Register No.: ....   Name : ....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (S), AUGUST 2023

CIVIL ENGINEERING

(2020 SCHEME)

Course Code : 20CET308

Course Name : Comprehensive Course Work

Max. Marks : 50   **Duration : 75 Minutes**

PART A

(Answer all questions. Each question carries 1 mark)

1. Following are the basic types of stress except
   - **A.** Tensile stress
   - **B.** Volumetric stress
   - **C.** Compressive stress
   - **D.** Shear stress

2. Elongation of a bar of length 'L', uniform cross section 'A', modulus of elasticity 'E' due to its own weight W is given by
   - **A.** 2WL/AE
   - **B.** WL/AE
   - **C.** WL/2AE
   - **D.** WL/3AE

3. For pure shear conditions on a 2D element, the normal stress is _____ when θ is between 0° to 90°
   - **A.** Tensile
   - **B.** Compressive
   - **C.** Zero
   - **D.** Maximum

4. The shear force at midpoint of a cantilever of length L carrying a concentrated load W at the free end
   - **A.** ½ WL
   - **B.** WL
   - **C.** ½ W
   - **D.** W

5. The bending moment at the end supports of a beam of length L, simply supported at the ends, carrying a concentrated load W at its mid span is
   - **A.** 4WL
   - **B.** WL
   - **C.** ¼ WL
   - **D.** Zero

6. If depth of a beam is doubled then the section modulus
   - **A.** Will remain same
   - **B.** Will decrease
   - **C.** Will be doubled
   - **D.** Will become 4 times

7. The main assumption of Bernoulli's equation is
   - **A.** The velocity of liquid particle, across any cross-section of a pipe is uniform
   - **B.** No external force except the gravity acts on the liquid
   - **C.** There is no loss of energy of the liquid while flowing
   - **D.** All of the above

8. The velocity distribution of viscous fluid through a circular pipe is
   - **A.** hyperbolic
   - **B.** circular
   - **C.** parabolic
   - **D.** elliptical

9. For critical depth of flow of water in open channels, the specific energy must be
   - **A.** minimum
   - **B.** maximum
   - **C.** Average of minimum and maximum
   - **D.** None of these

10. A pitot tube is used to measure
    - **A.** Pressure
    - **B.** Difference in pressure
    - **C.** Velocity of flow
    - **D.** None of these

11 Stress strain relationship for Newtonian fluid is
 A. Parabolic   B. Hyperbolic
 C. Linear   D. Inverse type

12 Which among the following is an assumption of Hagen-Poiseuille equation?
 A. Fluid is compressible   B. Fluid is uniform
 C. Fluid is laminar   D. Fluid is turbulent

13 Thickness of a pavement may be reduced considerably by
 A. Compaction of soil   B. Stabilisation of soil
 C. Drainage of soil   D. Combination of all the above

14 In quadrantal bearing system, back bearing of a line may be obtained from its forward bearing, by
 A. Adding 180°, if the given bearing is less than 180°   B. Subtracting 180°, if the given bearing, is more than 180°
 C. Changing the cardinal points, i.e. substituting N for S and E for W and vice-versa   D. None of these.

15 The type of transition curves generally provided on hill roads, is
 A. Circular   B. Cubic parabola
 C. Lemniscate   D. Spiral

16 Theodolite is used for
 A. Measurement of horizontal and vertical angles   B. Measurement of magnetic bearing
 C. Measurement of direct angles   D. All of the above

17 True meridians are generally preferred to magnetic meridians because
 A. These converge to a point   B. These change due to change in time
 C. These remain constant.   D. None of these.

18 The ideal shape of a transition curve, is
 A. Clothoid   B. Cubic spiral
 C. Cubic parabola   D. Lamniscate

19 Which of the following methods is more suitable for the determination of permeability of clayey soil?
 A. falling head method   B. horizontal permeability test
 C. constant head method   D. none of the above

20 The maximum particle size for which Darcy's law is applicable is:
 A. 0.2 mm   B. 0.5mm
 C. 1.0 mm   D. 2.0 mm

21 According to IS classification system, the soils can be classified into:
 A. 15 groups   B. 18 groups
 C. 3 groups   D. 7 groups

22 The permeability of soil varies:
 A. Inversely as square of grain size   B. As square of grain size
 C. As grain size   D. Inversely as void ratio

23 The coefficient of permeability of a soil:
 A. Increases with an increase in temperature   B. Increases with a decrease in temperature
 C. Increases with a decrease in unit weight of water   D. Decreases with an increase in voids ratio

24 IS classifications of soil is in many cases similar to:
 A. AASHTO classification   B. Textural classification
 C. Unified soil classification   D. MIT classification

25 Varnish is a transparent or semi-transparent solution of resinous substances in
   A. Alcohol
   B. Linseed
   C. Turpentine
   D. All the above

26 Soundness test of cement is done using
   A. Le Chatelier's apparatus
   B. Turbidimeter
   C. Vicat Apparatus
   D. Briquette

27 In paints the pigment is responsible for
   A. Durability
   B. Colour
   C. Smoothness
   D. Glassy face

28 A wall constructed to resist the pressure of an earth filling, is called
   A. retaining wall
   B. breast wall
   C. buttress.
   D. parapet wall

29 In which type of tender architect invites tender on behalf of client?
   A. Single tender
   B. Open tender
   C. Limited tender
   D. Confidential tender

30 Green cement is
   A. Green coloured cement
   B. Cement mixed with plant products
   C. Cement mixed with recycled materials
   D. Cement mixed with green algae

PART B

(Answer all questions. Each question carries 2 marks)

31 A uniformly distributed load of 20 kN/m acts on a simply supported beam of rectangular cross section of width 20 mm and depth 60 mm. What is the maximum bending stress acting on the beam of 5m.
   A. 5030 MPa
   B. 5208 MPa
   C. 6600 MPa
   D. Insufficient data

32 A cantilever beam of span 3 m carries a point load of 100N at the free end. The maximum BM will be
   A. 100 Nm
   B. 300 Nm
   C. 150 Nm
   D. 600 Nm

33 The total energy line lies over the hydraulic gradient line by an amount equal to
   A. Velocity head
   B. Friction head
   C. Pressure head
   D. Datum head

34 In venturimeter, the ratio between throat diameter and pipe diameter is generally adopted as
   A. 1:2
   B. 1:8
   C. 1:5
   D. 2:11

35 In an ideal transition curve, the radius of curvature
   A. is constant
   B. at any point is directly proportional to its distance from the point of commencement
   C. is inversely proportional to the radius of main curve
   D. is directly proportional to the radius of main curve

36 Design of horizontal curves on highways, is based on
   A. design speed of vehicles
   B. permissible friction on the road surface
   C. permissible maximum super-elevation
   D. all the above.

37   The minimum water content at which the soil just begins to crumble when rolled into threads 3 mm in diameter, is known

    A. liquid limit   **B.** plastic limit

    C. shrinkage limit   **D.** Permeability limit.

38   Coulomb's equation for shear strength can be represented as:

    A. c = s + s tan Φ   **B.** c = s - s tan Φ

    C. s = s + c tan Φ   **D.** s = c + s tan Φ

39   The failure criteria used for reinforced concrete beams and columns in limit state method is based on

    A. Maximum principal stress theory   **B.** Maximum principal strain theory

    C. Maximum shear stress theory   **D.** Maximum distortion strain energy theory

40   The nominal thickness of an expansion joint in brick walls, is kept more than

    A. 5 mm   **B.** 10 mm

    C. 15 mm   **D.** 20 mm