



ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਜਲੰਧਰ
PUNJAB TECHNICAL UNIVERSITY JALANDHAR

Max. Marks: 90

Time: 90 Mins.

Entrance Test for Enrollment in Ph.D. Programme

Important Instructions

- Fill all the information in various columns, in capital letters, with blue/black ball point pen.
- Use of calculators is not allowed.
- All questions are compulsory. No negative marking for wrong answers.
- Each question has only one right answer.
- Questions attempted with two or more options/answers will not be evaluated.

Stream:

DisciplineCivil Engineering.....

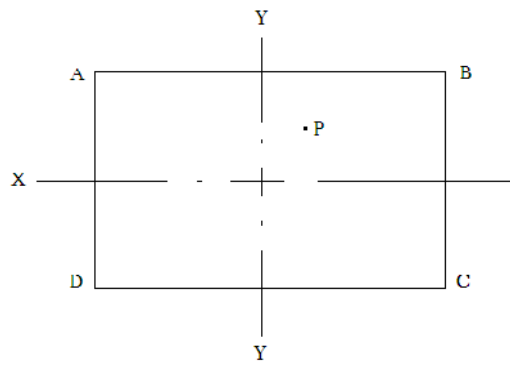
Name

Fathers Name

Roll NumberDate:15-07-2012.....

Signature of Candidate:

Signature of Invigilator



- c. It is difficult to connect beams to the round sections
 - d. All of the above
- 16. Lacing bars in steel column should be designed to resist**
- a. Bending moment due to 2.5 % of the column load
 - b. Shear force due to 2.5 % of column load
 - c. 2.5 % of the column load
 - d. Both (a) and (b)
- 17. Minimum pitch provided in rivetted steel tanks is**
- a. 1.5 d
 - b. 2.0 d
 - c. 2.5 d
 - d. 3.0 d
- Where d is diameter of rivets
- 18. Steel tanks are mainly designed for**
- a. Weight of tank
 - b. Wind pressure
 - c. Water pressure
 - d. Earthquake pressure
- 19. The property of fresh concrete, in which the water in the mix tends to rise to the surface while placing and compacting, is called**
- a. Segregation
 - b. Bleeding
 - c. Bulking
 - d. creep
- 20. Workability of concrete is inversely proportional to**
- a. Time of transit
 - b. Water-cement ratio
 - c. The air in the mix
 - d. Size of aggregate
- 21. The compressive strength of 100 mm cube as compared to 150 mm cube is always**
- a. Less
 - b. More
 - c. Equal
 - d. All of the above
- 22. The most commonly used admixture which prolongs the setting and hardening time is**
- a. Gypsum
 - b. Calcium chloride
 - c. Sodium silicate
 - d. All of the above
- 23. The fineness modulus of fine aggregate is in the range of**
- a. 2.0 to 3.5
 - b. 3.5 to 5.0
 - c. 5.0 to 7.0
 - d. 6.0 to 8.5
- 24. The factor of safety for**
- a. Steel and concrete are same
 - b. Steel is lower than that for concrete
 - c. Steel is higher than that for concrete
 - d. None of the above
- 25. Diagonal tension in a beam**
- a. Is maximum at neutral axis
 - b. Decreases below the neutral axis and increases above the neutral axis
 - c. Increases below the neutral axis and decreases above the neutral axis
 - d. Remains the same

26. According to IS : 456, minimum slenderness ratio for a short column is

- a. Less than 12
- b. Less than 18
- c. Between 18 and 24
- d. More than 24

27. The minimum cover in a slab should neither be less than the diameter of bar nor less than

- a. 10 mm
- b. 15 mm
- c. 25 mm
- d. 13 mm

28. The ratio of the diameter of reinforcing bars and the slab thickness is

- a. 1/4
- b. 1/5
- c. 1/6
- d. 1/8

29. The depth of footing for an isolated column is governed by

- (i) Maximum bending moment
- (ii) Shear force
- (iii) Punching shear

The correct answer is

- a. Only (i)
- b. Only (i) and (ii)
- c. (i) and (iii)
- d. (i), (ii) and (iii)

