54 : 1st half.11-PH(U).

Con. 3035-11. Limit State Method for Reinforced RK-3202

(R)

LSM - May 11

May 2011

(REVISED COURSE)

(3 Hours) [Total Marks : 100

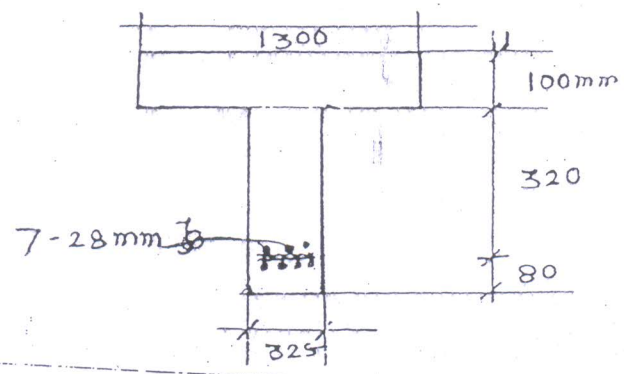
N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any four questions from remaining six questions.
(3) Use of IS 456-2000 is not permitted.
(4) Assume any other data wherever not given but state and justify the same.
(5) Figures to the right indicate full marks.

1. (a) Why is limit state method considered more desirable than elastic design ? 3
(b) Define Anchorage bond, Development bond and Flexural bond. 3
(c) From the first principles, derive stress block parameter for limit state method for singly reinforced section. 6
(d) Design a circular column to carry an axial load of 1500 kN using helical reinforcement use M 25 concrete and steel Fe 415. Use Limit State Method. 8

2. (a) When is it required to design a doubly reinforced beam ? 3
(b) A reinforced concrete beam 230 mm wide is to carry a dead load of 30 kN/m (including its self weight) and a live load of 20 kN/m. The beam is simply supported on a span of 7·0 m. Design a section when– 17
(i) Depth is not restricted
(ii) Effective depth is restricted to 550 mm. Use limit state method for design. Use M 20 and Fe 415 steel

d'/d	0·05	0·1	0·15	0·2
fsc N/mm^2	355	353	342	329

3. (a) The cross sectional dimensions of T- beam are as shown. Assuming M 20 grade concrete and Fe 415 steel calculate ultimate moment of resistance of section. 12



(b) Derive the expression for limiting moment of resistance for T-beam when Neutral axis lies in the Web but Rectangular past of stress diagram lies in the flange. 8

[TURN OVER

4 (a) A rectangular beam 250 × 450 mm effective depth is reinforced with 5 bars of 20 mm diameter out of which two bars are bentup at 45° at a section. Design the shear reinforcement Adop L-SM M 20 and Fe 415. The ultimate shear force is 250 kN 15

P%	0·5	0·75	1·0	1·25	1·5	1·75	2·0
J_c	0·48	0·56	0·62	0·67	0·72	0·75	0·79

If the above beam is subjected to ultimate moment of 45 KNm ultimate shear of 45 kN and ultimate torsional moment of 20 KNm. Design the beam Adopt M 20 Fe 415. Use L.S.M.

(b) Give the partial safety factors for material strength (y_m) as per IS 456 for concrete and steel in limit state of collapse and serviceability. 3

