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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (R) (FT/WP) Examinations April 2026 (2024 Scheme)

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Course Code: PBCET404

Course Name: DESIGN OF CONCRETE STRUCTURES

Max. Marks: 40 Duration: 2 hours 30 minutes

Use of IS456:2000 and Column Design charts of SP 16 are permitted

PART A

(Answer all questions. Each question carries 2 marks) CO Marks

1	Define the terms (i) Design strength (ii) Partial safety factor		(2)
2	What is development length? Calculate the development length for 12 mm mild steel reinforcement in tension with M20 mix.		(2)
3	What are flanged beams? Where can we effectively utilize their contribution for moment of resistance?		(2)
4	When does a slab behave as a two way slab?		(2)
5	List the main criteria of serviceability to be considered in RC structures.		(2)
6	Define slenderness ratio of compression members. How are columns classified based on this ratio?		(2)
7	List any four shallow foundations with sketches.		(2)
8	What is punching shear in footings?		(2)

PART B

(Answer any one full question from each module, each question carries 6 marks)

Module -1

9	Determine the moment of resistance of a beam section with width 300mm, overall depth 500 mm and reinforced with 3# 25mm dia. Effective cover to reinforcement is 50mm. Use M30 concrete and Fe 415 steel. Also, calculate the limiting moment of resistance of the section and comment on the design and failure mode of the beam.		(6)
10	Design the shear reinforcement of a beam section of width 250mm and effective depth 420mm. The shear force at the support is 100kN and the percentage of tensile reinforcement is 0.6. Use M25 concrete and Fe 415 steel		(6)

Module -2

11 Design a rectangular beam section to resist a factored bending moment of 575kNm. The size of the section is limited to 300mm x 700mm overall. Use M 25 concrete and Fe 415 steel. (6)

12 Design and detail a simply supported slab for a room of interior dimension 5m x 4m subjected to an imposed load of 8kN/m^2. Thickness of supporting wall is 300 mm. Use M 25 concrete and Fe 415 grade steel (6)

Module -3

13 Design a circular column to carry an axial load of 1000kN. Use M25 concrete and Fe 415 steel. Draw the longitudinal section and a cross section showing the reinforcement. (6)

14 Design the reinforcement for a rectangular column 250 x 350mm subjected to an ultimate load of l200kN and ultimate moment of 60kNm with respect to the major axis. Use M25 concrete and Fe415 grade steel. Take effective cover as 50mm (6)

Module -4

15 Design a reinforced concrete footing for a rectangular column 400mm x 600mm bearing a load of 600kN. Safe bearing capacity of the soil is 120kN/m^2. Adopt M25 concrete and Fe415 grade steel (6)

16 Design a square footing for an axially loaded column of 450 mm x 450 mm size. Load on the column is 800kN. The safe bearing capacity of soil is 190kN/m^2. Use M30 concrete and Fe415 steel. (6)

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