



**SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR**  
Siddharth Nagar, Narayanavanam Road – 517583

**QUESTION BANK (DESCRIPTIVE)**

**Subject with Code :** GE-II(13A01702)

**Course & Branch:** B)Tech - CE

**Year & Sem:** IV-B)Tech & I-Sem

**Regulation:** R13

**UNIT –V**

**PILE FOUNDATIONS AND WELL FOUNDATIONS**

1. What do you understand by the term 'efficiency of a pile group'? Derive the expression of spacing Between friction piles for 100% efficiency of the pile group. **[10M]**
2. A pile not resting on rock, derives 60% of its ultimate axial capacity from skin friction and the Balance 40% from end bearing. If a safe load of 33% of the ultimate capacity is applied to the pile, will it be resisted by skin friction or end bearing? Discuss why? **[10M]**
3. Why is the theoretical approach of estimating axial pile capacity more popular than the other Approaches? **[10M]**
4. How would you determine the settlement of pile groups in different soils? **[10M]**
5. A precast concrete pile 30 cm  $\times$  30 cm in cross section is driven by hammer. The maximum rated hammer energy = 35 kN - m. The weight of the ram = 35.5 kN, the total length of the pile = 20 m, the hammer efficiency = 0.8, the coefficient of restitution = 0.45, the weight of the pile cap = 3.2 kN, and the number of blows for the last 3.0 cm of penetration is 5. Estimate the allowable pile capacity by using:
  - A) The E N formulae with FS = 6
  - B) The modified E N formulae with FS = 4
  - C) The Danish formula with FS = 4. **[10M]**
6. A group of 16 piles of 50 cm diameter is arranged with a centre to centre spacing of 1.0 m. The piles are 9 m long and are embedded in soft clay with cohesion 32 kN/m<sup>2</sup>. Bearing resistance may be neglected for the piles - Adhesion factor is 0.6. Determine the ultimate load capacity of the pile group. **[10M]**
7. A square group of 9 piles was driven into soft clay extending to a large depth. The diameter and length of the piles were 30 cm and 10 m respectively. If the unconfined compression strength of the clay is 90 kN/m<sup>2</sup> and the pile spacing is 90 cm centre to centre, what is the capacity of the group? Assume a factor of safety of 2.5 and adhesion factor of 0.75. **[10M]**
8. A) What are the conditions where a pile foundation is more suitable than a shallow foundation? **[5M]**
  - B) Discuss various dynamic formulae. What are their limitations and validity? **[5M]**
9. Briefly explain how the load carrying capacity of a pile is determined using pile load test. **[10M]**
10. A) What are the conditions where a pile foundation is more suitable than a shallow foundation **[2M]**
  - B) Describe various types of pile foundations **[2M]**

- C) Discuss different methods for installation of piles [2M]
- D) What is negative skin friction? [2M]
- E) Discuss the uses of penetration tests for the estimation of load carrying capacity of piles [2M]

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1. If the piles transmit the load through their bottom tips the piles are known as [     ]  
A) Friction piles    B) driven piles    C) end bearing piles    D) sheet piles
2. If the piles transfer the load through skin friction between pile and surrounding soil, the pile is known as [     ]  
A) Friction piles    B) driven piles    C) end bearing piles    D) sheet piles
3. If the piles are driven into the soil by applying blows of a heavy hammer on their tops is known as [     ]  
A) Driven pile    B) Driven and cast – insitu pile    C) bored and cast – insitu piles    D) screw piles
4. If the piles are formed by driving a casing with a closed bottom end and later filled with concrete then the pile is known as [     ]  
A) Driven pile    B) Driven and cast – insitu pile    C) bored and cast – insitu piles    D) screw piles
5. If the piles are formed by excavating a hole into the ground and then filling it with concrete, then the pile is known as [     ]  
A) Driven pile    B) Driven and cast – insitu pile    C) bored and cast – insitu piles    D) screw piles
6. If the piles are screwed into the soil then the pile is known as [     ]  
A) Driven pile    B) Driven and cast – insitu pile    C) bored and cast – insitu piles    D) screw piles
7. If the piles are jacked into the soil by applying a downward force with the help of a hydraulic jack is known as [     ]  
A) Driven pile    B) Driven and cast – insitu pile    C) jacked piles    D) screw piles
8. The piles are used to transfer the load of structure to a suitable stratum by ending and bearing then the pile is known as [     ]  
A) Load bearing pile    B) compaction pile    C) tension pile    D) sheet pile
9. If the piles used to increase the relative density then the pile is known as [     ]  
A) Load bearing pile    B) compaction pile    C) tension pile    D) sheet pile
10. If the piles are used to anchor down structures subjected to hydrostatic uplift force then the pile is known as [     ]  
A) Load bearing pile    B) compaction pile    C) tension pile    D) sheet pile
11. The piles used as retaining structures are known as [     ]  
A) Load bearing pile    B) compaction pile    C) tension pile    D) sheet pile
12. The piles used to protect water – front structures from impact of ships or vessels are known as [     ]  
A) Load bearing pile    B) compaction pile    C) tension pile    D) Fender piles
13. The piles used to provide anchorage for anchored sheet piles are known as [     ]  
A) Load bearing pile    B) compaction pile    C) tension pile    D) Anchor piles
14. The ultimate capacity of a single pile driven into sand is obtained by using the equation [     ]  
A)  $Q_u = Q_p + Q_s$     B)  $Q_p = Q_u + Q_s$     C)  $Q_s = Q_p + Q_u$     D)  $Q_u = Q_p + Q_t$
15. When the soil layer surrounding a portion of pile shaft settles more than the pile, a downward drag occurs on pile is known as [     ]  
A) Skin friction    B) positive skin friction    C) negative skin friction    D) friction
16. A pile foundation is used when [     ]  
A) The loads are heavy    B) the soil stratum near ground surface is weak    C) both a & b

