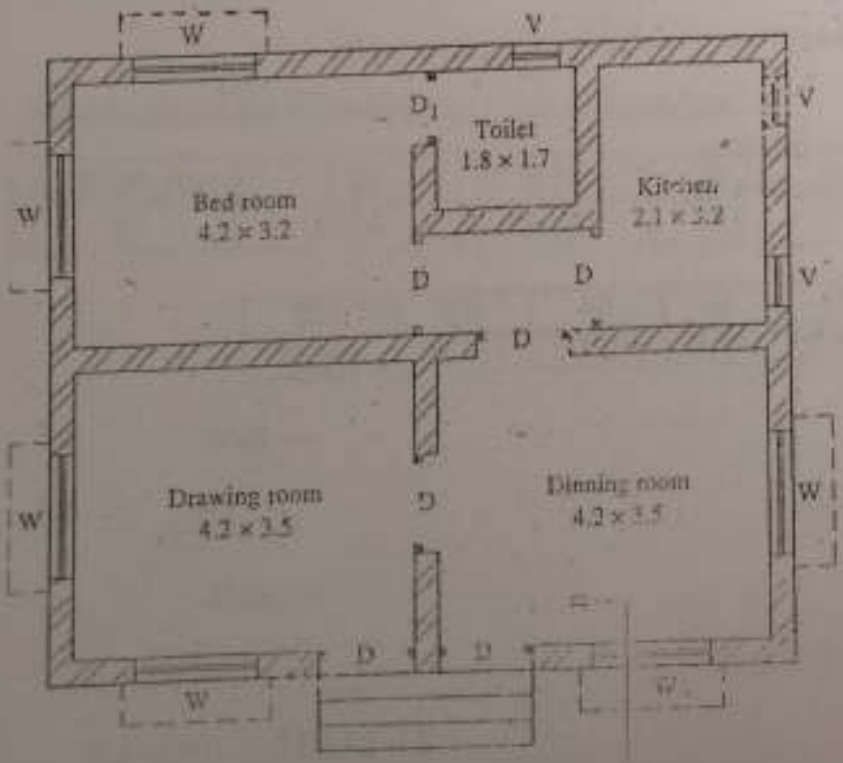
Q.6)

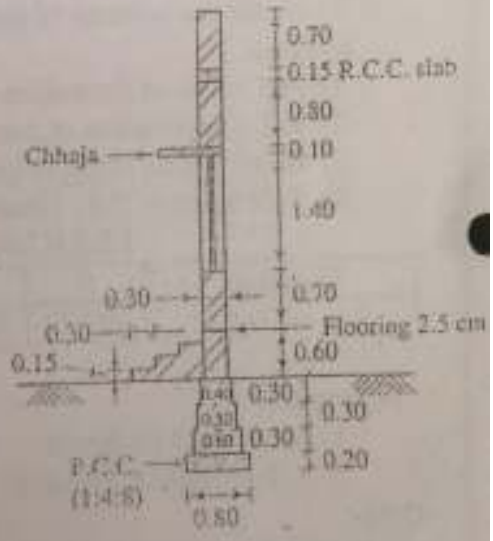
a) A building is newly constructed with cost of Rs.80 lakhs.over a plot of land Costing Rs.50Lakhs.Building consists of 10 flats of area 120M^2.each. Work out monthly standard rent / flat from the following data;-
- Expected net return from land & building = 6%.
- Rate of interest on Sinking fund = 7%
- Life of building = 55 years.
- Salvage value = 10% of cost of building.
- Repairs & maintenance cost = 7% of building cost.
- Taxes & other outgoings = 25% of gross rent. --- 10M.

b) What is bar bending Schedule? Why it is prepared? ---- 06M.
Explain clearly along with its profarma. ---- 04M.

c) Explain:-
1) Pre-bid conference
2) Debitable agency. --- 20M.

Q.7) Write notes on following (any four)
a) Earnest Money Deposit & Security Deposit
b) C.B.R.I. method.
c) I.S 1200
d) Freehold properties & leasehold properties.
e) Use of computers in Estimation process.





Sub:- PC

QP Code : 8666

...: 3 Hours

Maximum Marks: 100

Note: 1.Question No.1 is compulsory. Attempt any four questions out of remaining six questions.
2. Assume data with suitable Justification, if needed.
3. IS-1343:1980 is permitted.
4. Support answers and solutions with neat and proportionate sketches.

Q1. A] A 4.1 m span simply supported beam of C/s 400mmx600mm is prestressed by a parabolic cable with maximum eccentricity of 200mm at centre of span and concentric at support. Locate pressure line in the beam at transfer stage. Take PF 410 kN. [05]
B] What is safe cable zone? Develop equations for the same. [05]
C] Justify need of high strength steel and concrete in prestressed concrete construction? [05]
D] Explain any one method of post tensioning system of prestressing. [05]

Q2. A pretensioned slab panel 500 mm wide and 200mm deep is provided on 5m simply supported span. Panel has to carry 5kN/m^2 imposed load. For no tension at any fiber at any stage at any section, determine spacing and eccentricity of ...mm dia wires. Each wire is carrying 60 kN force initially. Wires provided are straight.
Consider unit weight of concrete as 25kN/m^3 and 18 % loss in prestressing force at service stage.
Also suggest suitable grade of concrete such that maximum compressive stresses in the extreme fiber is within permissible limits. [20]

