(Time: 4 Hours) (Total Marks: 80)

N.B: 1.Question number 1 is compulsory; attempt any three out of the remaining five questions.
2. Use of relevant IS codes is permitted.
3.Assume suitable data wherever necessary.

QP-10066849

1.Attempt **ANY *FOUR*** **20**

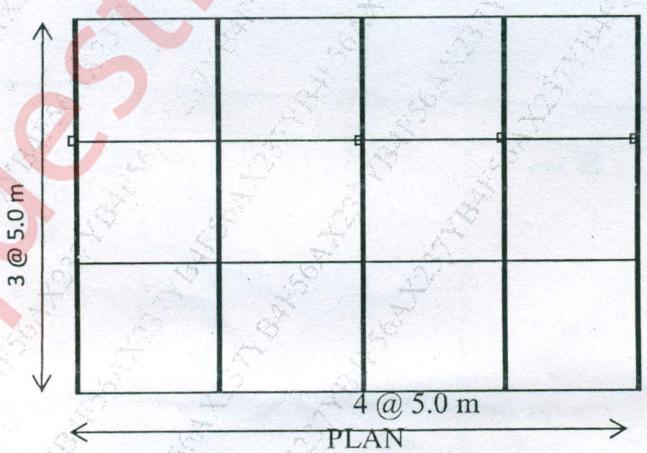
(a)Explain importance of ductile detailing in RCC design.
(b)Differenciate between a rigid base and flexible base in water tanks based on their structurual behaviour.
(c)Write down step by step procedure for design of isolated footing.
(d)Explain any three general guidelines for planning the staircase.
(e)Differenciate between static and dynamic loads.Explain different types of dynamic loads.

2. Design a cantilever retaining wali to retain 5.2 m earth above ground level. Take SBC 200 kN/m^2 and density of soil18 kN/m^3 respectively. Use M20 and Fe415 steel, $\mu = 0.6$, $\emptyset = 30$deg. Depth of foundation is 1 m below ground level.Draw reinforcement details. **20**

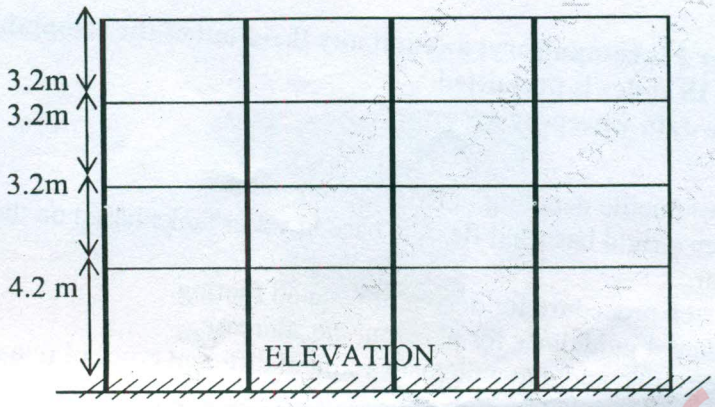
3. Design a dog- legged stair for a building in which the vertical distance between floors is 3.6m. The stair hall measures 3.5m x 5m. The L.L may be taken as 2.0 kN/m^2. Use M20 concrete and Fe415 steel bars.Draw reinforcement details. **20**

4. Design a circular water tank resting on ground by approximate method for a capacity of 3 lac liters. The water tank has flexible base. Use M25 grade of concrete and Fe500 steel. Draw reinforcement detail. **20**

5. (a) The building shown in figure is located in Mumbai. The soil conditions are hard and the entire building is supported on a raft foundation. The R. C. frames are infilled with brick-masonry. The lumped weight due to dead loads is 10 kN/m^2 on floors The floors are to cater for a live load of 3 kN/m^2 on floors. Determine design seismic load on the structure as per IS:1893(Part1)2016. **14**

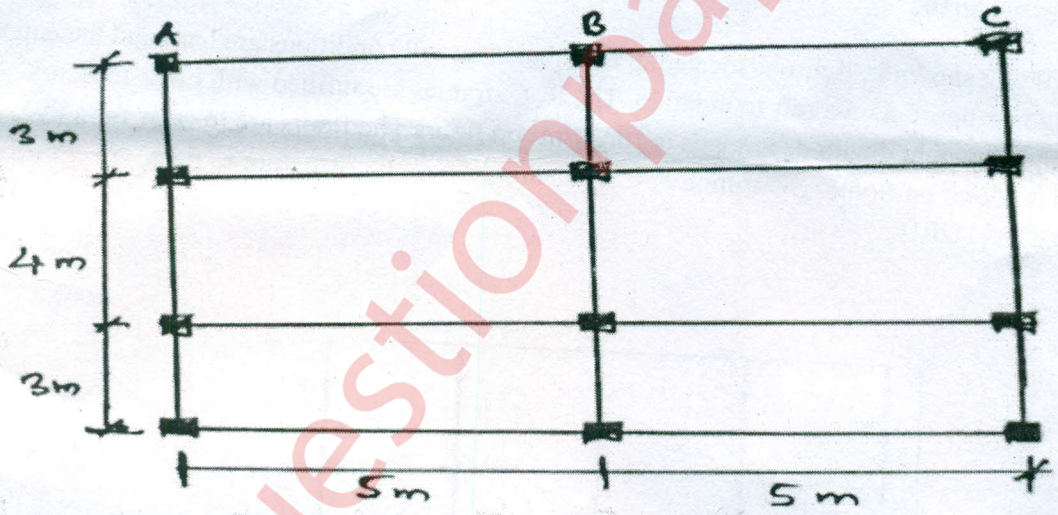


PLAN



b) In a post-tensioned beam cable is subjected to a stress of 1000 N/mm2.If the slip is found to be 3mm.find the percentage loss due to this cause. The beam is 15m long.
Take Es=200 kN/mm2 **06**

6. The framing plan of a building is shown below.The design live load is 3 kN/m^2 and floor finish is 1 kN/m^2.All external walls are 230mm thick and internal walls are 150mm thick.Slab thickness is 200mm and floor to floor height is 3.2 m. All columns are of 450mmx450mm.Grade of concrete is M20 and steel is Fe415.
Design beam ABC and draw reiforcement details.(Design of slab is not required) **20**



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