(c) Define character's load and characteristic strength. 2

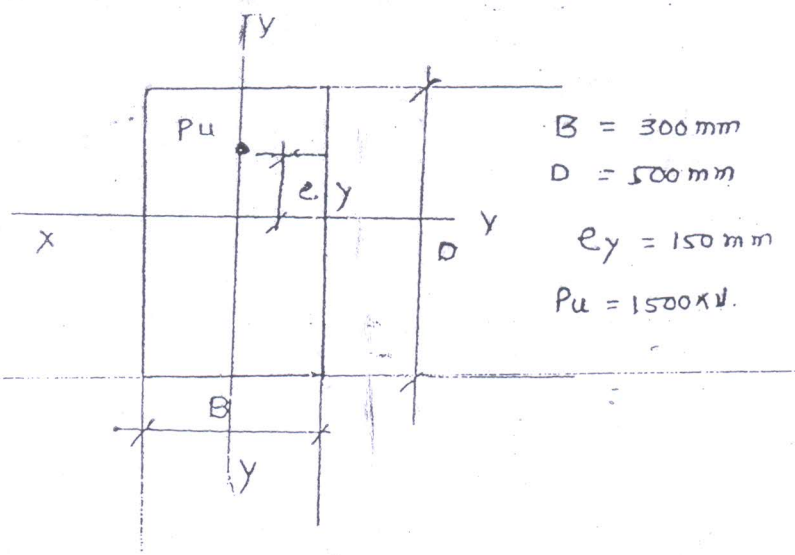
5. (a) Derive the expression for moment of resistance for reinforced section by using Whitney's stress block parameter. 5

(b) R.C. beam 300 mm × 600 mm is reinforced with 3 bars of 20 mm ϕ on tension side with an effective cover of 45 mm. Determine the safe load the beam can carry if the beam is simply supported on span of 4 meter. Use "Whitney's stress block" parameter. Grade of concrete M 20 steel Fe 250. 10

(c) Write short note on :- 5
Various types of footings provided under different condition, showing sketches.

6. (a) Design a simply supported slab to cover a room with internal dimensions 4·0 m × 5·0 m and 230 mm thick walls allaround. Assume a live load of 3 KN/m² and a finish load of 1KN/m². Use M 20 concrete and Fe 415 steel. Assume that slab corners are prevented from lifting up. Given that αx = 0·0748 and αy = 0·056. Use Limit State Method. 12

(b) Design a uniaxially eccentricity loaded column section as shown in figure. Consider concrete of grade M 25 and steel of grade Fe 415. 8



LSM
May-11

7. Design a rectangular combined footing for column A and B carrying axial load 800 KN 1200 KN respectively. Column A is 450 mm x 450 mm and column B is 600 mm x 600 mm. The centre to centre spacing of column is 4·0 meter. The SBC of soil is 200 kN/m^2. Use M 20 concrete and Fe 415 steel. Draw neat sketches showing plan and elevation in longitudinal and transverse direction of the footing. 20

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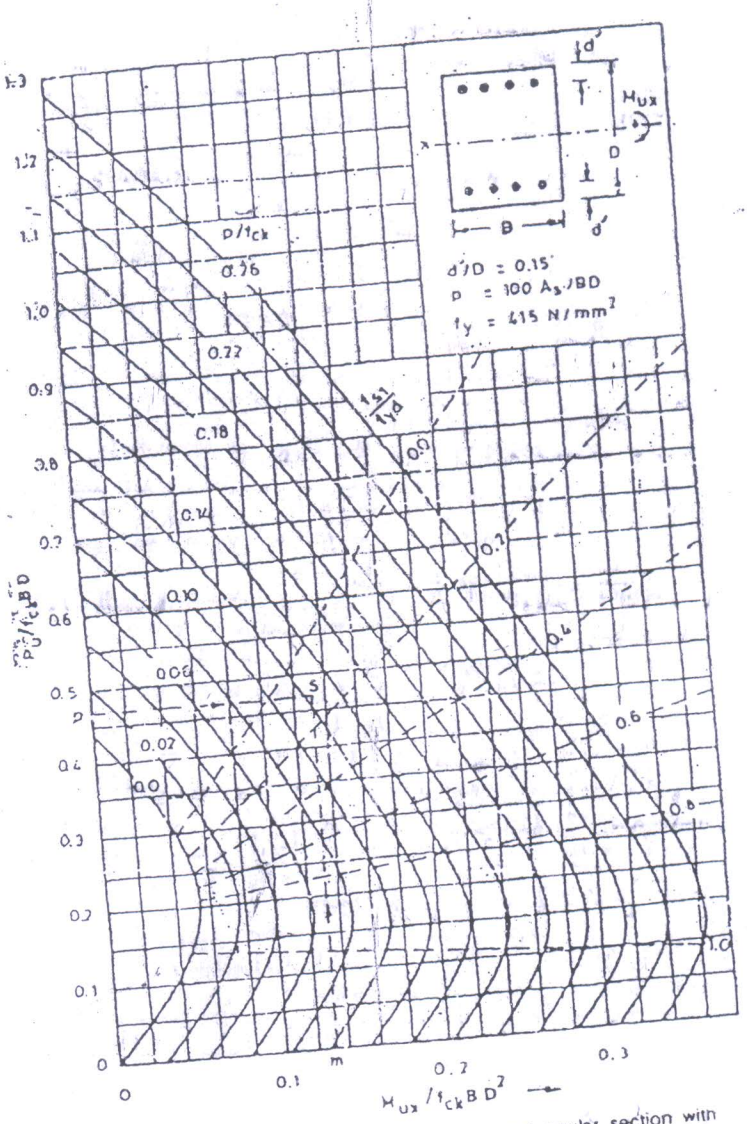


