Registration No: | | | | | | | | | | |

Total Number of Pages: 02 **B.Tech.**
PCCI4301

5th Semester Back Examination 2017-18
Design of Concrete Structures
BRANCH: CIVIL
Time: 3 Hours
Max Marks: 70
Q.CODE: B217

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.
Use of IS 456:2000 is permitted.
Assume suitable additional data wherever required

Q1 **Answer the following questions :** **(2 x 10)**

a) State two different types of *limit state*.

b) With physical observation, how can you distinguish between mild steel and HYSD steel.

c) Draw the stress block for limit state method of design at any section of a rectangular RCC beam under flexure and show the lever arm.

d) Why tension steel bars for simply supported beams are bent at an angle of 45 degree in the support zone?

e) Distinguish between column subjected to *concentric loading* and *eccentric loading*.

f) At what locations in a two way slab, torsional reinforcement is provided.

g) Differentiate between *one way shear* and *two way shear*.

h) What are the minimum and maximum amount of longitudinal reinforcement provided in a column as per IS codal provision?

i) State the advantage f a T beam.

j) Draw a typical single flight and show tread, riser, waist and going.

Q2 A double reinforced beam of size 250mmx 400 m (bd) is provided with tensile reinforcement of 4 bars of 12 mm dia and compressive reinforcement of 3 bars of 12 mm dia. The distance from extreme end upto centre of steel is 40 mm both at top and bottom. Calculate the ultimate moment of resistance of the beam. Use M20 and Fe415 steel. **(10)**

Q3 A reinforced concrete beam of bxd size , 200 mmx 400 mm carries an udl of 12 kN/m excluding the self weight over a simply supported beam of 6m effective span. The tension reinforcement provided is 4, 12 mm dia at middle zone and 2, 12 mm dia at support zone. Design the beam for shear considering both vertical stirrups and bent up bars. Show the c/s of shear reinforcement at extreme end and at centre of span. **(10)**

Q4 A simply supported beam of span, 6 m has an effective depth of 400 mm. The beam is reinforced with tension steel of 1.6 per cent. Check, whether the deflection control criteria of the beam is satisfied as per IS codal provision. Assume M20 concrete and Fe415 steel. **(10)**

Q5 Design the one way simply supported slab of 3m by 7m subjected to uniformly distributed imposed load of 2 kN/m^2 using M20 concrete and Fe415 steel. The load of floor finish is 1.5 kN/m^2 . The width of beams at the support is 300 mm. Show the reinforcement detailing. **(10)**

Q6 Design a circular column of 600 mm diameter with helical reinforcement subjected to an axial load of 1500 KN. Use M25 concrete and Fe 415 steel. **(10)**

Q7 Design an isolated footing for a square column of size 400mmx400mm with 8-20mm diameter longitudinal bars carrying service loads of 1500 KN with M20 and Fe 415. The safe bearing capacity of soil is 230KN/m^2 at a depth of 1 m below the ground level. **(10)**

Q8 **Write short notes on any TWO :** **(2x5)**

a) Stress-strain curve for mild steel and tor steel
b) Limit state of serviceability
c) Punching shear
d) Diagonal tension and diagonal compression