Sem-VII (CE) LSMRCS

LSMRCS

LSM

CE

42 : 2nd half.13-Avi(bd)

Con. 10136-13. (REVISED COURSE) LJ-14029

Dec.2013

(3 Hours) [Total Marks : 100

N.B. 1) Question No.1 is compulsory. Attempt any four questions out of remaining six questions.

2) Assume suitable data wherever required and state it clearly.

3) Illustrate your answers with neat component sketches wherever required.

4) Answers should be written in the legible handwriting, stepwise and in the systematic manner.

1. Attempt any four of the following :

(a) What do you mean by 'Limit State"? Explain its various types. 05

(b) Explain in detail under, over and balanced section w.r.t Limit state method of RC design. 05

(c) Derive design stress block parameters for singly reinforced section for LSM of design. 05

(d) State the situations where doubly reinforcement is provided. Also Draw various forms of shear reinforcement provided in beam. 05

(e) State the IS code provision for minimum and maximum area of steel, diameter and number of bars, cover in case of column. 05

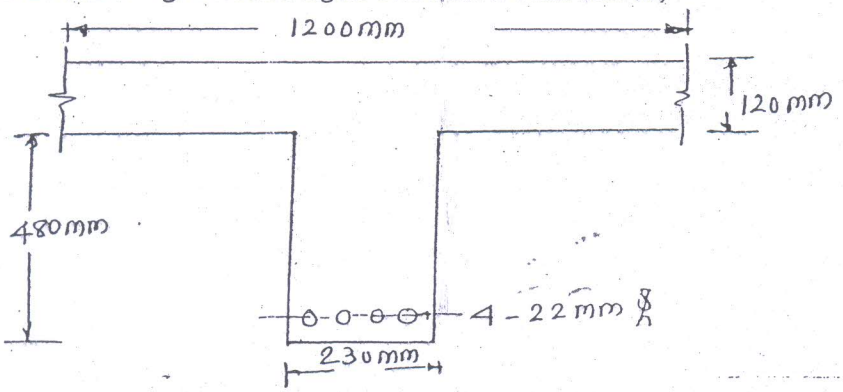
2. (a) An RC section 230 mm × 600 mm depth overall and reinforced with 4-20 mm ϕ is used as a simply supported beam over an effective span of 5m. Determine the maximum udl the beam can carry safely (including self weight). Use Fe 415 steel and M20 concrete. 08

(b) Design the reinforcement for a R.C beam of size 230 mm × 500 mm overall depth supported between an effective span of 6.0 m. It is subjected to u.d.l D.L + L.L (service load) of 35 kN/m. Use M20 concrete and Fe 415 steel. 12

d'/d	0.05	0.10	0.15	0.2
f_{sc}	355.1	351.9	342.4	329.2

3. (a) Describe in brief concept of equivalent flange thickness for analysis and design of R.C. T section. 04

(b) Find the ultimate moment of resistance of T beam section using Fe 415 steel grade and M20 concrete grade. Refer figure below for T beam section; 16



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4. (a) (i) Explain development length 02

(ii) Write difference between one way and two way slab. 03

(b) Design the slab for a room of size 4.0m × 5.0 m with two adjacent edges discontinuous. The slab panel is subjected to live load of 3.5 kN/m^2 and floor finish load 1.0 kN/m^2 apart from its self weight. Use Fe 415 steel and M20 grade concrete. Use following B.M coefficients. 15

Negative moment at continuous edge		Positive moment at mid span	
Short span	Long span	Short span	Long span
0.0625	0.047	0.037	0.37

5. (a) Explain different types of foundation 04

(b) Design the combined rectangular pad footing using following details: 16

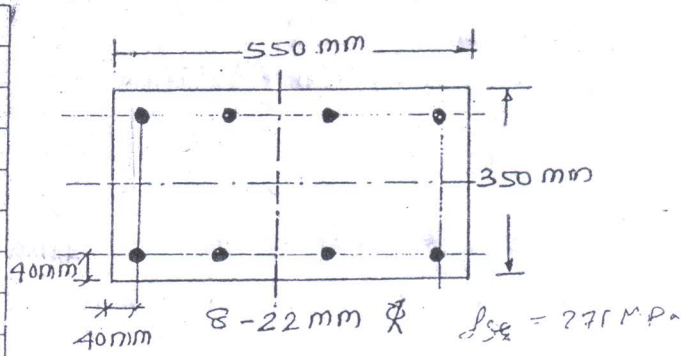
	Column A	Column B
Size	230mm × 500mm	230mm × 700mm
Load (service)	850 kN	1150 kN
Reinforcement	6 – 16 mm ϕ (Tor)	6 – 20 mm ϕ (Tor)

Distance between centre to centre between columns is 2.3m. Assume width of footing as 1.5 m. and S.B.C of soil as 150 kN/m^2. Also draw a neat sketch showing reinforcement details.

