R18 Regulation *Subject code: 2P5AB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech V Semester Regular Examinations, February 2021

Design of Reinforced Cement Concrete Structures

Maximum Marks: 70 ***Date:03.01.2022*** Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Note: IS456:2000, SP-16 CHART IS ALLOWED.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 Explain the classifications available in serviceability limit state?
2 Represent the formula used to find the actual neutral axis in working stress method?
3 Explain torsional shear.
4 Explain the types of shear failure in reinforced concrete beams?
5 Assess the minimum number of steel rods for different types of columns
6 On what condition intermediate column is more suitable?
7 Outline the necessity to provide transverse reinforcement in one way slab?
8 Distinguish between the behavior of one-way slab and two-way slabs.
9 Draw a neat sketch of a masonry footing.
10 Compare one-way footing and two-way footing in foundation?

Part-B

Answer All the following questions. (5X10M=50Marks)

11 A rectangular RC section having a width of 350 mm is reinforced with 2 numbers of 28 mm diameters at an effective depth of 550 mm. adopting M20 grade concrete and Fe415 HYSD bars. Determine the ultimate moment of resistance of the section. (10M)

OR

12 Explain working stress method with limit state method and ultimate load methods of design of R.C structures. (10M)

13 A rectangular beam of 300mm wide is reinforced with 4nos.#25mm dia at an effective depth of 600mm. a beam has to resistant of factored shear force of 400KN @ support section. Assume f_{ck}=20N/mm^2; f_y=415N/mm^2. Design the vertical stirrups. (10M)

OR

14 Compute the reinforcement required for a rectangular beam section for the following data. Size of the beam 300mm X 600mm, factored moment=115KNm, Factored torsion=45KNm, Factored shear=95KN. Use M 20 concrete and Fe 415 steel. (10M)

15 Design an axially loaded tied column 400 mm x 400 mm pinned at both ends with unsupported length of 3m to carry a factored load of 2300KN.Use M 20 & Fe 415. (10M)

OR

16 Design a uniaxial spiral circular short column with details as given below. (10M)
(i) Factored axial load = 300kN
(ii) Factored bending moment = 80kNm
(iii) Column size = 400mm
Use M20and Fe415 combination.

17 Design a two way slab for an office floor size 3.5m x 4.5m with discontinuous and simply supported edges on all the sides with the corners prevented from lifting and supporting a service live load of 4.4kN/m^2. AdoptM20 grade and Fe415HYSD bars. (10M)

OR

18 Design a dog legged stair for a building in which vertical distance between floor is 3.6m. LL=3kN/m^2, Landing width =1.25m, Support thickness=230mm and use M20 & Fe 415 grades respectively. (10M)

19 A rectangular RCC column of size 400 mm x 600 mm carrying an axial load of 1800kN.If the safe bearing capacity of the soil is 150kN/m^2.Design a suitable footing. Use M25 concrete and Fe415. (10M)

OR

20 Design a combined footing for the two columns at a multi-storey building. The columns of size 400mmx400mm transmit a working load of 300kN each and they are spaced at 5m c/c . The safe bearing capacity of soil at site is 200kN/m^2. Adopt M20 grade concrete and Fe415 grade steel. Sketch the details of reinforcements in the combined footing. (10M)