M.TECH. DEGREE EXAMINATION

Model Question Paper - I

Branch: Civil Engineering

Specialization: Geomechanics and Structures

First Semester

MCEGS 104 ADVANCED DESIGN OF CONCRETE STRUCTURES

(Regular – 2013Admissions)

Time : 3 Hours Maximum: 100 Marks

Answer **all** *questions*

(USE OF IS 456:2000 AND INTERACTION CURVES ARE PERMITTED)

1 (a) What are short term and long term deflections? What is the deflection due to shrinkage? Write down the expression for the same. (5)

(b) A simply supported reinforced concrete beam of rectangular section 250mm wide by 450mm overall depth is used over an effective span of 4m. The beam is reinforced with 3 nos.20mm dia Fe415 at an effective depth of 400mm. Two hanger bars of 10mm dia are provided. The self weight together with dead load on the beam is 4kN/m and service live load is 10 KN/m. Using M20 grade concrete and Fe415 grade steel compute(a) Short term deflection (b)Long term deflection (c)Maximum crack width at tension face directly under bar (20)

OR

2. Design a biaxial eccentrically loaded braced rectangular column for the following data

Ultimate axial load = 2000kN
Ultimate biaxial moments = M_{ux}=250kNm and M_{uy}=150kNm
Unsupported length(l)=3.25m
Effective length l_{ex}=3m, l_{ey}=2.75m
Column section (b) in x-direction=400mm, D=600mm
Adopt M25 grade concrete and Fe415 grade steel (25)

3 (a) What are advantages and disadvantages of flat slab? (5)

(b) Design the edge beam of size 250mmX500mm with slab thickness of 150mm of a flat slab when subjected to a maximum torsional moment of 38kNm. Assume M25 grade concrete and Fe415 grade steel. (20)

OR

4(a) What are the limitations of yield line theory. (5)

(b)A rectangular slab 5mX6m is simply supported and is isotropically reinforced with 10mm dia@200mm c/c both ways at an average depth of 100mm. The overall depth of slab=130mm. Estimate safe permissible load on the slab using yield line theory. Use M20 concrete and Fe415 grade steel. (20)

5 .Figure 1 shows an intermediate frame of multistoried buildings. The frames are spaced at 4mc/c. Take live load as 4kN/m^2.Assume slab thickness as 100mm.Analyze the floor level ABCD using substitute frame method.

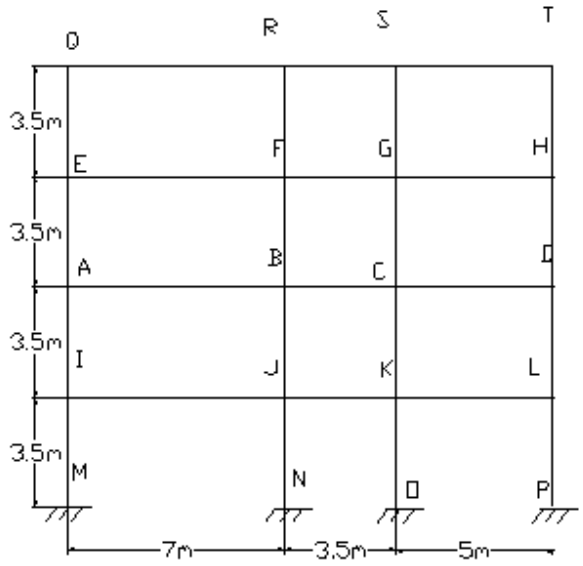

Figure 1 (25)

OR

6. RC continuous beam ABCD consists of three spans. The exterior span AB and CD are 4m each and interior span BC is 6m. Dead load is 25 kN/m and imposed load is 40 kN/m. Draw the bending moment envelope (for maximum sagging bending moment for interior span) for ultimate load condition. (25)

7(a) What are the various steps involved in the design of cast-in-situ joints in frames. (5)

7(b) The following are the details of an internal beam column of type 1 joint subjected to reversals which are not due to earth quake.

(i) column 600X600mm with 8 nos-25mm dia bars. Column factored load=1400kN.Storey height=3m
(ii)beams on either side are 400X500mm with 3 nos of 28mm dia (1846 mm^2) on the top and 3nos of 25mm dia (1473 mm^2) at bottom.
Assuming fck=25kN/ mm^2 and fy=415N/ mm^2
Design the joint. (20)

OR

8. (a) What are the design rules to be applied to concrete members under fire test under ISO834 with respect to the followingi) cover to steel
ii) size of members(minimum thickness for a given fire rating)
iii) other factors like detailing practice (15)
(b) What are the devices used to improve the ductility performance with seismic loading. Also mention the methods used for achieving these objectives as laid in IS-13920. (10)