Ref. no. :- EX/CE/5/T/304/2019(old)

BACHELOR OF ENGINEERING(CIVIL ENGINEERING)

3rd year-1st semester-2019(old)

Design of Concrete Structures I

Time – 3 hour | Full marks – 100

Figures in the margin indicates marks

IS 456 and SP16 codes are allowed in the examination hall
Assume reasonable values of any data, if required
Answer any four questions

1. Design a RCC slab panel 4 .2m x 5.2m (Two adjacent edges discontinuous and two other edges continuous) against a live load of 3 KN/m^2 . Grade of concrete M20 and Grade of steel Fe415. Calculate the maximum deflection. Apply Limit State method of design as per IS456 . $¥_L$=1.5. Show detail of reinforcement through neat sketches. 25

2. Design a short square column with a square isolated RCC footing against an axial compressive load of 1200 KN. Grade of concrete M20 and Grade of steel Fe415. Safe capacity of soil = 120 KN/m^2 . Apply Limit State method of design as per IS456. $¥_L$=1.5. Show detail of reinforcement through neat sketches. 25

3. (a) Design a RCC short column against an axial compressive load of 2000 KN and moments Mx = 150 KN-m and My=125KN-m. Grade of concrete M25 and Grade of steel Fe415. $¥_L$=1.5. Apply Limit State method of design as per IS456. 10

   (b) Design a simply supported RCC beam of span 6m against a live load of 30 KN/m. Grade of concrete M25 and Grade of steel Fe415. Partial safety factor against load = 1.5. Apply Limit State method of design as per IS456.
   If you reduce the depth provided by 20%, what will be the change in design against shear. 10+5=15

4. Design a Dog legged staircase for an office building within a clear space of 3.2m x 5.75m. Floor to floor height = 3m. Live load=5 KN/m^2 . Grade of concrete M20 and Grade of steel Fe415. $¥_L$=1.5. Apply Limit State method of design as per IS456. Show detail of reinforcement through neat sketches. 25

5. Design a five span continuous beam of each span 5m against dead load of 30 KN/m and live load of 20KN/m. Use BM and SF coefficients as per IS456 for calculating design BM and SF. Show detail of reinforcement through neat sketches. Apply Limit State method of design as per IS456. 25