30. The critical section for finding maximum bending moment for footing under masonry wall is located

- a. At the middle of the wall
- b. At the edge of the wall

- c. halfway between the middle and edge of the wall
- d. At a distance equal to effectiveness depth of footing from the edge of the wall

31. Water content of soil can

- a. never be greater than 100%
- b. take value only from 0% to 100%
- c. be less than 0%
- d. may be greater than 100%

32. If the permeability of a soil is 0.08 cm/sec, the type of soil is

- a. Gravel
- b. Sand
- c. Silt
- d. Clay

33. Pheratic line in earthen dam is

- a. straight line
- b. parabolic
- c. circular
- d. elliptical

34. The unit of co-efficient of consolidation is

- a. cm^2/gm
- b. cm^3/gm
- c. cm^2/sec
- d. $\text{gm-cm}/\text{sec}$

35. If a cohesive soil specimen is subjected to a vertical compressive load, the inclination of the crack to the horizontal is

- a. 90°
- b. 45°
- c. 22.5°
- d. 0°

36. Allowable bearing pressure for a foundation depends upon

- a. allowable settlement only
 - b. ultimate bearing capacity of soil
 - c. both (a) and (b)
 - d. none of the above
- 37. The bearing capacity of a circular footing in comparison to a strip footing of width equal to diameter of former will be**
- a. equal
 - b. more
 - c. less
 - d. cannot be said
- 38. Void ratio of a soil mass can**
- a. never be greater than unity
 - b. take value between zero to one only
 - c. be always zero
 - d. take any value greater than zero
- 39. Maximum size of clay particles is**
- a. 0.002 mm
 - b. 0.02mm
 - c. 0.075 mm
 - d. 1 mm
- 40. Hydraulic head that would produce a quick condition in a sand stratum of thickness 1.5 m, specific gravity 2.67 and void ratio 0.67 is equal to**
- a. 1.0 m
 - b. 1.5 m
 - c. 2.0 m
 - d. 3.0 m
- 41. Which of the following method is more suitable for the determination of coefficient of permeability of clayey soil?**
- a. constant head method
 - b. falling head method
 - c. horizontal permeability test
 - d. all of the above
- 42. The value of compression index for a remolded sample whose liquid limit is 50% is approximately equal to**
- a. 0.028
 - b. 0.28
 - c. 0.36
 - d. 0.036
- 43. Rise of water table in cohesion less soils up to ground surface reduces the net ultimate bearing capacity approximately by**
- a. 25%
 - b. 50%
 - c. 75%
 - d. 90%
- 44. The maximum permissible settlement in isolated footing on clayey soil for RCC structure as per IS 1904 is**
- a. 50mm
 - b. 60mm
 - c. 75mm
 - d. 100mm
- 45. The settlement of a group of friction piles as compared to that of a single pile is**
- a. Same
 - b. Less
 - c. More
 - d. None of the above
- 46. An ideal fluid is**

- a. One which obeys Newton's law of viscosity
 - b. Frictionless and incompressible
 - c. Very viscous
 - d. Frictionless and compressible
- 47. The unit of kinematic viscosity is**
- a. Gm/cm-sec^2
 - b. Dyne-sec/cm^2
 - c. $\text{Gm/cm}^2\text{-sec}$
 - d. Cm^2/sec
- 48. Quick sand is**
- a. Coarse sand
 - b. Fine sand
 - c. Medium sand
 - d. A phenomenon
- 49. A floating body is said to be in a state of stable equilibrium**
- a. When its metacentric height is zero
 - b. When the metacentre is above the centre of gravity
 - c. When the metacentre is below the centre of gravity
 - d. Only when its centre of gravity is below its centre of buoyancy
- 50. Centre of buoyancy always**
- a. Coincides with the centre of gravity
 - b. Coincides with the centroid of the volume of fluid centre of gravity
 - c. Remains above the centre of gravity
 - d. Remains below the centre of gravity
- 51. When the velocity distribution is uniform over the cross-section, the correction factor for momentum is**
- a. 0
 - b. 1
 - c. $4/3$
 - d. 2
- 52. Equation of continuity is based on the principle of conservation**
- a. Mass
 - b. Energy
 - c. Momentum
 - d. None of the above
- 53. The pressure at the summit of a siphon is**
- a. Equal to atmospheric
 - b. Less than atmospheric
 - c. More than atmospheric
 - d. None of the above
- 54. The major loss of energy in long pipes is due to**
- a. Sudden enlargement
 - b. Sudden contraction
 - c. Gradual enlargement or contraction
 - d. Friction
- 55. The losses are more in**
- a. Laminar flow
 - b. Transition flow
 - c. Turbulent flow
 - d. Critical flow
- 56. The horse power transmitted through a pipe is maximum when the ratio of loss of head due to friction and total head supplied is**
- a. $1/3$
 - b. $1/4$
 - c. $1/2$
 - d. $2/3$
- 57. The chezy's coefficient**
- a. Is dimensionless

