

D 1052

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Name.....

Reg. No.....

**EIGHTH SEMESTER B.TECH. (ENGINEERING) DEGREE
EXAMINATION, DECEMBER 2009**

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

(2004 admissions)

Time : Three Hours

Maximum : 100 Marks

*IS : 2210—1900 ; IS : 1343 Codes and SP 16 are permitted inside the examination hall.
Answer all questions.*

1. (a) What are the assumptions made in design of prestressed concrete members ?
(b) Explain in detail about Anchorage zone.
(c) What are the assumptions made in the design of folded plates ?
(d) Explain the need for bending theory.
(e) Draw the stress distribution for the various load conditions for composite construction with prefabricated prestressed concrete beam and cast-in-situ slab.
(f) Write short notes on membrane theory.
(g) Draw a circular shell and indicate the various components.
(h) Classify the different types of shell roofs.

(8 × 5 = 40 marks)

2. (a) A R.C. circular shell has the following :—

Radius = 8 m.

Span = $2L = 30$ m.

Semicentral angle = $\phi = 60^\circ$.

Thickness = $t = 80$ mm.

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

Or

- (b) A R.C. shell having semicircular directrix is freely supported at the ends :

Radius of the shell = 8 m.

Length of the shell = $2L = 40$ m.

Thickness of the shell = 75 mm.

Calculate the membrane forces at $X = 0, 10, 20$ m. and $\phi = 0^\circ, 30^\circ, 60^\circ, 90^\circ$ under its own weight.

Turn over

3. (a) Analyse the folded plate ABCDEF. The plates AB and EF are vertical, while the plate CD is horizontal. The plates BC and DE are inclined at 45° to the horizontal. All the plates are 15 cm. thick and their width are as follows :

AB and EF = 1.5 m.

BC and DE = 4.5 m.

CD = 3.5 m.

Live load = 0.75 kN/m^2 of covered area.

Distance between the traverse = 15 m.

Draw the stress distribution diagram for the plates.

Or

- (b) Write in detail about the design procedure of shear walls.

4. (a) A post-tensioned prestressed concrete rectangular beam of effective span 30 m. carry a dead load of 15 kN/m . in addition to a live load of 22 kN/m . Adopting M35 concrete and assuming 20 % loss of prestress, design the section of the beam at midspan, the prestressing force and the eccentricity.

Or

- (b) A prestressed concrete beam $150 \times 300 \text{ mm}$. in section is prestressed with a straight cable at an eccentricity of 50 mm. The effective prestressing force is 75 kN. The span of the beam is 5 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.

(3 × 20 = 60 marks)