

**FACULTY OF ENGINEERING & TECHNOLOGY**  
**M.E(Structural Engg) Year Examination - June- 2015**  
**EL-I Advanced Design of Concrete Structure**  
**(Revised)**

[Time: Three Hours]

[Max. Marks:80]

“Please check whether you have got the right question paper.”

N.B

- i) Solve any two questions from each section.  
 ii) Is 456, 1343 1893, 3370, are allowed.

## SECTION-A

- Q.1 a) Explain isotropically reinforced simply supported square slab subjected to udl over its entire surface by virtual work method. 10  
 b) A simply supported circular slab of radius 2:8m is reinforced with 10mm bars at 180mm c/c in two mutually perpendicular directions .Average effective depth is 100mm and overall depth of 125mm. Use M20 & fe415 . Determine how much service load it can carry. Take finishing load as  $1\text{KN}/\text{m}^2$ . 10

- Q.2 Design hopper bottom of a rectangular bunker of capacity 300KN to store coal using M20 & fe415 . Unit weight of coal is  $8\text{KN}/\text{M}^3$  .Angle of repose of coal = $25^\circ$  20

- Q.3 Design a flat bottom circular elevated water tank with dome roof of diameter 12m and total height 3.2. It is to be supported by a ring beam of diameter by 9m.The ring beam is to be supported by eight columns.Use M25 concrete &Fe415 steel.Design top dome , top ring beam and cylindrical wall. 20

## SECTION-B

- Q.4 Design a post –tensioned prestressed concrete two –way slab 6m ×8m in size to support a live load of  $3\text{KN}/\text{m}^2$ . If cables of 4 wires of 5mm diameter stressed to  $1000\text{ N}/\text{mm}^2$  are available for use. Determine the number of cables in the two principal directions . The stresses in concrete not to exceed 14 Mpa in compression and tensile stresses are not permitted under Service loads . The loss ratio is 0.8. check for limit states of serviceability and collapse. 20

- Q.5 A composite section is made up of a precast pretensioned rib 100m wide by 200mm deep with cast in situ slab 400mm wide by 40mm thick . The beam with an effective span of 5m is prestressed by an effective force of 150KN at an eccentricity of 33.33mm. The live load on the composite beam is 8 KN/ m. The modulus of elasticity of precast Beam concrete is  $35\text{KN}/\text{mm}^2$ .While that of concrete in the cast in situ slab is  $28\text{KN}/\text{mm}^2$ . Loss ratio is 0.85. Assuming propped type of construction determine the long term deflection of the composite beam if creep coefficient is 1.6. 20

- Q.6 A non cylinder prestressed concrete pipe of internal diameter 800mm and thickness of concrete shell 74mm conveys water at a working pressure of 1.5 Mpa . The length of each pipe is 4m.The pipes are supported on pedestals at 4m intervals. The longitudinal compressive force of prestress in the pipe due to prestressing is 3 Mpa . check for safety of pipe for flexural stresses as per IS considering the pipe as a hollow circular section spanning over 4m. 20