CLASS: B.TECH/BARCH   SEMESTER:
BRANCH: CIVIL/ARCH   SESSION: MO/2022

SUBJECT: CE301 STRUCTURAL DESIGN I

TIME: 2 HOURS   FULL MARKS: 25

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
6. IS 456:2000 is allowed in the Examination hall.

			CO	BL
Q1 (a)	Name two types of cement which can be used for making concrete.	[2]	1	1
Q1 (b)	Write advantages of concrete for construction of reinforced cement concrete structures.	[3]	1	2
Q2 (a)	What do you mean by design load or factored load?	[2]	1	2
Q2 (b)	Write the limit state conditions to be satisfied in design by limit state method.	[3]	1	2
Q3 (a)	A rectangular beam has width of 300 mm, effective depth of 545 mm with area of tension steel of 1473 mm^2. Check whether the section is under-reinforced or over-reinforced. Assume f_{ck} = 20 N/mm^2 and f_y = 415 N/mm^2.	[2]	2	4
Q3 (b)	Determine the ultimate moment carrying capacity of the beam mentioned in Q3(a).	[3]	2	4
Q4 (a)	Calculate the development length of 20 mm diameter steel reinforcement bar of Fe415 grade of steel under tension. Assume M20 grade of concrete.	[2]	2	3
Q4 (b)	A rectangular beam of size 230 mm width and 450 mm effective depth is reinforced with four bars of 20 mm diameter. Determine the vertical shear reinforcement to resist the factored shear force of 250 kN. Consider M25 concrete and Fe415 steel.	[3]	2	4
Q5 (a)	A T-beam with 1500 mm width of flange, 115 mm depth of web and 250 mm width of web and 500 mm effective depth is carrying a factored bending moment of 625 kN-m. Check the location of neutral axis. Assume M20 grade of concrete and Fe415 steel.	[2]	2	3
Q5 (b)	Calculate the area of tension steel required for the beam as mentioned in Q5(a)	[3]	2	4

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