6. (a) Explain different types of columns 04

(b) Find the design strength corresponding to limiting condition of 'no tension' in the column section as shown below. Assume eccentricity of loading with respect to major axis only. Use M25 concrete grade and Fe 415 steel grade. 16

For Fe415	
Strain	Stress (N/mm^2)
0.0000	0.0000
0.00144	288.70
0.00163	306.70
0.00192	324.80
0.00241	342.80
0.00273	351.80
≥0.00380	360.90



7. (a) Determine ultimate moment of resistance for a singly reinforced rectangular beam of width 300 mm and 450 mm effective depth. The tension reinforcement consists of 4 – 16 mm dia. Take σ_{cu} = 20 N/mm^2 and σ_{sy} = 420 N/mm^2. Use ULM. 10

(b) Design the shear reinforcement for the rectangular beam of dimension 300 × 500 mm (effective) provided with 4 – 20 mm dia. In tension zone. The beam is subjected to UDL of 50 kN/m over the span of 4 m. Use M20 concrete and Fe 415 steel. Adopt LSM. 10

p_t%	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25
τ_c(N/mm^2)	0.36	0.48	0.56	0.62	0.67	0.72	0.75	0.79	0.81

11-11-13-DTP2-KG-22

Con. 7758-13.

3 Sem-VII-(CE)
Dec. 2013

EE-II

(Revised Course)

(3 Hours)

EE-II Supply

LJ-13906

CE

[Total Marks : 100

N.B. : (1) Question No. 1 is compulsory.
(2) Attemp any four questions out of remaining six questions.
(3) Assume suitable data wherever necessary.

1. (a) Explain self purification of streams. 5
(b) Convert 90 μ g/m^3 of NO_2 to ppm at 25°C and 101.325 Kpa pressure. 5
(c) Explain various methods of noise control. 5
(d) Describe with sketches the treatment of sewage by Imhoff tanks. 5

2. (a) Explain in detail Ozone depletion and acid rain. 10
(b) Explain in detail different systems of plumbing with diagram. 10

3. (a) Explain various methods of sludge disposal. Draw a neat sketch of sludge drying bed. 10
(b) Design sedimentation tank for 12 MLD flow to treat the sewage. Assume suitable data. 10

4. (a) Explain in detail self purification of streams. Explain various factors affecting the rate of self purification. 10
(b) Design a single stage trickling filter for the following data :- 10

Sewage flow	=	5500 m^3/day.
BODs of raw sewage	=	250 mg/l.
Recirculation ratio	=	2
Depth of media	=	2.2 m.
BOD of effluent	=	30 mg/l

5. (a) Explain the terms related to activated sludge process. 10
(i) F/M (ii) Aeration (iii) Hydraulic Retention Time
(iv) Mixed Liquor Suspended solids (v) Sludge age
(b) A sample of sewage shows 5 days 20°C BOD value of 300 mg/l. What is the ultimate BOD ? What is BOD exerted in 10 days, If the reaction is carried out at 30°C ? Take $K_{10} = 0.1$ / day. 8
(c) Define sludge volume Index. 2

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6. (a) Draw a flowsheet of sewage treatment plant employing trickling filter. Explain working of each unit in brief. 10

(b) Design a septic tank for a colony of 200 people. Define septic sewage. 10

7 Write short notes on the following (any four) :- 20

(a) Crown Corrosion.
(b) Server appurtances.
(c) Sludge digestion
(d) Drop manhole
(e) Grit Chamber
(f) Aerated Lagoon.

Sem VII - CE

shilpa-2nd half-(c)13-51

IE - I

(REVISED COURSE)

IE-I

CE

LJ–13972

Con. 8488–13.

Dec. 2013

(3 Hours) [Total Marks : 100

N. B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) State the **assumption** clearly.
(4) Draw **neat sketches** wherever necessary.

1. (a) List the benefits and ill effects of irrigation. 20
(b) What is Bhandara Irrigation ? What are its advantages and disadvantages ?
(c) State advantages of sprinkler irrigation with its limitations.
(d) Define dirty, delta, baseperiod and establish the relationship between them.