Q3. A rectangular beam 300mmx450mm is to carry 12kN/m (factored imposed udl) on 6m simply supported span. Calculate principal tension for the following cases.
a] Beam is not prestressed.
b] Beam is prestressed with a straight concentric cable. Take PF 210kN.
c] Beam is prestressed with a straight cable at 50mm from soffit of the beam. Take PF 210kN.
d] Beam is prestressed with a parabolic cable which is at 50mm from soffit of the beam at mid span and at 350mm from soffit of the beam at support. Take PF 210kN.
e] No horizontal or curved prestressing is provided but it is prestressed vertically by 5mmϕ wires at 100mm c/c with f_i=1200 mPa.
Comment by comparing principal tension in case b,c,d and e with case 'a'. [20]

Q4. 8m spanned, simply supported prestressed concrete beam is designed to carry uniformly distributed load.
a] Calculate deflection at transfer stage.
b] Calculate deflection at cracking.
c] Calculate deflection when beam is loaded with 1.25 times of cracking load.
Compare deflections in case a,b and c with corresponding IS limits.
Following are specifications of the beam,
Top and bottom flange: 400mm wide and 120mm deep
Web: 400mm clear depth and 100mm width
Cable: parabolic with eccentricity 150mm above neural axis at support and 250mm below neutral axis at mid span
Prestressing force: 300 kN at transfer
Loss factor: 0.85
Area of prestressing steel: 100mm^2
Grade of concrete: M50
Young's modulus of elasticity of steel: 2x10^5 MPa [20]

[TURN OVER

Q5. A two span continuous beam ABC of AB=10m and BC=10m is carrying 22kN/m (inclusive of self weight). C/s is 230mmx500mm. Beam is prestressed by parabolic cable which is concentric at supports A, B and C, but having maximum eccentricity of 100mm at mid span of AB and BC.

a] Locate C-line in the beam due to combined effect of prestressing force and loads.

b] Determine resultant stresses at in the extreme fibers at support sections A, B and C. Also determine resultant stresses in the extreme fibers at mid span section of span AB and span BC.

c] Make the cable concordant by linear transformation and recalculate the extreme fiber stresses at different sections for same load on beam. [20]

Q6. A] Calculate loss of stresses in steel in following pretension beam.

C/s: 230mmx500mm

Area of prestressing steel: 150mm^2

f_i =1000 MPa

f_p =1500 MPa

Cable: linear, concentric at support and 150mm below neutral axis at mid span

Young's modulus of elasticity of steel: 2.1x10^5 MPa

Young's modulus of elasticity of concrete: 0.3x10^5 MPa

Shrinkage strain in concrete: 0.0003 [10]

B] A post tensioned simply supported beam 'AD' of 8m span is of C/s 230mmx500mm. End A is anchored. Jacking force is applied from end D. For 2m span AB cable is linear. It is concentric at A and has eccentricity 200mm below neutral axis at B. For central 4m part of beam BC it is straight at 200mm below neural axis and for rest 2m span CD it linear and concentric at D.

Take f_s =1000 MPa, μ=0.3 and k=0.0015/m

Consider loss of stresses due to friction alone, calculate the stresses in cable at A, B and C. [10]

Q7. A] Calculate UMR of 250mmx500mm bonded post tensioned beam of 6m span.

Take Area of prestressing steel: 150mm^2, f_i =1000 MPa and f_p =1500 MPa. [10]

B] Provide an anchor plate of suitable dimension and thickness for a beam of cross section 250mmx500mm. A cable of 150mm^2 transfers a force of 150kN.Use M50 concrete. Make sure that stresses in concrete just behind the anchorage are within permissible limits. Take dia of duct 40mm. Permissible shear stresses in steel plate are 100MPa. Also design reinforcement to resist bursting tension. [10]

(Rev) May-15
08/06/15

Civil

Sub:- RCRM

QP Code : 8672

(REVISED COURSE)
(3 Hours) [Total Marks: 100

N.B. :(1) Question no. 1 is **compulsory.**
(2) Answer any **four** questions from the remaining **six.**
(3) Draw neat **sketches** wherever **necessary.**
(4) **Figures** to the **right** indicate **maximum** marks

1. Write short notes on following (answer any **four**):— 20
   (a) Causes for deterioration of concrete
   (b) Ultra Sonic Pulse velocity Test
   (c) Shotcreting
   (d) Polymer Modified Concrete
   (e) Epoxy Mortars

2. (a) What are the various causes of deterioration of concrete structures? Explain the environmental factors. 10
   (b) How repairs are classified? Give the details of general observations on condition of structures for each of damage. 10

3. (a) Define condition survey and enlist the objectives and stages of condition survey. 10
   (b) Explain the following Tests 10
      (i) Rebound Hammer test
      (ii) Pull-off and pull-out test

4. (a) What are the various methods of corrosion protection? Explain any one method in detail. 10
   (b) What are the causes of seepage and leakage in concrete structures 10

5. (a) Explain in detail properties of moisture barrier system. 10
   (b) What are the objectives of grouting? Explain the procedure of injection grouting 10

6. (a) Enlist the essential parameters for deciding upon a repair material for concrete 10
   (b) Explain the above grade and below-grade water proofing of concrete structures 10

7. Explain the following:— 20
   (i) Concrete endoscopy
   (ii) Thermal Protection coating
   (iii) Cover meter test
   (iv) Carbonation test
