SUBJECT CODE NO:- P-294
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (CIVIL) Examination MAY/JUNE-2016
Design of Structures - II (RCC)
(Revised)

[Time: Three Hours]   [Max Marks:80]

"Please check whether you have got the right question paper."

N.B   1) Use of IS 456: 2000 is allowed.
             2) Q. No.1 and Q. no 6 are compulsory.
             3) Attempt any two questions from each section from remaining.

Section A

Q.1   Explain the following terms (any five)   10
     a)   Doubly reinforced beams
     b)   Classification of cracks
     c)   Necessity of under reinforced section
     d)   Bent up bars
     e)   Stress block parameter for shear
     f)   Modification factor

Q.2 a)   Derive from first principle the values of design parameters Kumax, Rumax, Ptmax for M_{23} and Fe_{550}.   05
     b)   Design a lintel over a 2.0m wide opening located centrally in a 300mm thick wall. The height of the masonry wall   10
             above the lintel is 3m. Take unit weight of masonry as $19KN/m^3$. Use M_{20} & Fe_{415}.

Q.3 a)   Explain the necessity of doubly reinforced section.   03
     b)   Find the area of steel for a beam 300 x600 (effective) subjected to the moment of 213.33 KNm, using M_{20} & Fe_{250}.   12

Q.4 a)   Explain with sketches the diagonal Tension   03
     b)   A simply supported beam 300 mm x 600 mm (effective) is reinforced with 5-25 mmØ. It carries a udl of 80 KN/m   12
             over an effective span of 6m. Out of 5 bars, two bars can be bent up. Design the shear reinforcement. Use M_{20} &
             Fe_{415}.

Q.5 a)   Explain with sketch the effective width of the flange   03
     b)   A floor consists of 150mm thick slab monolithically constructed with 300mm wide beams spaced at 3.6m center   12
             to center. The effective span of beam is 5m. The slab is subjected to live load of $4.5 KN/m^2$. Design an
             intermediate beam. Use M_{20} & Fe_{415}.

Section B

Q.6   Explain the following (any five)   10
     a)   Function of distribution steel in slab
     b)   Restrained and unrestrained slab
     c)   Function of lateral ties
     d)   Critical sections for shear in footing
     e)   Components of staircase
     f)   I.S specifications for reinforcement in compression member

Q.7 a)   Explain torsional steel in Two ways slab.   03
     b)   Design a reinforced concrete slab for a hall measuring 8m x 16m. The slab is supported on RCC beams 250 wide   12
             and spaced at 4.0m c/c. The live load is $5KN/m^2$. Use M_{20} & Fe_{415}.

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Q.8   Design a dog-legged staircase for an office building in a room measuring 3.0x6.0 m (clear dim^n) floor to floor   15
        height is 3.0 m It is supported on brick wall of 230mm thick. Use M_{20}& Fe_{415}. Show the reinforcement details.

Q.9   Design a column of size 450 x 600 mm and having 3 m unsupported length. The column is subjected to a load of   15
        2000 KN and is effectively held in position but not restrained against rotation.

Q.10   Design a footing for a column of 400 x 500 mm. the safe bearing capacity of soil is 190 KN/M^2. Load on column is   15
        850 KN. Use M_{20}& Fe_{415}.

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