Fig. 9.14 $P_u - M_u$ interaction curve for rectangular section with reinforcement equally distributed on two opposite faces

Exam –May–11–140

Con. 3065–11.

May 2011 (R)

(REVISED COURSE)

(4 Hours)

RK–3207

[Total Marks : 100

NOTE:.

iv) Question No. 1 is compulsory.

v) Attempt any four out of the remaining six questions.

vi) Figure to the right indicate full marks

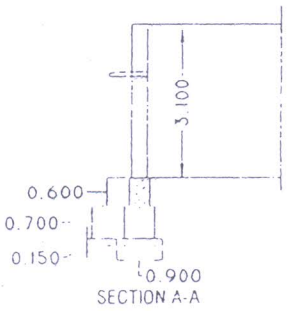
Q.1 Work out the quantities from given plan & section.

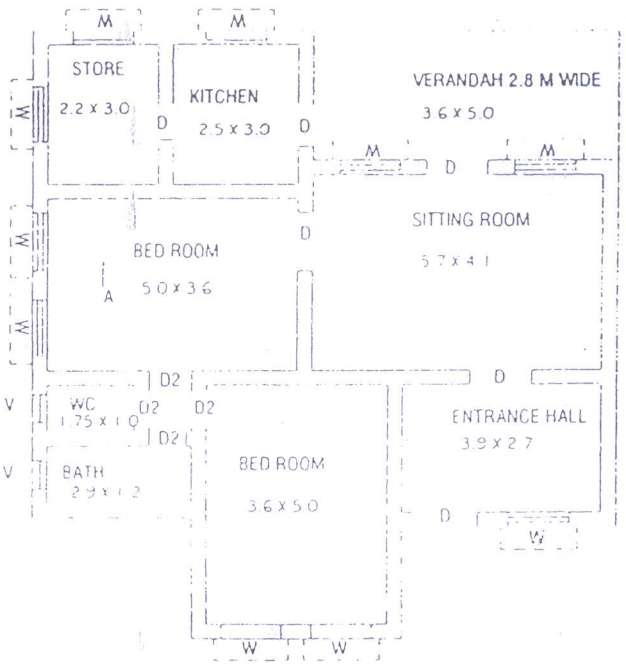
a) Excavation in ordinary soil

b) UCR masonry in C.M.(1:6)

c) RCC quantities for slab, lintel and chajja in M20 grade of concrete

d) Internal plastering in C:M 1:4.