2. (a) Find the required reservoir capacity to cater to the needs of the crops. The base period, dirty and area under each crop in the command area are given below :– 10

Crops	Base period (days)	Duty (Ha/ cumecs)	Area under crop (Ha)
(1) Wheat	120	1800	4800
(2) Sugar cane	360	800	5600
(3) Cotton	200	1400	2400
(4) Rice	120	900	3200

(b) With neat sketches, explain various storage zones of reservior. 10

3. (a) Derive an expression for base width of elementary profile of a gravity dam for :– 10
(i) No tension condition
(ii) No shiding condition, when the reservoir in full.
(b) A concrete gravity dam has the following features :– 10
Top width – 6m
Top of dam – R.L. 200m
R. L. of bottom of dam – 116m
R. L. of fail water level – 122m
RL and FRL – 196m.
u/s face is vertical. D/S face is vertical upto RL 191·00m and there after d/s face slopes 2H : 3V. Drainage holes are located 8m away from u/s face, unit weight of concrete 23·5 kN/m³. Check the stability of dam.

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4. (a) Describe the recuperation test in an open well. 10

(b) Design a tube well tobe sunk in confined aquifer of 20m thickness fully. The yield required is 2400 m^3/day, coefficient of permeability of aquifer was found to be 40 m/day. The drawdowm in the well was taken to be 4m. 10

5. (a) Discuss the design criteria of filters for earth dams. 10

(b) Explain the procedure for determining storage capacity and yield of reservoir using mass curve. 10

6. (a) Explain an ogee spillway with neat sketch. How it is designed ? 10

(b) The ordinates of a 4 - h unit hydrograph at an interval of 4 hour are 0, 20, 80, 130, 150, 130, 90, 52, 27, 15, 5 and 0 (zero) curves. 10

Derive the ordinates of 2 - hours unit hydrograph for the same catchment.

7. (a) Unit Hydrograph theory and assumption. 20

(b) Theissen polygon method.

(c) coefficient of Transmissibility and Coefficient of Permieability.

(d) Factors affecting runoff.

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Sem-VII-CE

PC

CE

shilpa-2nd half-(d)13-7

Con. 10297–13.

(REVISED COURSE)

LJ–14183

Dec. 2013

(3 Hours)

[Total Marks : 100

N. B. : (1) Question No. 1 is compulsory.
(2) Solve any four from remaining six questions.
(3) Assume suitable data if required.
(4) Use of IS 1343-1980 is permitted.

1. (a) State and explain principal of prestressing. What is difference between Tansfer and Service stage ? 5

(b) What is end zone in a post tensioned PC member ? Discuss about the stresses distribution in end zone. 5

(c) Why high strength concrete and steel is required in prestressed concrete ? 5

(d) Explain the concept of pressure line and internal resisting couple method. 5

2. (a) Determine PF, if a rectangular beam 250 mm × 300 mm is prestressed by a cable at 50 mm from centroid at mid span. A 4 m simply supported beam carries a central point load of 65 kN. Consider no tension at mid-span at service. 5

(b) A box girder of Psc bridge of span 40 m has overall dimensions of 1200 mm ×1800 mm. Uniform thickness of wall is 200 mm. The Live load analysis indicates a maximum live load moment of 2000 kN-m at centre of span. The girder is prestressed by parabolic cables with total initial force 7000 kN. The cables which are concentric at supports have an eccentricity of 800 mm at centre of span. Determine and sketch stress distribution at centre of span at transfer and at service using internal resisting couple method. Take :- $\eta = 0.8$. 15

3. (a) What are the different types of losses in pre-tensioned and post-tensioned prestressed concrete member ? 5

(b) A post tensioned prestressed concrete beam 15 meter span is subjected to initial prestress of 1400 kN transfered at 28 days strength of concrete cable profile is parabolic with eccentricity of 500 mm at mid-span. Jacking is done from both ends of beam. Estimate net loss of prestress for following : 15

(i) Loss due to elastic shortening
(ii) Shrinkage of concrete
(iii) Creep of concrete
(iv) Slip in anchorage
(v) Frinctional loss.

