Total No. of Printed Pages:2

SUBJECT CODE NO: H-372
FACULTY OF SCIENCE AND TECHNOLOGY
B.E. (Civil)
Design of Structures-III
(REVISED)

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

Please check whether you have got the right question paper.

N.B   i)   Solve <u>any two</u> questions from <u>section A and Section B each</u>
             ii)   Use of IS: 456, IS:3370, IS:1343, and IS:875 is permitted
             iii)   Assume suitable data, if necessary and state it clearly

Section A

Q.1 Two columns 5 meter apart centres carry the load of 1600KN and 2400 KN respectively. The size of   20
columns are $600mm \times 600mm$ and $750mm \times 750mm$. Design the combined trapezoidal footing for
the columns. The projection beyond the centre line of the column parallel to the length of footing are
limited to 0.8 meter and 1.4 meter respectively approximate weight of footing may be taken as 320 KN.
Safe bearing capacity of soil is $300KN/M^2$. Use M-30 and Fe-500. Also draw the reinforcement
diagrams.

Q.2   a)   A large banking hall 18 $meter \times 20$ $meter$ is to be provided with flat slab without drop. The   15
             columns are placed 4.5 meter centre to centre along the shorter span and 5 meter centre to centre
             along longer span. Design interior panel of flat slab for live load of $4KN/M^2$ floor finish of
             1 KN/M^2. Use M-25 and Fe-415. Also draw the reinforcement diagrams

        b)   Explain the difference between direct design method and equivalent frame method of design of   05
             flat slab. Also explain the advantages and disadvantages of flat slab

Q.3 Design a counterfort retaining wall for the following data: 20
        i)   Height of stem above ground level=7.5 meter
        ii)   The earth fill level with top
        iii)   Density of earth fill = $16\ KN/m^3$
        iv)   Angle of repose= 28^0
        v)   Foundation depth below ground level =2meter
        vi)   Safe bearing capacity of soil = $200\ KN/m^2$
        vii)   Spacing of counterfort= 3.5meter centre to centre
        viii)   Coefficient of friction = 0.6
        ix)   Use M-40 and fe-415 Also draw the reinforcement diagrams

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Section B

Q.4 Design an underground water tank $4 \, meter \times 10 \, meter \times 3 \, meter$ deep. The sub soil consists of sand having angle of repose of 30^0, and saturated unit weight of $17 KN/m^3$. The water table is likely to rise upto ground level. Use M-30 grade of concrete and fe-500 grade of steel. Take unit weight of water as $9.81 \, KN/m^3$ draw neat sketches of reinforcement detailing   20

Q.5   a) Explain the necessity of high grade concrete and high tensile stress wires in prestressed concrete members   08

b) State the advantages and disadvantages of prestress concrete. Also state the methods of prestressing with their advantages and disadvantages.   09

c) State the principles of prestressing   03

Q.6   a) Design a circular slab for the room 5 meter in effective diameter, the circular slab is simply supported at the edges and carries live load of $4 \, KN/m^2$. The slab has finishing coat of 20mm cement concrete. Density of finishing coat $=24 \, KN/m^3$. Use M-25 and fe-500. Draw neat sketches of reinforcement detailing   07

b) Design a form work for the beam for the following data   13
   i)   Thickness of floor= 120 mm
   ii)   Centre to centre spacing of beams =3 meter
   iii)   Width of beam=300mm
   iv)   Height of ceiling of the roof=4 meter
   v)   Take live load on sheathing as 4000 N/m^2 and dead weight of wet concrete as 26.5 KN/m^3