B TECH
(SEM V) THEORY EXAMINATION 2017-18
DESIGN OF CONCRETE STRUCTURES -I

Time: 3 Hours   *Total Marks: 100*

Notes: *Attempt all Sections. Assume any missing data.*

SECTION A

1.   **Attempt *all* questions in brief.**   **2 x10 = 20**

   a) What is modular ratio?
   b) Determine the modular ratio of M20 grade concrete.
   c) What is effective depth in a beam section?
   d) What is minimum grade of concrete for general reinforced concrete work recommended by the IS code-456:2000.
   e) What is determined in slump cone test?
   f) What is neutral axis?
   g) What is effective cover?
   h) What is lever arm?
   i) What is creep of concrete?
   j) What is shrinkage of concrete?

SECTION B

2.   **Attempt any *three* of the following:**   **10 x 3 = 30**

   a) Write short note on water-cement ratio.
   b) Write assumption made in working stress method.
   c) What are the over reinforced section and under reinforced section.
   d) Write formula to determine the moment of resistance of over reinforced section and under reinforced section. With diagram of section
   e) What is critical section and critical neutral axis?

SECTION C

3.   **Attempt any *one* part of the following**   **10 x 1 =10**

   a) Crass section of a singly reinforced concrete beam is 300mm wide and 500mm deep. To centre of reinforcement which consist of 4 bars of 16mm diameter? If stresses in concrete and steel are not exceed $7N/mm^2$ and $140N/mm^2$ .respectively. Determine the moment of resistance of beam. Take m= 13.33.
   b) A singly reinforced concrete beam in 300mm wide and 450mm deep to the centre of reinforcement which consists of 4 bars of 16mm diameter. If safe stress in concrete and steel are $7N/mm^2$ and $230N/mm^2$. Respectively. Find moment of resistance of section. Take m=13.33.

4.   **Attempt any *one* part of the following:**   **10 x 1=10**

   a) A singly reinforced rectangular beam 350mm wide has a span of 6.25m and carries a load of 16.3KN/m. if stresses in concrete and steel shall not exceed $7N/mm^2$ and $230N/mm^2$. Find the effective depth and area of tensile reinforcement. Take m=13.33.
   b) A doubly reinforced rectangular beam is 300mm wide and 500mm deep to centre of tension steel. It is reinforced with 4 bars of 18mm dia. as compressive steel at an effective cover of 40mm and with 4 bars of 20mm dia. as tensile steel. If stresses in concrete and steel are not to exceed $7N/mm^2$ and $230N/mm^2$.respectively. Find moment of resistance of section. Take m=13.33.

5.   **Attempt any _one_ part of the following:**   **10 x 1=10**

   a)   A beam of reinforced concrete is 300mm wide and 450mm deep to centre of tension steel. It is reinforced with 4 bars of 16mm dia. as compressive steel and 4 bars of 25mm dia. as tensile steel. Determine the moment of resistance of section.   Cover to centre of compressions steel=50m use M20 concrete and Fe415 steel Take m=13.33.
   b)   What is meant by segregations and bleeding of concrete?

6.   **Attempt any _one_ part of the following:**   **10 x 1=10**

   a)   A singly reinforced beam 250mm wide is 400mm deep to the centre of tensile reinforcement .determine the limiting moment of resistance of beam section and limiting area of reinforcement. use M20 concrete and Fe250 steel
   b)   A beam of rectangular section 300mm wide and 500mm effective depth is provided with 4 bars of 18 mm dia. as tensile steel. find depth of neutral axis use M20 concrete and Fe250 steel

7.   **Attempt any _one_ part of the following:**   **10 x 1=10**

   a)   A T beam of flange width 1400mm, flange thickness 100mm, rib width 300mm and effective depth 500mm has to be designed as a balanced section. Find the reinforcement required and limiting moment of resistance. use M20 concrete and Fe250 steel
   b)   A reinforced concrete column is 450mm x400mm and has to carry a factored load of 1800KN. Length of column is 2m.find area of reinforcement required. Use M20 concrete and Fe250 steel.