Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B. Architecture (2012 & Onwards) (Sem.–3)

# STRUCTURE DESIGN-I

Subject Code : BACH-307

M.Code : 70419

Time : 3 Hrs. Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. **Attempt SIX questions. Q. No. 1 is COMPULSORY. Attempt any FIVE from the rest.**

1. a. What do you mean Bending Stress? (5×2=10)
   b. What is difference between column and beam?
   c. What is difference between gross bearing capacity and net bearing capacity?
   d. What is difference between short column and slender column?
   e. What is difference between tensile stress and bending stress?
2. Design brick Column 3000mm hight for load of 400 kN. And a horizontal force of 1.0 kN Assume compressive strength of brick 100kg/sq cm (draw neat sketches). (10)
3. Calculate the base pressure diagram developed in brick retaining wall of following case?

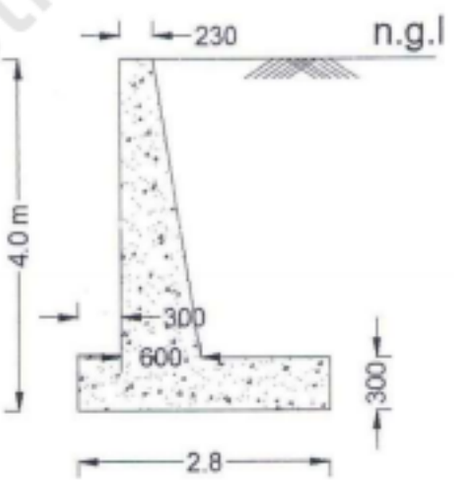


**FIG. 1**

Density of Soil $\gamma$ = 18 kn /$m^3$

Density of concrete = 24 Kn/$m^3$

Angle of repose $\varphi$ = 30 degree. (10)

4. Design a brick column for compressive load of 300kN and bending moment 10 kN-m. Assume safe compressive stress of bricks 90 kG per square cm. (10)

5. Find factor of safety against overturning in following diagram? (10)

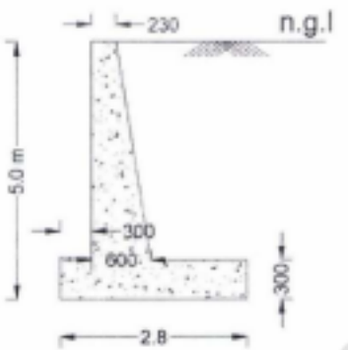


**FIG. 2**

6. Explain rankine formula for minimum depth of foundation? What will be the minimum depth of foundation for maximum stress on soil below foundation 200 kN/square meter, assume angle of repose of soil –30 degree? (10)

7. Write short note on following : (10)
   a. compressive strength.
   b. effective length of column
   c. Moment of resistance
   d. Shear stress in beam

8. Explain middle third rule? Find base pressure for following diagram : (10)

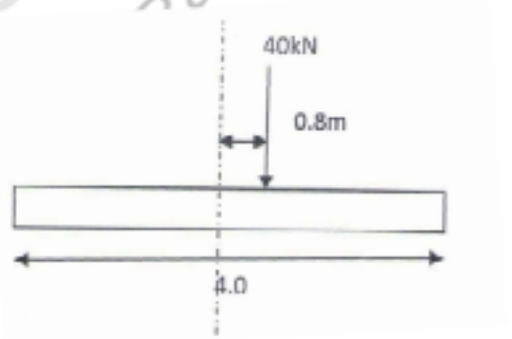


**FIG. 3**

Base resting on elastic pad length is 4m and width is 1.0m (eccentricity of load is 0.8m)

9. A timber beam, 2m long, section depth 200 and width 100mm is simply supported on edges, find the bending tensile and compression stresses if a UDL of 1kN is applied on it. (10)

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**