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EIGHTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2012

CE 04 804 (A)—ADVANCED STRUCTURAL DESIGN—II

(2004 Admissions)

Time : Three Hours   Maximum : 100 Marks

IS : 2210-1990 ; IS : 1343 codes and SP 16 are permitted inside the examination hall.

Answer all questions.

I. (a) Briefly explain general classification of shells.

   (b) Differentiate between shell of revolution and shell of translation.

   (c) What are the advantages of folded plates over shells ?

   (d) Differentiate between plate action and slab action.

   (e) What are the advantages and disadvantages of Composite construction ?

   (f) Briefly explain structural action of shear wall.

   (g) What are the main forces acting on anchorage zone ?

   (h) Briefly explain the general principle of design of prestressed concrete beams.

$(8 \times 5 = 40 \text{ marks})$

II. (a) A reinforced shell having semi circular directrix is freely supported at the ends :

Radius of shell	=	8 m
Length of shell (2 L)	=	36 m
Thickness of shell (t)	=	75 mm

Calculate the membrane forces at X= 0, 9, 18 m and $\phi = 0, 30°, 60°, 90°$ under its own weight.

Or

   (b) A reinforced shell having circular directrix has the following dimensions :—

Radius	=	6 m
Span (2L)	=	30 m
Semi central angle (ϕ)	=	60°
Thickness (t)	=	75 mm

Calculate the maximum stress due to self weight only in the shell by beam theory and compare the values with result of the membrane theory.

(20 marks)

Turn over

III. (a) Explain in detail on different types of shear walls and design of shear walls.

Or

(b) Analyse the folded plate ABCDEF. The plates AB and EF are vertical, while the plate CD is horizontal. The plate BC and DE are inclined at 45° to the horizontal. All the plates are 12 cm thick and their widths are as follows :

AB and EF	=	1.25 m
BC and DE	=	4.0 m
CD	=	3.0 m
Live load	=	0.75 kN/m² of covered area
Distance between the transverse	=	10.0 m.

Draw the stress distribution diagram for the plates.

(20 marks)

IV. (a) A precast beam of size 150 mm × 300 mm and prestressed to have an effective stress of 12 N/mm² at top and zero at bottom. The beam is erected over a simple span of 6 m and a slab of size 300 mm × 80 mm is cast over it by propping. If the grade of concrete is same, obtain the resultant stresses. The live load on the slab is 600 kPa.

Or

(b) A prestressed concrete beam 100 mm × 300 mm in section is prestressed with a straight cable at an eccentricity of 60 mm. The effective prestressing force is 90 kN. The span of the beam is 6 m and the total load on the beam including the self weight is 2.5 kN/m. Determine the pressure line at quarter span and midspan sections.

(20 marks)

[3 × 20 = 60 marks]