1. A square foundation is 2m×2m in plan. The soil supporting the foundation has a friction angle of $\phi' = 25^\circ$ and c' = 20kN/m2. The unit weight of soil, Υ, is 16.5 kN/m^3. Determine the allowable gross load on the foundation with a factor of safety of 3. Assume that the depth of the foundation is 1.5m and that general shear failure occurs in the soil.
   a) 1438 kN
   b) 1250 kN
   c) 500 kN
   d) 1000 kN Ans: a
2. For a shallow foundation, B= 0.6m, L=1.2m, and Df= 0.6m The known soil characteristics are as follows:
   Soil: $\phi' = 25^\circ$, c'= 48kN/m2 , , Υ= 18 kN/m3, Modulus of elasticity,Es=620 kN/m2, Poisson's ratio,μ_s=0.3.
   Calculate the ultimate bearing capacity.
   a) 549.32kN/m^2
   b) 640kN/m^2
   c) 500.01kN/m^2
   d) 480.32kN/m^2 Ans: a
3. In a medium to dense sand, stiff clay or stiff silt extending up to about 6m to 8m, what type of foundation is suitable?
   a) Raft foundation
   b) Friction piles
   c) Caisson foundation
   d) Shallow foundation Ans: d
4. A footing 1.8m×2.5m is located at a depth of 1.5m below the ground surface in a deep deposit of a saturated overconsolidated clay. The groundwater level is 2m below the ground surface. The

undrained shear strength from a direct simple shear test is 120kPa and Υ_{sat} =20 kN/m^3. Determine the allowable bearing capacity,assuming a factor of safety of 3, for short term condition. Neglect the effects of embedment.

a) 360kPa
b) 264kPa
c) 500kPa
d) 320kPa

Ans: b

5. What type of foundation distributes the weight of the structure across a large area, thus reducing the induced stresses in the underlying soils?

a) Isolated footing
b) Combined footing
c) Mat foundation
d) Strap footing

Ans; c