Assignment unit-I

1. What are the various design philosophies Explain in detail?
2. Explain the following terms
   - (i) Balanced section
   - (ii) under reinforced section
   - (iii) over reinforced section
3. What is meant by the segregation and Bleeding of Concrete?
4. Define modular ratio in detail.
5. Design a rectangular Beam section to carry 160 KN-M moment with M-20 concrete and Fe415 steel. The over all depth of the beam is restricted to 270 MM
6. Define type of section in details?

WSM

(1) What is R.C.C ? Why do we reinforce plain concrete?
(2) Write short notes on the following
   a) Working stress method
   b) Limit state method
(3) Compare deformed and plain bars.?
(4) Explain what is nominal mix & design mix concrete? Explain various steps of mix design.
(5) State the assumptions made in the theory of elastic bending.
(6) What do you understand by balanced section.
(7) What is a doubly reinforced beam and why it is provided.?
(8) What is modular ratio ? What is its significance in design?.
(9) Determine the values of design constant (J, K, Q) and percentage of balanced steel for a beam of dimension, b and d. use M25 and Fe415 steel.
(10) Find the MOR of an R.C.C beam 350mm x 550mm (effective) if is reinforced with 3 bars of 20mm diameter. Use M20 concrete and Fe415 steel. Take $m = 13.33$ Also comment on the type of beam section.
(11) An RCC beam 300mm wide and 550mm deep (effective) is reinforced with 4- bars of 25 mm dia. Determine the stresses in concrete and steel of the beam is subjected to a bending moment of 140 kNm. Take $m = 13.33$.

P.T.O.

(12) An RCC beam 300mm x 600mm deep (effective) is provided with tensile and compressive steel of 1256mm² each. The reinforcement on the compression side is placed 40mm from top edge of the beam. Find the moment of resistance of the section using
1) Elastic theory.

(13) A doubly reinforced concrete beam is 400mm wide and 600mm deep to the centre of tensile reinforcement. The compression reinforcement consist of 4-16mm diameter bars and tensile reinforcement consist of 4-20mm ϕ bars. The beam section is subjected to a bending moment of 150 kN.m. Determine the stresses developed in steel and concrete. Take $m=16$ $d_c=40$mm.

(14) Design the section of a doubly reinforced beam to resist a bending moment of 185000 N.m. The section of the beam is restricted to 350 x 700mm. Assume 50mm effective cover and M20 and mild steel is used.

(15) Determine the effective depth required by an RCC beam to resist a bending moment of 20 kNm. Also determine the area of tensile reinforcement needed. Take $b=\frac{d}{2}$. use M20 concrete & Fe 415 steel.

Assignment (Unit-II) & (III)

1. Define limit state method in detail.?
2. Define limit state of serviceability.
3. Write Effective width for the T-Beam & L-Beam.
4. Design the single reinforced beam in USM Write the steps in designing.
5. A rectangular Beam 200mm wide and 400mm eff. depth is reinforced with 3 bars of 16 mm dia of the grade of concrete is M-20 and grade of steel Fe 415. determine the bending moment capacity.
6. Design the T-Beam & write the steps of designing.

LSM:

1. Explain the limit state method of design.
2. What are the different types of limit state of design?
3. Define the following terms?
   i) Limit state
   ii) Factored load
   iii) characteristic strength
   iv) Design values.
4. Explain the line "limit state method is more rational than working stress method."
5. State the assumptions of limit state of collapse (flexure).
6. Differentiate between balanced, under-reinforced and over reinforced sections.
7. Determine the depth of N.A. for a beam of section 250mm wide and 400mm deep (effective). The beam is reinforced with 3-bars of 20mm diameter. Use $f_{ck} = 20 N/mm^2$ & $f_y = 415 N/mm^2$
8. Draw the strain diagram for a rectangular beam section and Calculate the limiting depth of the N.A. for Fe415 steel.
9. An RCC beam 300mm x 500mm effective is carrying a factored moment of 175 kNm. Determine the area of steel required if M20 concrete and Fe 415 steel is used.
10. A singly reinforced simply supported beam 200mm x 500mm (effective) is reinforced with 4 - 25mm diameter bars. Determine the ultimate moment of resistance

of the section. Also Calculate the ultimate load the beam can carry over a span of 5m. use M20 concrete and Fe415 steel.

(11) What are the conditions in which we design a doubly reinforced beam.?

(12) Determine the ultimate MOR of a rectangular beam 300mm x 600mm (effective), reinforced with 5-25mm diameter bars in tension zone and 2-25mm ϕ bars in compression zone. use M20 concrete and Fe415 steel. Take dc = 60mm.

(13) Determine area of reinforcement required for a