BAE 523 Soli Mechanics Test

(1)A specimen of sand has a porosity of 35 percent, and the specific gravity of the solids is

2.70. Compute the specific weight of this soil in pounds per cubic foot (kilograms per cubic

meter) in the saturated and in the submerged state.

(2) Soil having a void ratio of 1.05 contains particles having a specific gravity of 2.72. Compute the hydraulic gradient that will produce a quicksand condition.

(3) A concentrated vertical load of 6 kips (26.7 IcN) is applied at the ground surface. Compute the vertical pressure caused by this load at a point 3.5 ft (1.07 m) below the surface and 4 ft (1.2 m) from the action line of the force.

(4) A rectangular concrete footing 6 x 8 ft (182.9 x 243.8 cm) carries a total load of 180 kips

(800.6 kN), which may be considered to be uniformly distributed. Determine the vertical

pressure caused by this load at a point 7 ft (213.4 cm) below the center of the footing.

(5) Two samples of a soil were subjected to triaxial compression tests, and it was found that

failure occurred under the following principal stresses: sample 1, *(T1 =* 6960 lb/ft2 (333.2

kPa) and cr3 = 2000 lb/ft2 (95.7 kPa); sample 2, *(T1* = 9320 lb/ft2 (446.2 kPa) and *V3 =*

3000 lb/ft2 (143.6 kPa). Find the cohesion and angle of internal friction of this soil,

trigonometrically .

(6) Sheet piling is to function as a cantilever retaining wall 5 ft (1.5 m) high. The soil weighs

110 lb/ft3 (17.28 kN/m3) and its angle of internal friction is 32°; the backfill has a horizontal

surface. Determine the required depth of penetration of the bulkhead.

(7) A wall footing carrying a load of 58 kips/lin ft (846.4 kN/m) rests on the surface of a soil

having these properties: w = 105 lb/ft3 (16.49 kN/m3); *c =* 1200 lb/ft2 (57.46 kPa); *4> =*

15°. Applying Terzaghi's formula, determine the minimum width of footing required to

ensure stability, and compute the soil pressure associated with this width.

(8) A structure is to be supported by 12 friction piles of 10-in (254-mm) diameter. These will

be arranged in four rows of three piles each at a spacing of 3 ft (91.44 cm) in both directions.

A test pile is found to have an allowable load of 32 kips (142.3 kN). Determine the

load that may be carried by this pile group.

(9)Describe Economics of Cleanup Methods in Soil Mechanics

(10) In a laboratory test, a load was applied to a soil specimen having a height of 30 in (762.0

mm) and a void ratio of 96.0 percent. What was the void ratio when the load settled A in

(12.7mm)?