Code No: CE1521   **GEC-R14**

III B. Tech I Semester Supplementary Examinations, July 2017
DESIGN AND DRAWING OF R.C.STRUCTURES
(Civil Engineering)

Time: 3 Hours   **Max. Marks: 60**

Note: 1. Answer any **ONE** Question from Part-A and any **THREE** Questions from Part – B.
   2. Use of IS: 456-2000 and design charts from SP-16 is allowed.
   3. For all design adopt Limit State Method

PART-A

1 × 24 = 24M

1. Design a simply supported rectangular beam to carry 30kN/m superimposed load over a span of 6m on 460mm wide supports. Use M20 grade concrete and Fe 415 grade steel. Check the design for all necessary conditions. Draw to a suitable scale (a) Longitudinal section showing the reinforcement details. (b) The cross section of the beam at salient points, showing reinforcement details.   (24M)

2. Design a reinforced concrete slab of size 6m x 4 m whose one short edge is discontinuous and corners are restrained at supports. The slab has to carry a live load of 4 kN/ m^2 and a floor finish of 1.5 kN/ m^2 . Use M25 grade concrete and Fe 415 steel. Sketch the details of reinforcement.   (24M)

PART-B

3 × 12 = 36M

1. a) Evaluate the design constants for the following combination of concrete and Steel for M-20 and Fe415.   (4M)

   b) Draw the stress block for limit state design of rectangular beam and explain its parameters.   (8M)

2. Determine the moment of resistance of a Rectangular concrete beam of 300mm X 400mm deep. Area of steel consists of 6 bars of 18mm ϕ in tension zone and 3 bars of 18mm ϕ in compression zone. Use M20 grade concrete and Fe 415 and effective cover is 35mm.   (12M)

3. a) A singly reinforced rectangular beam of size 230 X450mm effective depth is reinforced with 4- 16mm dia HYSD bars as tension steel. The ultimate shear force at the section is 120KN. State whether shear reinforcement is required or not ?   (7M)

b) calculate the development length for a single Fe415 grade steel bars of 12mm dia in concrete of M20 grade under

i) tension   ii) compression.   (5M)

4. Design the reinforcement in short column 300 X 600mm subjected to ultimate axial load of 1200KN and together with ultimate moments of 120KN-m and 90KN-m about the major and minor axis by using M25 and Fe 415. Assume cover is 50mm.   (12M)

5. Find the moment of resistance of a T- beam section having b_w =300mm, b_f =1500mm, D_f =100mm and d=500mm. The reinforcement consists of 4 bars of 20mm dia. Use M20 and Fe415 steel.   (12M)

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