- b. Has the dimension of velocity
 - c. Has the dimension of discharge
 - d. Has the dimension $L^{1/2}T^{-1}$
- 58. For a trapezoidal channel section to be most economical, its hydraulic radius must be equal to**
- a. $y/4$
 - b. $y/2$
 - c. $y/2\sqrt{2}$
 - d. $y/3\sqrt{2}$
- 59. The duty is largest**
- a. At the head of water course
 - b. On the field
 - c. At the head of main canal
 - d. Same at all places
- 60. Hydrograph is the graphical representation of**
- a. Runoff and time
 - b. Surface runoff and time
 - c. Ground waterflow and time
 - d. Rainfall and time
- 61. A divide wall is provided**
- a. At right angle to the axis of weir
 - b. Parallel to the axis of weir and upstream of it
 - c. Parallel to the axis of weir and downstream of it
 - d. At an inclination to the axis of weir
- 62. As per Lacey's theory, the silt factor is**
- a. Directly proportional to average particle size
 - b. Inversely proportional to average particle size
 - c. Directly proportional to square root of average particle size
 - d. Not related to average particle size
- 63. If the R.L's of canal bed level and high flood level of drainage are 212.0 m and 210.0 m respectively, then cross drainage work will be**
- a. Aqueduct
 - b. Superpassage
 - c. Siphon
 - d. Siphon aqueduct
- 64. If D is the depth of scour below original bed, then the width of launching apron is generally taken as**
- a. 1.2 D
 - b. 1.5 D
 - c. 2.0 D
 - d. 2.5 D
- 65. A hyetograph is a graphical representation of**
- a. Rainfall intensity and time
 - b. Rainfall depth and time
 - c. Discharge and time
 - d. Cumulative rainfall and time
- 66. Assertion A: The consumption of water increases with increase in the distribution pressure.
Assertion R: Higher distribution pressure causes more loss and waste of water.**
- Select your answer according to the coding system given below**
- a. Both A and R are true and R is correct explanation of A
 - b. Both A and R are true and A is correct explanation of R
 - c. A is true but R is false
 - d. R is true but A is false

67. The maximum permissible limit for fluoride in drinking water is

- a. 0.1 mg/litre
- b. 1.5 mg/litre
- c. 5 mg/litre
- d. 10 mg/litre

68. The type of valve which allow water to flow in one direction but prevents its flow in the reverse direction is

- a. Reflux valve
- b. Sluice valve
- c. Air relief valve
- d. Pressure relief valve

69. A sewer that receives the discharge of a number of house sewers is called

- a. House sewer
- b. Lateral sewer
- c. Intercepting sewer
- d. Sub-main sewer

70. Standard BOD is measured at

- a. 20°C- 1 day
- b. 25°C- 3 day
- c. 20°C- 5 day
- d. 30°C- 5 day

71. In the design of grit chambers

- a. Baffles are essential
- b. Temperature is an important factor
- c. The detention period should be at least 30 minutes
- d. The maximum velocity of flow is 30 cm per second

72. The shape of the camber best suited for cement concrete pavement is

- a. Straight line
- b. Parabolic
- c. Elliptical

- d. Combination of straight and parabolic

73. Camber in the road is provided for

- a. Effective drainage
- b. Counteracting the centrifugal force
- c. Having proper sight distance
- d. None of the above

