

M.Tech. 3rd Semester (Civil Engg.)

Examination, December-2018

SPECIALIZATION, IN STRUCTURAL DESIGN

Paper- MTSD-301

Design of Structure-III

Time allowed : 3 hours]

[Maximum marks : 100

Note: Attempt any five questions. All questions carry equal marks use of IS 456 allowed. Assume suitable data if necessary.

1. Design a silo for storing maize having unit weight of 6870 N/m^2 . The silo has 6m internal diameter and height of cylindrical-portion is 15m. The conical dome has a slope of 40° with horizontal and has an opening of 60 cm diameter. Use Airy's Theory. Take $\mu = 0.521$ and $\mu = 0.432$ Use M20 grade concrete. 20
2. Design a chimney of 30 m height having external diameter of 2.6 m throughout the height. The Chimney has a fire brick lining of 100 mm thickness provided up to a height of 24 m base with an air gap of 100 mm. Assume the temperature of gases above the surrounding air as 240°C . Take α for R.C.C. as 11×10^{-6} per degree and $E_s 2 \times 10^5 \text{ N/mm}^2$. Use M 20 grade concrete. 20
3. Distinguish between a bunker and a silo. Using Airy's Theory derive an expression for calculating the height up to which a bin behaves as a shallow one. 20

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4. What are construction aspects that are considered for silos construction? Explain all in detail with suitable examples. 20
5. Design a side wall to retain earth embankment 3m high above the ground level. The unit wt of the earth is 18 KN/m³ and its angle of repose is 30°. The embankment is horizontal at its top. The safebearing capacity of soil may be taken as 100 KN/m² and the coefficient of friction between soil and concrete may be taken as 0.5 use M20 mix and Fe 500 bars. 20
6. Explain the construction aspects of bunker's in detail. 20
7. Design a roof slab of a room measuring 5m × 6m size. The slab is simply supported on all the four edges with corners held down and carries a super imposed load of 5000 N/m² including floor finishing. Use M25 Mix and Fe 415 bars. 20
8. Write short notes on 20
 - (i) Different methods of Computing Static pressure.
 - (ii) Difference between Bunkers, Silos and Chimneys and marine structure.
 - (iii) Total vertical load of grains transferred to the wall.
 - (iv) Different types of stress acting on a dom and their effects.