(1)All wall 300 mm th.,(2) slab th=120mm, (3) chajja projection 500 mm, (4) Chajja th.=100 mm,,(5) band lintel 200 mm th.,(6) lintel level=2.1m above plinth.(7) floor to ceiling height=3.1 m,
Doors D=1000*2100, D2= 900*2100,
Windows W1=2000*1300, W2=1500*800, V=600*400, O=1200*2100

Q.2. A)Prepare rate analysis for UCR masonry in C:M 1:4

B) Draft the detailed specification for 1st class Brick masonry in super structure.

[TURN OVER

Q.3 A) Prepare an approximate estimate of cost for (G+3) RCC frame structure building with four flats per floor, each of 80 sqm. carpet area, in a sub-urban area. Assume cost of construction of super structure as Rs.6500 / sqm. 10

B) Draft a tender notice for the construction of commercial building of an estimated cost 50 crore. The duration of project is 24 months. 10

Q.4 A) What is bar bending schedule? Prepare the bar bending for the following column and footing also calculate the quantity of concrete. 10

C1	230x300 of L=6.0 above footing top	6-16# with links of 8#@200 c/c
F1	1.8x2.0x0.6 / 0.15 sloped footing	12# @ 150c/c both ways

B) A person has purchased a plot of land costing Rs. 1,20,000/- and has constructed a building there on at a cost of Rs. 5,00,000/- including W/S, sanitary electrical installations. Allowing a net return @ 7% on cost of construction and @ 5% net return on the cost of land, work out standard rent of the property with the following data: 10

i-Sinking fund on 4% basis for the future life of 75 years =0.0022
ii-Annual maintenance ½ % of cost of construction
iii-Municipal taxes and other outgoings 28.5% of gross rent.

Q.5 A) Work out the earthwork quantities in embankment and cutting for a length of 600 m. The particulars are : 10

Formation width=20 m., side slope: in embankment=2:1(H:V), in cutting =1.5:1 (H:V)
There is no transverse slope. Rising gradient of 1:250 upto 250 m. chainage , Rising gradient of 1:100 upto 600 m chainage

Chainage	0	50	100	150	200	250	300	350	400	450	500	550	600
GL	152.00	152.35	152.60	153.8	153.0	152.68	152.2	151.5	151.2	150.65	150.35	150.6	150.8
FL		151.6				152.4						155.4	

B) Explain different types of contracts with their suitability. 10

Q.6 A) Explain Belting method of valuation for land with example. 8

B) Find the quantity and cost of materials for the following works. 12

A. 110 sqm. Internal plaster, 12 mm thick in cm (1:4)
B. 75 cum. RCC (1:1.5:3) with 1.5% steel
C. 60 cum 1st class B.B. masonry in cm (1:5)

Q.7 Write short notes on (any four) : 20

a. Earnest money deposit (EMD)
b. Defect liabiiity
c. Liquidated damage
d. Workman's compensation act
e. Easement right
f. CBRI equations

CIVIL - SEM - VII

Irrigation Engg

30/5/11

23 1st half 11-AM(n)

Con. 3367-11.

May 2011 (R)

RK-3204

IE - May

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any four questions out of remaining six questions.
(3) Assume suitable data if necessary and mention it clearly.
(4) Figures to the right indicate full marks.

1. (a) Establish relation between duty, delta and base period. 5
(b) Explain with neat sketch Drip Irrigation. 5
(c) A water course has command area of 1200 H. Intensity of irrigation for rice is 80% and its transplantation period is 16 days with a delta of 600 mm. If available rain during this period is 200 mm. Find field duty of irrigation water and duty at head of water course. If transit losses are 20%. Calculate carrying capacity of water course. 10

2. (a) Explain :—
(i) Recording and Non-recording raingauges 5
(ii) Methods used for computing mean precipitation over a catchment area 5
(b) The following are the ordinates of a 12 hour unit hydrograph 10

Time (hr.)	0	12	24	36	48	60	72	84
Flow (cumec)	0	16	29	26	14	7	1.5	0

If the successive 12 hrs rainfall excesses are 1.5 cm, 3.0 cm and 0.75 cm for the catchment plot the resulting flood hydrograph on a graph sheet mark the lag time and flow expected for the river.

