[Total No. of Printed Pages:*2*]

CODE NO:- U - 33

FACULTY OF CIVIL ENGINEERING

Third Engg Examination

DECEMBER 2014

Design of Structure-II (RCC)

T.E Civil (Revised)

[Time: THREE *Hours*] **[Max. Marks: 80]**

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

N.B
1) Question no 1.and 6 are compulsory.
2) Attempt any two questions from each section.
3) Draw neat sketches wherever necessary.
4) Assume suitable data if required.
5) Use is 456-2000 is allowed.

SECTION A

Q.1 Explain the following terms (any five) 10

i) Modes of failure.
ii) Effective span
iii) Singly reinforced beams.
iv) Different cases encountered in the flanged section.
v) Difference between one-way slab & two way slab.
vi) Shear reinforcement
vii) Types of bond
viii) Curtailment of bars.

Q.2
a) Derive from the first principles the value of design parameters Kumax, Rumax and pt max for a balanced section of grades M_{20} and fe550. 05
b) An R.C.C beam is required to resist a bending moment of 70 KN.M. Design the beam for flexure, taking $\frac{b}{d} = 0.5$. Use M_{20} grade of concrete & Fe415 steel. 10

Q.3
a) Why is it undesirable to design over reinforced section? 03
b) A beam 250 MM X 550mm effective is subjected to a factored bending moment 300KN-m. Determine the area of doubly reinforced beam. Use M_{20} concrete and Fe 250 grade of steel. Assume effective covers for both sides as 50mm. 12

Q.4
a) Why is it necessary to control deflection? 02
b) What are the various types of deflection? 02
c) Design a shear reinforcement for a beam with 230mm wide and 450 mm effective depth. The beam is subjected to a shear of 130 KN. Use M_{25} and Fe 415 grades and percentage of steel is 1.5% 11

Q.5
a) What is cracking? How are the cracks classified? 03
b) An isolated simply supported T-beam has a flange width of 2300mm and flange thickness of 120mm. the effective span of the beam is 3.5m. The effective depth of the beam is 580mm and its width 300mm. The beam having the reinforcement with 8-20mm diameter. Use M_{20} and FE_{415} grades. Determine the moment of resistance of the section. 12

SECTION B

Q.6 Explain the following terms (any five) 10

i) Restrained slab and unrestrained slab.
ii) Slenderness ratio.
iii) Classification of columns.
iv) Transverse reinforcement.
v) Pitch of helical reinforcement.
vi) One-way shear and two-way shear.
vii) Minimum eccentricity.
viii) Unsupported length of the column.

Q.7 Design a slab for a hall of size $4.5m \times 6.5m$. Slab is simply supported on all four edges; the corner is held down and carries a superimposed load of $4KN/m^2$. Use M_{20} & Fe_{415} grades. Also draw the neat sketches showing the reinforcement. 15

Q.8

a) Write short notes on serviceability requirements of one-way slab design. 03
b) A rectangular column of section $300mm \times 500mm$ is reinforced with 8 bars of 25mm & determine the load carrying capacity of column taking min. eccentricity less than 0.05 times lateral dimensions. Use M_{20} and Fe $_{415}$ grades. 12

Q.9

a) A space available in the residential building for a staircase in $4.1m \times 3.2m$. in which doglegged stair is to be accommodated. The floor to floor height is 3.8m plan & designs the staircase. 12
b) Practically what precautions are taken to make a R.C.C. building more earthquake resistance? 03

Q.10 Design an isolated rectangular R.C.C. footing for a column of size $230mm \times 300mm$ carrying an axial load of 80 KN. Assume S.B.C. is $180KN/m^2$. Use M_{20} & Fe_{415} grades. Draw the neat sketch showing all the necessary details of reinforcement. 15