74. The terrain may be classified as rolling terrain if the cross slope of land is

- a. Up to 10%
- b. Between 10% and 25%
- c. Between 25% and 60%
- d. More than 60%

75. As per IRC recommendations the maximum limit of super elevation for mixed traffic in plain areas is

- a. 1 in 15
- b. 1 in 12.5
- c. 1 in 10
- d. Equal to camber

76. The equilibrium super elevation for mixed traffic required to counteract the centrifugal force fully is given by

- a. $V^2/27.5R$
- b. $V^2/75R$
- c. $(0.75V)^2/127R$
- d. $V^2/127R$

Where V is the maximum speed of vehicle in kmph and R is the radius of curve in meter

77. The maximum design gradient for vertical profile of a road is

- a. Ruling gradient
- b. Limiting gradient
- c. Exceptional gradient
- d. Minimum gradient

78. The maximum width of a vehicle recommended by IRC is

- a. 1.85m
- b. 2.44m
- c. 3.81m
- d. 4.72m

79. The estimate of $\int_{0.5}^{1.5} \frac{dx}{x}$ obtained using Simpson's rule with three-point function evaluation exceeds the exact value by

- a. 0.235
- b. 0.068
- c. 0.024
- d. 0.012

80. The annual precipitation data of a city is normally distributed with mean and standard deviation as 1000mm and 200mm, respectively. The probability that the annual precipitation will be more than 1200 mm is

- a. <50%
- b. 50%
- c. 75%
- d. 100%

81. The infinite series $1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$ corresponds to

- a. Sec x
- b. e^x
- c. cos x
- d. $1 + \sin^2 x$

82. The square root of a number N is to be obtained by applying the Newton Raphson iterations to the equations $x^2 - N = 0$. If i denotes the iteration index, the correct iterative scheme will be

- a. $x_{i+1} + 1 = \frac{1}{2} \left(x_i + \frac{N}{x_i} \right)$
- b. $x_{i+1} = \frac{1}{2} \left(x_i^2 + \frac{N}{x_i^2} \right)$
- c. $x_{i+1} = \frac{1}{2} \left(x_i + \frac{N^2}{x_i} \right)$
- d. $x_{i+1} = \frac{1}{2} \left(x_i - \frac{N}{x_i} \right)$

83. There are two containers, with one containing 4 red and 3 green balls and the other containing 3 blue and 4 green balls. One ball is drawn at random from each container. The probability that one of the balls is Red and the other is Blue will be

- a. 1/7
- b. 9/49
- c. 12/49
- d. 3/7

84. The $\lim_{x \rightarrow \infty} \frac{\sin(\frac{2}{3}x)}{x}$ is

- a. 2/3
- b. 1
- c. 3/2
- d.

85. The order and degree of the differential equation

$$\frac{d^3 y}{dx^3} + 4 \sqrt{\left[\frac{dy}{dx} \right]^2} + y^2 = 0$$

are respectively

- a. 3 and 2
- b. 2 and 3
- c. 3 and 3
- d. 3 and 1

86. The product of matrices $(PQ)^{-1}P$ is

- a. P^{-1}
- b. Q^{-1}
- c. $P^{-1}Q^{-1}P$
- d. $PQ P^{-1}$

87. The general solution of $\frac{d^2y}{dx^2} + y = 0$

is

- a. $y = P \cos x + Q \sin x$
- b. $y = P \cos x$
- c. $y = P \sin x$
- d. $y = P \sin^2 x$

88. For a frequency distribution, mean, median and mode are connected by the relation

- a. $\text{Mode} = 3 \text{ Mean} - 2 \text{ Median}$
- b. $\text{Mode} = 2 \text{ Median} - 3 \text{ Mean}$
- c. $\text{Mode} = 3 \text{ Median} - 2 \text{ Mean}$
- d. $\text{Mode} = 3 \text{ Median} + 2 \text{ Mean}$

89. Which of the following is not a measure of central tendency?

- a. Mean
- b. Median
- c. Mode
- d. Standard Deviation

90. What should be added to the polynomial $x^2 - 5x + 4$, so that 3 is the root of the resulting polynomial?

- a. 1
- b. 2
- c. 4
- d. 5