4th Sem / Civil
Subject:- Soil Mechanics and Foundation Engineering

Time : 3Hrs.   M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory   (10x1=10)

Q.1 As per IS, the specific gravity of soil is determined at
a) $10^{\circ}C$ b) $17^{\circ}C$
c) $27^{\circ}C$ d) $47^{\circ}C$

Q.2 Consistency, in general, is that property of a soil which is manifested by its resistance to
a) Impact   b) Rolling
c) Flow   d) None of the above

Q.3 Plasticity index is
a) ratio of liquid limit to plastic limit
b) Difference of liquid limit and plastic limit
c) Product of liquid limit and plastic limit
d) Difference of water content and plastic limit

Q.4 The minimum water content at which soil just begins to crumble when rolled into 3 mm dia. threads is
a) Permeability limit   b) plastic limit
c) Shrinkage limit   d) consistency limit

Q.5 The pressure on a phreatic surface is
a) Less than atmospheric pressure
b) Equal to atmospheric pressure
c) Greater than atmospheric pressure
d) Not related to atmospheric pressure

Q.6 Quick sand is
a) a type of sand
b) a condition in which a cohesion less soil losses its strength because of upward flow of water
c) a condition in which a cohesive soil losses its strength
d) None of above

Q.7 The effective stress controls the following properties of soil:
a) Shear strength   b) Compressibility
c) Permeability   d) All above

Q.8 In a shear box test the failure plane is
a) Weakest plane   b) vertical plane
c) Horizontal plane   d) major principal plane

Q.9 In modified Proctor Test, the weight of rammer is
a) 4.89   b) 2.6 kg
c) 2.0 kg   d) 3.6 kg

Q.10 The ratio of theoretical length of recovered sample to the actual length of recovered sample is called
a) Length ratio   b) Recovery ratio
c) Area ratio   d) None of these

SECTION-B

Note: Objective type questions. All questions are compulsory.   (10x1=10)

Q.11 The piping failure in a hydraulic structure can be prevented by_____

Q.12 Total stress defined as the sum of_____

Q.13 SPT used to determine the_____

Q.14 The number of blows given by a hammer in SPT is known as_____

Q.15 Equationally specific gravity can be written as_____

Q.16 A soil has L.L of 30, Corresponding P.I. given by A line is_____

Q.17 A constant head permeameter is used for_____ grained soils.

Q.18 Coefficient of permeability of soil_____ with increase in temperature

Q.19 Marine soil is transported by_____ and deposited in_____

Q.20 Terzaghi's analysis is valid for_____ foundation.

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions.   (12x5=60)

Q.21 Discuss the origin of soils with reference to geological cycle.

Q.22 Bulk density of a clay sample was found to be 1.0 gm/c.c. Water content was 20%. Determine void ratio and degree of saturation Take $G = 2.68$.

Q.23 Define and explain the following terms:
   a)   Consistency index   b)   Plasticity index
   c)   Liquidity index

Q.24 Which are the various factors affecting permeability of soil? Discuss each briefly.

Q.25 State and discuss Darcy's law of flow through porous media.

Q.26 In a constant head permeameter, the following observations were taken;
   Constant head = 6 cm
   Diameter of test sample = 10 cm

Quantity of water collected = 350 ml
Duration of the test = 270 sec.
Length of sample = 10 cm
Calculate the coefficient of permeability of the soil.

Q.27 Explain quick sand phenomenon.

Q.28 Write a short note on primary consolidation.

Q.29 Define shear strength. Give its importance.

Q.30 Explain unconfined compression test. Give sketch of the apparatus and write how it works.

Q.31 Which are the various factors that affect compaction? Discuss each in short.

Q.32 Differentiate between compaction and consolidation.

Q.33 Which are various factors which affect the bearing capacity of soil? Explain each.

Q.34 Define isober and pressure bulb with neat sketch.

Q.35 Define foundation. Differentiate between shallow and deep foundations.

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions.   (2x10=20)

Q.36 Explain Constant head permeability Method with neat & clean diagram.

Q.37 a)   Describe standard Proctor Test's Procedure of performance.
   b)   Draw neat & clean sketch of standard Penetration Test. Enlist name of apparatus also.

Q.38 Explain the Plate Load test to find out the ultimate bearing capacity of soil. State its limitations also.