- D) The depth is large
17. The load carrying capacity of pile depends upon [ ]  
 A) Skin friction B) point resistance C) type of pile D) both a & b
18. The negative skin friction on a pile develops when [ ]  
 A) The soil in which it is driven is sandy soil B) the soil surrounding it settles more than the pile  
 C) the ground water table rises D) the soil near the tip is clay
19. The load carrying capacity of a bored pile in sand is about \_\_\_ times that of a driven pile  
 A)  $\frac{1}{2}$  to  $\frac{2}{3}$  B)  $\frac{2}{3}$  to  $\frac{3}{4}$  C)  $\frac{3}{4}$  to 1.25 D) more than 1.25 [ ]
20. The group efficiency of driven pile in sand at a close spacing may be [ ]  
 A) Equal to 100% B) greater than 100% C) less than 100% D) none of the above
21. Pneumatic caissons are used where the soil flow into the excavated area of an open caisson is [ ]  
 A) Faster than it can be removed B) slower than it can be removed C) negligible D) zero
22. The maximum depth of a pneumatic caisson is usually limited to [ ]  
 A) 10m B) 20m C) 80m D) 40m
23. The adhesion factor for drilled piers on clay is usually taken as [ ]  
 A) 1.0 B) 0.80 C) 0.60 D) 0.40
24. The floating caisson generally [ ]  
 A) Have greater load – carrying capacity than open caissons  
 B) Have greater depth below ground surface than open caisson  
 C) Less expensive than open caissons  
 D) Have poor quality of construction than open caissons
25. The diameter of Double – D wells is [ ]  
 A) 6m B) 4m C) 9m D) 8m
26. The depth of bridge foundation for rectangular wells is [ ]  
 A) 4-6m B) 7-8m C) 8-11m D) 13-15m
27. Lacey formula to calculate depth of scour in alluvial soils is [ ]  
 A)  $d = 0.473 (Q/f)^{1/3}$  B)  $d = 0.473 (Q/f)^{2/3}$  C)  $d = 0.473 (Q/f)^{4/3}$  D)  $d = 0.473 (Q/f)^{5/3}$
28. On piers parallel to the direction of water , the intensity of water pressure is given by [ ]  
 A)  $p=KV^2$  B)  $p=KV^3$  C)  $p=KV^5$  D)  $p=KV$
29. In case of allowable transverse load of well foundation the factor of safety should not be \_\_\_\_\_ [ ]  
 A)  $<2$  B)  $>2$  C)  $=2$  D) 1
30. Dewatering is not allowed after the well has sunk to about [ ]  
 A) 6m B) 8m C) 9m D) 10m
31. As per IS 3955-1967 the tilt should generally be limited to [ ]  
 A) 1 in 40 B) 1 in 50 C) 1 in 60 D) 1 in 70
32. A well foundation is a type of [ ]  
 A) Open caisson B) Pneumatic caisson C) Floating caisson D) Drilled pier
33. The grip length below the maximum scour level further railway bridges is usually [ ]  
 A) 0.5R B) 0.25R C) R D) 2R
34. In some well foundation the following is not provided [ ]  
 A) RCC Well cap B) Top plug C) Bottom plug D) Curb
35. The most commonly used shape of a well foundation is [ ]  
 A) Double-D well B) Circular well C) Double Octagonal well D) Rectangular well
36. The thickness of steining for railway bridges is usually kept as of outside diameter [ ]  
 A)  $\frac{1}{8}$  B)  $\frac{1}{10}$  C)  $\frac{1}{9}$  D)  $\frac{1}{4}$
37. The settlement of a group of friction piles as compared to that of a single pile is [ ]  
 A) Less B) more C) unaffected D) unpredictable
38. Negative skin friction on piles is dominant in [ ]

- A) Piles resting on hard sands                      b friction piles in soft clays  
C) Friction piles in sands                            D) none
39. Close spacing ( less than the least) of piles in dense and will cause                      [       ]  
A) Objectionable upheaval                            B) increased compaction  
C) Increased pile capacity                            D) decreased the pile capacity
40. The group efficiency of a pile group                      [       ]  
A) Will be always < 100 %                            B) will be always > 100%  
C) May be <100% or > 100% depending upon the type of soil, method of installation and pile spacing  
D) Is > 100% for pile groups in cohesion less soils and < 100 % for those in cohesive soils

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