Graphic Era
HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

Term Evaluation (Odd) Semester Examination September 2025

Roll no...............................

Name of the Course: B.Tech (Civil. Engg)
Semester: V
Name of the Paper: *Reinforced Cement Concrete Design*
Paper Code: TCE 502
Time: 1.5 hour   **Maximum Marks: 50**

Note:
- (i) Answer all the questions by choosing any one of the sub-questions
- (ii) Each question carries 10 marks.

Q1.   **(10 Marks)**
a. Give an elaborate discussion of various field tests and equipment's that shall be applied in RCC construction site? *(CO1)*

OR

b. Explain any 5 different Non Destructive Tests used for testing concrete and structural member parameters with the help of rough figures? *(CO1)*

Q2.   **(10 Marks)**
a. Explain how the Idealized Stress-Strain curve for the Steel is developed in IS 456-2000? (CO1)

OR

b. Differentiate Working Stress, Ultimate Load and Limit State philosophies of RCC design with their unique features of application? *(CO1)*

Q3.   **(10 Marks)**
a. Formulate the Moment of Resistance of a balanced, singly reinforced rectangular section? Explain how shall we consider the Moment of Resistance ability of Balanced, under reinforced and over reinforced beam sections (explain either by Working Stress/Limit State method)? *(CO2)*
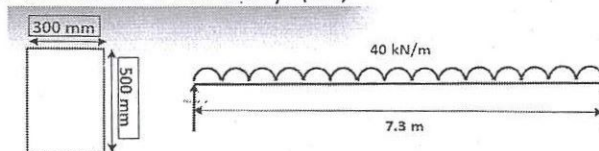
OR

b. Derive the design constants for a singly reinforced balanced rectangular beam section of b x D dimensions using either in Working Stress method or Limit State Method of RCC Design philosophy? *(CO2)*

Q4.   **(10 Marks)**
a. A simply supported beam has the following section details. It is provided with 5-32 mm dia main bars (with 2 bent up at ends) and 4-20 mm dia compression reinforcements. Please check and design the shear reinforcements for the section if necessary? *(CO2)*
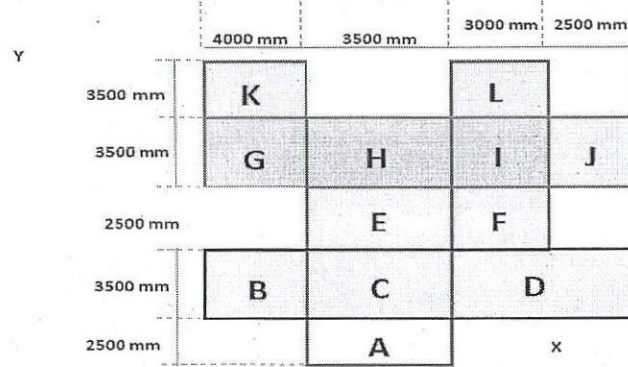

OR

b. Calculate the Design Load to be considered for HE beam and Idealize the same to reduce the Complexity of calculations to UDL? *(CO2)*
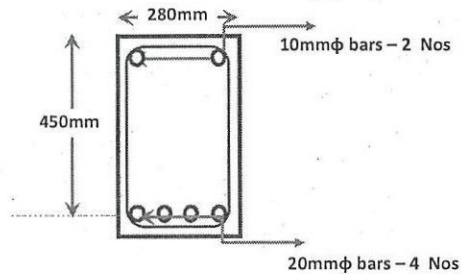
Q5. (10 Marks)

a. Analysis of a Singly reinforced RCC beam section using WSM for its bending moment carrying capacity? M25 grade concrete and Fe 500 grade steel are used for the beam. Bottom, Top and Side covers are to be taken as 25,25 and 25 mm simultaneously. *(CO2)*

OR

b. Using M25 grade Steel and Fe415 Grade Steels, Design the beam for flexure with the given dimentional ? *(CO2)*
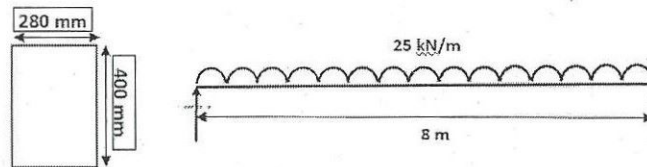

Table: For general LSM Design Use

Stress-Strain Values for		Fy= 500			Stress-Strain Values for		Fy= 415		
K	Strain	Ultimate Stress - Strain Curve	Idealized Curve	Corresponding Strain	K	Strain	Ultimate Stress-Strain Curve	Idealized Curve	Corresponding Strain
0.0000	0.0000	0.0000	0.00	0.000000	0.0000	0.0000	0.0000	0.00	0.000000
0.8000	0.0001	400.0000	347.83	0.001839	0.8000	0.0001	332.0000	288.70	0.001543
0.8500	0.0003	425.0000	369.57	0.002148	0.8500	0.0003	352.7500	306.74	0.001834
0.9000	0.0007	450.0000	391.30	0.002657	0.9000	0.0007	373.5000	324.78	0.002324
0.9500	0.0010	475.0000	413.04	0.003065	0.9500	0.0010	394.2500	342.83	0.002714
0.9750	0.0020	487.5000	423.91	0.004120	0.9750	0.0020	404.6250	351.85	0.003759
1.0000	0.0035	500.0000	434.78	0.005674	1.0000	0.0035	415.0000	360.87	0.005304