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**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST SEMESTER M.TECH DEGREE EXAMINATION, OCT 2020**

**Civil Engineering
(Structural Engineering)**

**01CE6107: ADVANCED THEORY AND DESIGN OF RC
STRUCTURES**

Max. Marks : 60

Duration: 3 Hours

Instructions: Answer any two questions from each Part

PART A

1. Design a simply supported beam $b = 300$ mm, $D = 550$ mm. Factored moment due to UDL is 350 kNm. Effective span 6.5 m, $f_{ck} = 25$ N/mm², $f_y = 415$ N/mm². (9)
2. a) Explain the effect of cyclic loading on concrete under uniaxial states of stress. (3)
b) Design the reinforcement in a column of size 300 mm diameter subjected to a factored axial load of 1500 kN and a factored moment 50 kNm. The unsupported length of the column is 3 m and is braced against side sway in both directions. Use M25 concrete and Fe 415 steel. Use helical reinforcement as stirrups. (6)
3. a) Compare limit state method with working stress method. (4)
b). Explain the design procedure for slender columns. (5)

PART B

4. a) What are the factors influencing crack width in flexural members? Briefly describe the mechanism of flexural cracking and how it is controlled in the design. (3)
b) A beam of width 230 mm and depth 400 mm having cover to reinforcement 25 mm is reinforced with 4 rods of 16 mm diameter. When the section is subjected to a BM of 100 kNm calculate the maximum crack width at the base. (6)
5. a) Explain the principle of shear wall analysis. (3)
b) Estimate the deflection of a simply supported rectangular RCC beam 300×600 mm having an effective span of 4 m subjected to a maximum bending moment of 210 kNm, of which 60% is due to permanent loads, grade of concrete M20 and grade of steel is Fe415. (6)

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