3. (a) Two tube wells each of 20 cm diameter are speed at 100 m distance. Both wells penetrate fully a confined aquifer of 12 m thickness. Calculate the discharge if only one well is discharging under a depression head of 3 m. What will be the percentage decrease in the discharge of the well if both the wells are discharging under the depression head of 3 m ? Take radius of influence for each well equal to 250 m and coefficient of permeability of aquifer as 50 m/day. 10
(b) Explain recuperation test 5
(c) Explain unit hydrograph theory 5

[TURN OVER

4. (a) A gravity dam is 50 m high, has a top width of 7 m and free board of 3 m. The upstream face has a slope of 0·15 H : 1V for the lowest 15 m depth and vertical for the remaining upper part. The downstream face is vertical for the first 6 m, thereafter it is sloping at 1V : 0·75 H. Drainage gallery is 6 m from the u/s face. Tail water depth = 2·5 m. sp. wt. of concrete is 25 kN/m^3. Assuming the coefficients of uplift and friction 0·7 each, check the stability of the dam for reservoir full condition. 12

(b) Explain what is pore-pressure and its role during and after construction of earth dam. 8

5. (a) List the salient features of cross-drainage works. Sketch and explain aqueduct and canal syphon. 10

(b) List the advantage of canal living. Give detailed specifications for two types of canal living 10

6. (a) Explain causes of failure of earthen dam with neat sketches. 6

(b) Explain with neat sketch "Energy dissipation of the foot of the spillway" 8

(c) Explain Reservoir Sedimentation. 6

7. Write short notes on any four of the following — 20

(a) Arch and Buttress dams
(b) Spillway Gates
(c) Modular and Non-modular outlets
(d) Head regulator and Cross regulator
(e) Bandharas irrigation.

Civil - VII

Elective-I - Prestressed Concrete

Con.3885-1. (REVISED COURSE) RK-3225

May 2011 (R) (3 Hours) [Total Marks : 100

PC

May - 11

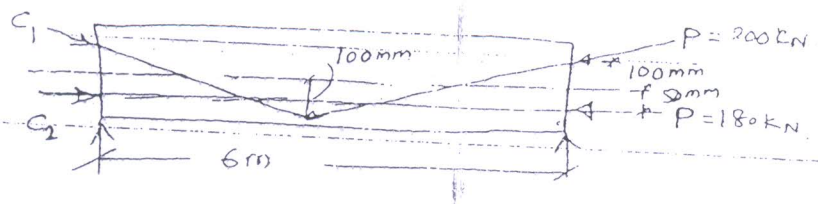
N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any four questions out of remaining six questions.
(3) Assume suitable data if required.
(4) IS1343 is permitted.

1. (a) Explain load balancing concept. Sketch different cable profiles and give their equivalent effect. 20
(b) What do you mean by loss of stresses in steel due to relaxation ? How it can be calculated.?
(c) Explain flexural failure of a prestressed concrete beam due to fracture of steel. Also due to low of high amount of steel provided at the section.
(d) What are advantages of continuous prestressed concrete members ? Discuss different concepts to achieve the continuity.

2. An unsymetric I-section beam has top flange 250 mm × 50 mm, bottom flange 125 mm × 80 mm web 450 mm (overall depth) and thickness 80 mm is to support an imposed load of 20 kN/m over a simply supported span of 6 m is prestressed by 4 high tensile wires of 7 mm ϕ .The wires are straight and located at 50mm from soffit of the beam. They are stressed to 1200 MPa. Calculate stresses in concrete at mid span, quarter span and support section at transfer and working stage. Assume 20% loss in PF at working stage. 20

3. (a) A rectangular section of 900 mm deep and 300 mm wide is used as a beam. Calcaulate its efficiency. 10
If an I section of same area and depth with width of bottom and top flange 600 mm thickness of bottom flanges and top flange 150 mm is used in placed of rectangular section. Which of above two sections is adivsable and why ?
(b) A prestressed concrete beam supports an imposed udl of 4 kN/m over a simply supported 10 m span. The beam has a C/S of 20 mm width and 600 mm depth. Find the effective force in the cable if it is parabolic with an eccentricily of 100 mm at the centre and zero at the ends. 10
(i) If the pressure line coincides with the neutral axis throughout the span.
(ii) If principal tensile stresses are zero neurtal axis throughout the span.

