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Bharatiya Vidya Bhavan's

Sardar Patel College of Engineer

(A Government Aided Autonomous Institute)

Munshi Nagar, Andheri (West), Mumbai – 400058.

KT-EXAM

Max. Marks: 100
Duration: 3 hr
Class: Btech
Name of the course: Limit State Method for RC Structures

Q.P. Code: CE 401
Course Code : CE 401
Sem-VII
Program: Civil Engineering

MASTER FILE.

Instructions:

1) Question No. 1 is compulsory.
2) Attempt any four from the remaining questions.
3) Draw reinforcement details wherever necessary.
4) Use of IS 456:2000 is permitted.

Question No			Maximum Marks	Course Outcome Number	Module Number
1	a)	State the assumptions made in LIMIT State of collapse(Flexure).Also draw stress and strain diagram across the section.	05	1	2
	b)	What do you mean by Limit State. Explain various limit states.	05	1	2
	c)	When it is required to design doubly reinforced beam section.Also draw various forms of shear reinforcement provided in beam.	05	1,2	3
	d)	Derive design stress block parameters for singly RC sections for LSM of design.	05	1,2	2
2	a)	RC section 230mmx500mm depth overall and reinforced with 4-20mm dia is used as simply supported beam over an effective span of 6m. Determine the maximum udl beam can carry safely Use M 25 and Fe-500.	10	1,2	3
	b)	A rectangular beam 300mm x500mm effective depth is reinforced with 4 bars of 20mm dia in tension zone .The beam is subjected to udl of 50kN/m over span of 7m.Design shear reinforcement.Use M30 and Fe 500	10	1,2	3
3)	a)	A RCC beam reinforced on tension side is 230mm wide with an effective depth of 500mm.It is reinforced with 4 bars of 20mm diameter Calculate the ultimate moment of resistance using Ultimate Load Method. Take σ_{cu} 20N/mm^2 and σ_{sy} 425N/mm^2	10	1	1

4)	b)	A TEE beam section having an effective depth of 450mm ,flange width of 1450mm ,rib width of 450mm ,slab depth of 150mm comprises of 7 bars of 25mm diameter. Calculate moment of resistance of beam. Use M-25and Fe-415.	10	1,2	4
	a)	Draw Pu-Mu curve for column of given proportions. Explain Region II and III of the curve in detail.	10	1,2	6
	b)	Design short helically reinforced column to resist service load of 1600kN.Use M30 and Fe 415.Draw reinforcement details.	10	1,2	6
5)	a)	Design a RC slab for an interior panel of a passage of a residential building. The size of panel is 3mx 3m.Using appropriate loading , design the slab panel. Give appropriate checks. Use M30 and Fe 415.	16	1,2	5
	b)	Explain in brief Whitney's theory.	04	1,2	1
6)	a)	A rectangular column of dimension 300mmx450mm is subjected to an ultimate axial load of 1000kN.Design isolated footing for column assuming SBC as 250kN/m^2.Use M25 and Fe 415.	15	1,2	7
	b)	Write a short note on various types of footing under various conditions showing sketches.	05	1,2	7
7)	a)	A RCC beam 250mm x450mm effective is subjected to an axial moment of resistance of 224kN-m.Find out the steel required using Ultimate Load Method. Take σ_{cu} 20N/mm^2 and σ_{sy} 425N/mm^2	10	1	1
	b)	Design one way slab panel of RCC residential building having dimensions 3mx7m. Using LL 2kN/m2 and F.F 1.5kN/m2 , design the slab panel. Give appropriate checks. Use M25 and Fe 415	10	1,2	5