Seat No: _____ Enrollment No: _____

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech., Winter 2017 - 18 Examination

Semester: 1 **Date: 28/12/2017**
Subject Code: 03209102 **Time: 2:00 pm to 4:30 pm**
Subject Name: Advanced Design of Concrete Structures **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.
5. Use of IS 456-2000, SP-16,IS 875 is allowed.

Q.1 Compute the short term deflection of the beam at mid span under the service loads for simply supported beam of 5m having self weight of 15kN/m and central point load of 20kN. The beam section is 250mm X 600mm and also reinforced with 3 no 16 mm diameter bars at bottom. The material are M_{20} grade concrete and HYSD reinforcement of grade Fe $_{415}$. Assume suitable data. **(15)**

Q.2 Answer the following questions. (Attempt any three) (Each five mark) **(15)**

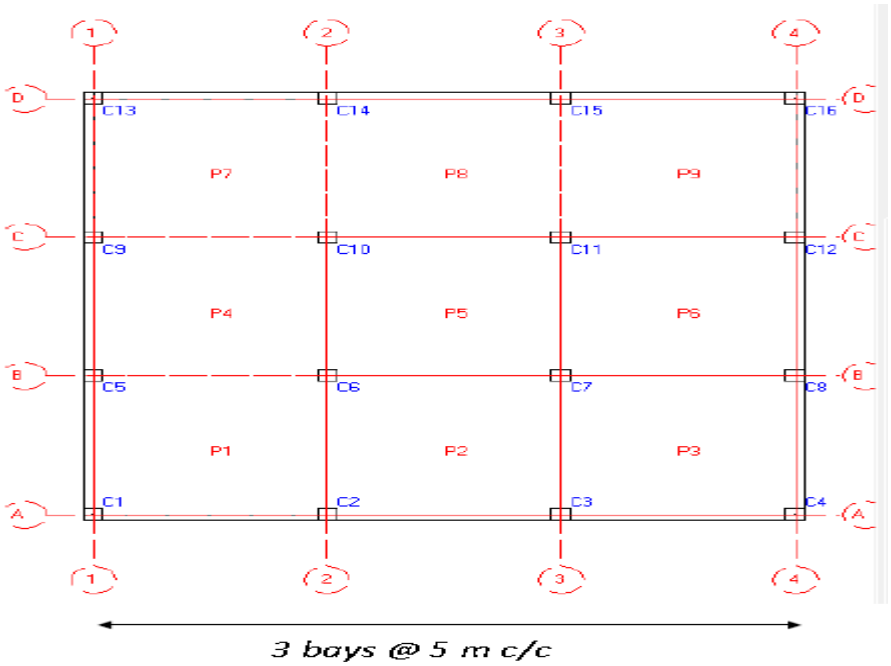
A) Differentiate between limit state method and working stress method.

B) What is a flat slab? Write structural advantages of it.

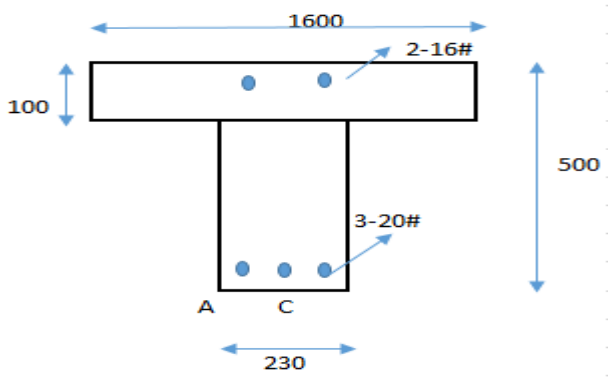
C) Write the limitations of Direct design method.

D) Define limit state and explain different types of limit states.

Q.3 A) Design corner panel P_7 by DDM flat plate supported on columns 500 mm square, for a Live Load = 3 kN/m^2, Floor Finish = 1.5 kN/m^2 use M_{20} and Fe_{415}. Assume clear cover = 20 mm. Effective Column Height = 3.3m. Bay spacing in X and Y direction = 5m c/c **(07)**



B) A simply supported T beam of span 5 m subjected to moment of 95 kNm at mid span. The section of beam is shown in figure. Calculate the crack width at corner A and center of tension face C as shown in figure. Use M_{20} grade concrete and HYSD reinforcement grade of Fe_{415}. **(08)**



OR

B) Design an annular raft foundation with following data: **(08)**
Internal diameter of shaft = 9m
Thickness of shaft = 200mm
ABP of soil at 3m depth = 250 kN/m^2
Unit weight of soil = 18 kN/m^3
Axial load on shaft = 20000kN
Earthquake moment at base of shaft = 24000kN*m
Earthquake shear at base of shaft = 1200kN
Permissible increase in ABP of soil when EQ is considered = 35%
The materials are M25 concrete and Fe 415 steel.
Q_{lim} = 3.45 for combination

Q.4 A) Design a circular water tank with flexible base and open at top for a capacity of 600000 liters resting on ground. The materials are M30 grade concrete and Fe 415 steel. **(07)**

OR

B) Design an interior panel of flat slab having equal panels of 6.5m X 6.5m. The building is braced with shear walls. The panels have drops 3m X 3m size. The depth of drop is 250mm and that of slab is 200mm. The internal columns are 500mm dia and column head is 1000mm in dia.The storey height above and below the slab is 4m. The loading is as follows: **(07)**
D.L= self weight + 2.7 kN/m^2
L.L= 4 kN/m^2
Use M_{20} concrete and Fe $_{415}$.

B) Design top dome for an intze tank with following data: **(08)**

1. Capacity = 1000000 liters
2. Height of staging = 18m up to bottom of tank
3. Wind load = 1.5kN/m^2
4. S.B.C. of soil = 235kN/m^2
5. Concrete = M30 grade for container, M20 for columns,bracing,foundations
6. Reinforcement = Fe 415