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Additional data :–

$A = 2{\cdot}5 \times 10^5$ mm^2 ,	$Ixx = 5{\cdot}2 \times 10^9$ mm^4
$As = 1300$ mm^2 ,	$Fs = 1050$ N/mm^2 at transfer
$Es = 2 \times 10^5$ kN/mm^2 ,	$Ec = 0{\cdot}38 \times 10^5$ N/mm^2
$\mu = 0{\cdot}25$,	Anchorage slip = 2·5 mm
$K = 0{\cdot}0015$ per m	

4. (a) A concrete beam having a rectangular section 200 mm wide and 400 mm deep is prestressed by a parabolic cable carrying an initial force of 250 kN the cable has an eccentricity of 50 mm at the centre of span and is concentric at the supports. If the span of beam is 12 m and the live load is 2 kN/m. Determine the short time deflection at the centre of span. Assuming Ec = 38 kN/mm^2, creep coefficient $\phi = 2{\cdot}0$, Loss of prestress = 20% of the initial stress after 6 months. Determine long time defection at the centre of span at this stage, assuming that the DL and LL are simultaneously applied after the release of prestress. 12

(b) Estimate principle tensile stresses at a critical section, and compare it with permissible. A beam of 150 mm × 400 mm of 12 m span is prestressed by a parabolic cable with maximum eccentricity 100 mm at centre and zero at ends. PF = 200 kN. Total load on beam 15 kN/m. Take M40 concrete. 8

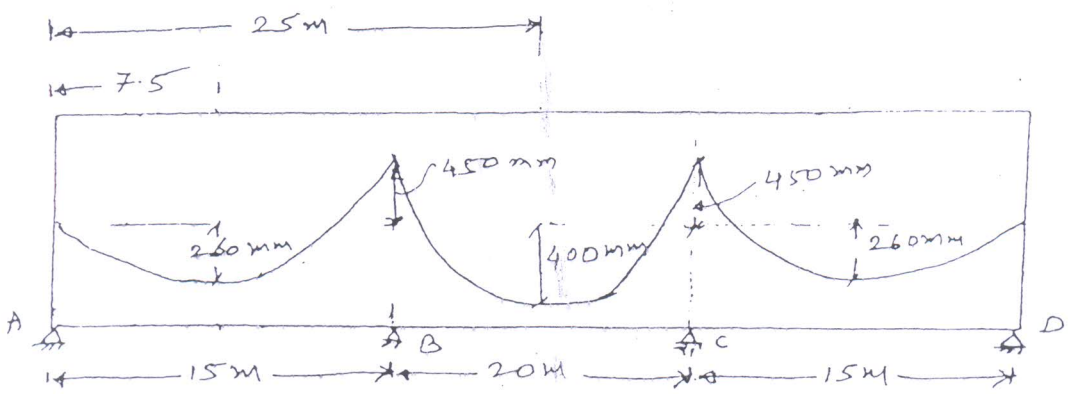
5. (a) A post-tensioned bridge girder with unbounded tendons is of box section of overall dimentsions 1200 mm wide by 1800 mm deep, with wall thickness of 150 mm. The high-tensile steel has an area of 4000 mm^2 and is located at an effective depth of 1600 mm. The effective prestress in steel after all losses is 1000 N/mm^2 and the effective span of the girder is 24 m. If fck = 40 N/mm^2 and fp = 1600 N/mm^2 estimate the ultimate flexural strength of the section. 8

(b) The end block of a post-tensioned prestressed member is 500 mm wide and 500 mm deep. Four cables, each made up of 7 wires of 12 mm dia. strands and carrying a froce of 1000 kN, are anchored by plate anchorages, 150 mm by 150 mm, located with their centres at 125 mm from the edges of the end block. The cable duct is of 50 mm diameter. The 28 day cube strength of concrete fcu is 45 N/mm^2. The cube strength of concrete at transfer fci is 25 N/mm^2. Permissible bearing stresses behind anchorages should conform with IS : 1343. The characteristic yield stress in mild steel anchorage reinforcement is 260 N/mm^2. Design suitable anchorages for the end block. 10

6. Design a post tensioned roof girder to suit the following data. 20

Effective span is 20 m, Live load = 9 kN/m,
Dead load (Excluding self weight) = 2 kN/m,
Load factors, for D.L = 1·4 and L.L. = 1·6
Cube strength of concrete fcu = 50 N/mm²
Cube strength at transfer fci = 35 N/mm²
Tensile strength of concrete, ft = 1·7 N/mm²
Ec = 34 kN/mm², Loss ratio η = 0·80
8 mm dia high tensile wires having a characteristic tensile strength fpu = 1500 N/mm², are available for use. Design I section.
(Check for minimum section modulus, check for eccentricity and prestressing force check for ultimate flexural strenght is required).

7. Estimate equivalent upward load and hence locate pressure line, is it concordant cable ? If not make it concordant by linear transformation. A system beam is symmetrically prestressed by a parabolic cable carrying 4000 kN prestressing force. 20



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