GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022
B. Tech Degree Examinations, December – 2020
(Fifth Semester)
BCEPC 5040 – GEOTECHNICAL ENGINEERING-II
(Civil Engineering)

Time: 2 hrs   Maximum: 50 Marks

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)   **(1 x 10 = 10 Marks)**

Q.1. Answer _ALL_ questions   **[CO#]   [PO#]**

a. According to Coulomb's wedge theory, the active earth pressure slides the wedge   1   2,3
    (i) Down and outwards on a slip surface   (ii) Up and inwards on a slip surface
    (iii) Horizontal upward and parallel to base   (iv) Horizontal inward and parallel to base

b. The passive earth pressure of a soil is proportional to (where φ is the angle of internal friction   1   2,3
    of the soil.)
    (i) $\tan(45° - \varphi)$ (ii) $\tan(45° + \varphi)$
    (iii) $\tan^2(45° - \varphi)$ (iv) $\tan^2(45° + \varphi)$

c. The lateral earth pressure on a retaining wall   1   2,3
    (i) Is equal to mass of the soil retained   (ii) Proportional to the depth of the soil
    (iii) Proportional to the square of the depth of the soil   (iv) Proportional to the internal friction of the soil

d. The bearing capacity of a soil depends upon   3   2
    (i) Size of the particles   (ii) Shape of the particles
    (iii) Cohesive properties of particles   (iv) All the above

e. Terzaghi's bearing capacity factors Nc, Nq and Nr are functions of   3   2
    (i) Cohesion only   (ii) Angle of internal friction only
    (iii) Both cohesion and angle of internal friction   (iv)None of the above

f. The minimum centre to centre distance of friction piles of 1 m diameter, is   2   2
    (i) 2 m   (ii) 2m to 3 m
    (iii) 3 m to 4 m   (iv) 5 m

g. Pile foundations are generally preferred to for   2   2
    (i) Bridge foundations   (ii) Sky scrapper buildings
    (iii) Residential buildings   (iv) Runways

h. Negative skin friction on piles   2   2
    (i) Is caused due to relative settlement of the soil   (ii) Is caused in soft clays
    (iii) Decreases the pile capacity   (iv) All of the above

i. Which sample has the natural structure of soil as modified   4   2
    (i) Undisturbed   (ii) Disturbed

(iii) Representative   (iv) Non-remoulded

j. The maximum shear stress occurs on the filament which makes an angle with the horizontal   5   2
plane equal to

(i) 30°   (ii) 45°

(iii) 60°   (iv) 90°

PART – B: (Short Answer Questions)   (2 x 5 = 10 Marks)

Q.2. Answer *ALL* questions

		[CO#]	[PO#]
a.	Differentiate active earth pressure and passive earth pressure	1	2,3
b.	What is total and differential settlement	3	2
c.	What is static load test on pile	2	2
d.	List the different forces acting on the well foundation	2	2
e.	Why is it important to take rock core samples	5	2

PART – C: (Long Answer Questions)   (6 x 5 = 30 Marks)

Answer *ANY FIVE* questions

		Marks	[CO#]	[PO#]
3.	Determine the passive earth pressure by Rankine's theory per unit run for a retaining wall 4m high with i=15°, ϕ=15 ° and γ=19 kN/m³. The back face of the wall is smooth and vertical	6	1	2,3
4.	State the different types of retaining walls. Explain any one in detail	6	1	2,3
5.	A square footing is required to carry a net load of 1200 kN. Determine the size of the footing if the depth of foundation is 2 m and the tolerable settlement is 40mm. The soil is sandy with N=12. Take a factor of safety of 3. The water table is very deep. Use Terzahi,s equation	6	3	2
6.	Discuss Meyerhof,s bearing capacity theory	6	3	2
7.	A concrete pile 30 cm diameter is driven into a medium dense sand (φ =35, γ =21 kN/m³, K=1 and δ =0.7) for a depth of 8m. Estimate the safe load, taking a factor of safety of 2.5	6	2	2
8.	What are the various components of a well foundation? What are their uses	6	2	2
9.	Enumerate the various steps considered in the planning of sub-surface exploration programme	6	2	2
10	How do you use the SPT results in foundation design	6	2	2

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