4. (a) Determine loss of stresses due to Elastic Deformation of Concrete in cable 1 and 2. Take m = 6 10



C/S of beam is 200 mm x 450 mm deep.
(i) If it is a pre-tension beam.
(ii) If it is a post-tension beam where cables are tensioned and anchored simultaneously.
(iii) If it is a post-tension beam where cables are tensioned and anchored successively.

[TURN OVER

(b) How loss of stresses in steel due to friction can be calculated ? Explain in brief. 5

5. (a) A 10 m span prestressed concret beam of rectangular C/S 120 mm x 300 mm is prestressed by a parabolic cable carrying an effective force of 180 kN with maximum eccentricity of 100 mm at mid span and zero at support. The beam supports an ultimate udl of 15 kN/m. Which include self wt of the beam. 10

(i) Estimate principal stresses at support at n-a.

(ii) If the beam is additionally prestressed in the direction of depth by vertical wires of 2 mm ϕ at 100 mm C/C with stresses 1200 MPa, calculate principal stresses.

(iii) Compare the Principal Tensile stresses with their permissible limit in both the cases.

(b) A simply supported post-tensioned prestressed concrete deck slab of a road bridge is 500 mm thick spanning over 10 m. The slab is prestressed by foyssinet cables each containing 12 high tensile wires of 8 mm ϕ. The cables are spaced at 400 mm C/C at an effective depth of 430 mm at mid span. Calculate ultimate flexural tensile strength and maximum permissible superimposed udl on slab of 1m width.

$\frac{A_{pf_p}}{bdf_{ck}}$	0·025	0·05	0·1	0·15	0·2	0·25	0·3	0·4
$f_{ap}/87f_p$	1	1	1	1	0·95	0·90	0·85	0·75
xu/d	0·054	0·109	0·217	0·316	0·414	0·488	0·558	0·653

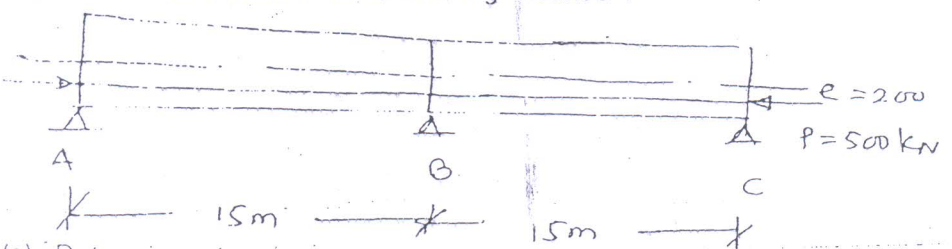
6. (a) A post-tensioned prestressed concrete beam of rectangular section 250mm wide is to be designed for an imposed load of 12 kN/m, uniformly distributed on entire span of 12 m. The stresses in concrete must not exceed 17 N/mm^2 in compression or 1·4 N/mm^2 in tension at any time. Loss in prestress may be assumed to be 15%. 15

(i) Calculate the minimum possible depth.

(ii) For the section provided calculate the minimum prestressing force and corresponding eccentricity.

(b) What is safe cable ? What is its significance ?

7. 20



(a) Determine primary, secondary and resultant moment due to prestressing force along at support B.

(b) If impose load of 2·4 kN/m is acting on entire beam, calculate resultant stresses at top and bottom at support B.

(c) Locate pressureline at service.