Roll No. ....

W472

B.Tech. (Weekend) EXAMINATION, 2020

(Fourth Semester)

REINFORCED CONCRETE DESIGN-I

CE(W)204

CE

Time : 2.5 *Hours*] [*Maximum Marks* : 80

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt any *four* questions. Assume any data if missing in the question paper.

1. (a) Mention the codal provisions for the modulus of rupture of concrete. Also, write down the difference between working stress and Limit state load methods.

(b) Explain the stress strain curve for concrete and mild steel with neat and clean diagram. **10,10**

2. Determine the moment of resistance of a beam using working stress method which has width 230 mm, overall depth 550 mm, cover to reinforcement 25 mm, includes 6-25 mm diameter bars of Fe 500 grade of steel using M 20 grade of concrete. **20**

3. A simply supported beam, 300 mm wide and 600 mm effective depth carries a uniformly distributed load of 55 kN/m, including its own weight over an effective span of 3.0 m. Design the beam for flexure, Use M 20 concrete. Draw the neat sketch showing reinforcement. **20**

4. A circular column of size 500 mm diameters has an effective length of 4.5 metres. The column is reinforced with 10 longitudinal bars of 20 mm diameters and spiral of 8 mm diameter at a pitch of 75 mm. Determine the sale load for column. Take M 25 and Fe 415. **20**

5. The flange of an isolated T-Beam is 125 mm thick and 1900 mm wide. Its web is 300 mm wide and the effective depth of the beam up to centre of the tensile reinforcement is 600 mm. The tensile reinforcement consists of 5 Nos. 25 mm diameter bars. The beam is simply supported over a span of 4 metres. Find out the maximum moment the beam can carry at a section. Take M 20 and Fe 500. **20**

6. Design the section for the following Data :
   (i) B.M. of 30 kN-m
   (ii) S.F. of 40 kN
   (iii) Torsional Moment of 35 kN-m. Design the section taking M 25 and Fe 500. **20**

7. Design a square footing carrying 1500 kN axial load from the column of size 450 × 450 mm. The safe bearing capacity of the soil is 130 kN/m^2 at a depth of 1.5 m. The coefficient of friction in between soil and concrete is 0.5. Use M 25 grade of concrete and Fe 500 grade of steel are to be used. **20**

8. Design a cantilever retaining wall to retain 2.5 m high embankment of the soil which weighs $19 kN/m^3$ with angle of repose 26^0. The safe bearing capacity of the soil is 120 kN/m^2 at a depth of 2.5 m. The coefficient of friction in between soil and concrete is 0.5. M 25 grade of concrete and Fe 500 grade of steel are to be used. **20**