

EKS-342

**B.E. VII Semester (CGPA) Civil Engg.
Examination 2017**

ADVANCED STRUCTURAL DESIGN - I (RCC)

Paper : CE-702

Time Allowed : Three Hours

Maximum Marks : 60

Note : Attempt all questions necessary.

- Q.1. a) Explain the function of Shear wall. 4
 b) Derive the expression for moment of resistance of a
 rectangular shear wall. 8
- OR
- a) Define Substitute frame. 4
 b) Explain the difference between a braced and unbraced
 building. What condition should be satisfied by a
 braced building. 8
- Q.2. a) Define difference types of retaining walls with neat
 sketches. 8
 b) Discuss the function of shear key. 4
- OR
- Design the stem and heel of a cantilever retaining wall to retain levelled earth 5 m above base level. Take density of soil as 18 kN/m^3 and angle of repose as 30° . Safe bearing capacity of soil is 160 kN/m^2 . Assume all data if necessary and give reinforcing detailing with neat sketch. 12

(2)

- Q.3. Design the top dome, top ring beam and cylindrical wall of an Intze tank the diameter of tank is 10 m and height of cylindrical wall is 4m. Use M20 concrete and Fe415 and give reinforcing detailing with neat sketch. 12

OR

- ✓ Design a rectangular tank 6m × 4m × 3m size resting on firm ground. Assume all data necessary. 12

- Q.4. a) Derive the expression for finding horizontal and vertical pressure exerted by stored material of height "h" in silo. Use Janssen theory. 6
- b) Using Airy's theory, derive an expression for horizontal pressure at any depth h below the top of bin. 6

OR

Design the side walls of a bunker for storing 500 kN coal consider 12

- i) Unit weight of coal - 9500 N/m^3
- ii) Size of bunker - $4\text{m} \times 4\text{m}$
- iii) Angle of repose - 30°
- iv) Hopper portion height - 2m with a central hole of $0.5\text{m} \times 0.5\text{m}$ and give the reinforcing details.

- Q.5. List the various types of losses of prestress. Explain in details. 12

OR

- a) Differentiate between prestressing and post-tensioning. 4
- b) A prestressed concrete beam $400 \text{ mm} \times 600 \text{ mm}$ in section has a span of 8m and is subjected to a uniformly distributed load of 18 kN/m including the self weight of the beam the prestressing tendons all located at the lower third point and provide an effective prestressing force of 960 kN. Determine the extreme fibre stresses in concrete at the midspan section. 8

