END TERM EXAMINATION

SIXTH SEMESTER [B.Tech] MAY-JUNE 2016

Paper Code: ETCE-310	Subject: Advanced Structural Design
Time: 3 Hours	Maximum Marks: 75

Note: Attempt any five questions including Q.no.1 which is compulsory. Assume missing data suitably. Use of IS 1983:2002 & IS 800:2007 is permitted.

Q1 Answer the following: (5x5=25)
- (a) Discuss general principles of seismic analysis.
- (b) Explain Lee-McCall System of prestressing in detail.
- (c) What are various loads acting on Transmission towers?
- (d) Write design steps for underground rectangular tank.
- (e) What do you understand by ductile detailing of Building. Explain with neat sketches?

Q2 (a) What are various advantages and disadvantages of prestressed concrete?   (4)

(b) A prestressed concrete beam of section 200 mm x 300 mm is used over an effective span of 7 m to support an effective load of 5 KN/m, density of concrete is 24 KN/m³. Find the followings: (8.5)
- (i) Prestressing force required for zero extreme fibre stresses at centre of span.
- (ii) Prestressing force required for zero Extreme fibre stresses at centre of span, if cable is eccentric at 100 mm from bottom.

Q3 A prestressed concrete beam of rectangular section 150 mm x 300 mm is prestressed by 7 mm wires located 100 mm from bottom of beam. If wires are initially tensioned to a stress of 1100 N/mm², calculate their stress at transfer and the effective stress after all losses.   (12.5)

Given data:	up to time of transfer	Total
Relaxation of steel	35/mm²	70 N/mm²
Shrinkage of concrete	100 x 10⁻⁶	300 x 10⁻⁶
Creep coefficient	-	1.6
Es	10 KN/mm²	
Ec	31.5 KN/mm²	

Q4 Design following components of an intze tank for 8 lakh litre capacity.
(a) Upper dome   (b) Upper ring beam   (c) Cylindrical wall   (12.5)

Q5 (a) What are various types of retaining walls, explain with sketches?   (4)
(b) Find out the section of cantilever retaining wall & check it against overturning for following data. Use M20 & Fe 415.   (8.5)

Height of earth embankment	:	3 m above GL
Unit weight of soil	:	18 KN/m³
Angle of repose	:	30⁰
Safe bearing capacity	:	120 KN/m²
Coefficient of friction	:	0.5

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P1/2

Q6 Design a gantry girder of 7 m span for a mill building to carry an electric overhead travelling crane having the following data: **(12.5)**

1. Crane capacity : 250 KN
2. Weight of crab : 60 KN
3. Span of crab b/w rails : 2 m
4. Weight of crane : 200 KN
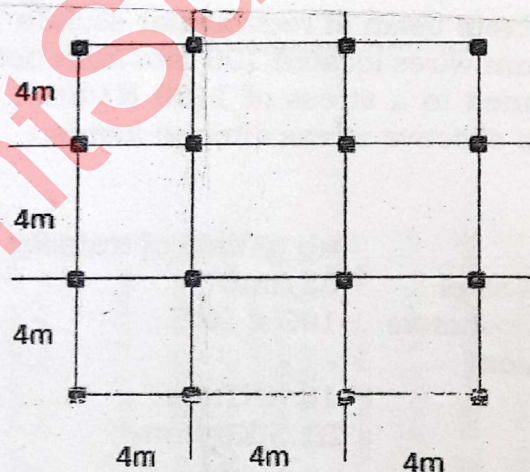5. Hook approach : 1.1 m
6. Wheel base distance : 3 m

Q7 (a) What is pressed rectangular steel tank & why it is preferred over other steel tanks. **(3)**

(b) Write a short note on design of box culvert. **(3)**

(c) Write design steps involved in design of rectangular steel tanks. **(6.5)**

Q8 Perform equivalent static analysis for a five storey building and calculate storey shear and base shear (plan shown in fig.). **(12.5)**

Beam size : 300 x 500 mm
Column Size : 400 x 400 mm
Slab thickness : 150 mm
Weight of Brick masonry: 19 KN/m³
Storey height : 3.5 m
Location of building : Noida

4m

4m

4m

4m   4m   4m

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