

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU
ARE ASKED TO DO SO)

A

Ph.D-EE-December, 2024
Civil Engineering

SET-Y

Sr. No. 10001

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) _____ (in words) _____

Name _____ Date of Birth _____

Father's Name _____ Mother's Name _____

Date of Examination _____

(Signature of the Candidate)

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Ph.D-EE-December, 2024/(Civil Engg.)(SET-Y)/(A)

1. The degree of static indeterminacy of a rigid-jointed space frame is :
 (1) $m + r - 2j$ (2) $m + r - 3j$ (3) $3m + r - 3j$ (4) $6m + r - 6j$
2. Which of the following are indeterminate structures ?
 (1) 3-hinged arch (2) Continuous Beam
 (3) Redundant frame (4) Both (2) and (3)
3. The stress carried by the King-Post of a King-Post roof truss is :
 (1) Tensile (2) Compressive
 (3) Tensile and Bending (4) Compressive and Bending
4. Match the following :

List I	List II
P. Slope deflection method	I. Force Method
Q. Moment distribution method	II. Displacement Method
R. Method of three moments	
S. Castigliano's second theorem	
(1) P-I, Q-II, R-I, S-II	(2) P-I, Q-I, R-II, S-II
(3) P-II, Q-II, R-I, S-I	(4) P-II, Q-I, R-II, S-I
5. For the administration of road transport, a Motor Vehicle Act was enacted in :
 (1) 1927 (2) 1934 (3) 1939 (4) 1947
6. The Muller-Breslau principle is the straight application of :
 (1) Kani's theorem (2) Maxwell reciprocal theorem
 (3) Moment area method (4) Unit load method
7. In conjugate beam, the loading is equal to :
 (1) Shear force diagram of actual beam
 (2) Bending moment diagram of actual beam
 (3) Loading of actual beam
 (4) M/EI diagram of actual beam

8. The horizontal component of a reaction at both lower end of a 3-hinged arch is known as :
(1) Thrust (2) Pull (3) Bending (4) Shear
9. The resultant of two perpendicular forces each equal to $P/2$ will be equal to :
(1) $P/\sqrt{2}$ (2) $\sqrt{2}$ (3) $2P$ (4) $\sqrt{2}P$
10. A block of weight 20 kN just begins to move along a horizontal surface on application of 5 kN horizontal force. The coefficient of friction between block and surface is :
(1) 0.10 (2) 0.20 (3) 0.25 (4) 0.50
11. Creep of concrete under compression is defined as the
(1) increase in the magnitude of strain under constant stress
(2) increase in the magnitude of stress under constant strain
(3) decrease in the magnitude of strain under constant stress
(4) decrease in the magnitude of stress under constant strain
12. A jet of water having a velocity of 20 m/s strikes a series of plates fixed radially on a wheel revolving in the same direction as the jet at 15 m/s. What is the percentage efficiency of the plates ? (round off to one decimal place)
(1) 37.5 (2) 66.7 (3) 50.0 (4) 88.9
13. The shape of the most commonly deigned highway vertical curve is :
(1) Spiral (2) Parabolic
(3) Circular (same radius) (4) Circular (different radius)
14. An amount of 35.67 mg HCl is added to distilled water and the total solution volume is made to one litre. The atomic weights of H and Cl are 1 and 35.5, respectively. Neglecting the dissociation of water, the pH of the solution, is :
(1) 2.50 (2) 3.50 (3) 2.01 (4) 3.01
15. A highway designed for 80 km/h speed has a horizontal curve section with radius 250 m. If the design lateral friction is assumed to develop fully, the required super elevation is :
(1) 0.02 (2) 0.05 (3) 0.09 (4) 0.07

16. As per IS 456 : 2000, the pH value of water for concrete mix shall not be less than :
(1) 4.5 (2) 6.0 (3) 5.5 (4) 5.0
17. Wind blown silt having little or no stratification is called :
(1) Talus (2) Drift (3) Peat (4) Loess
18. The ratio of lateral strain to linear strain is known as :
(1) Modulus of elasticity (2) Modulus of rigidity
(3) Poisson's ratio (4) Elastic limit
19. A glass rod have an elastic modulus of 90 GPa and Poisson's ratio of 0.2 will have its bulk modulus (in GPa) :
(1) 50 (2) 108 (3) 270 (4) 91
20. If a simply supported beam of span L carries a point load W at the mid span, then downward deflection under the load will be :
(1) $WL^3/3EI$ (2) $WL^3/8EI$ (3) $WL^3/48EI$ (4) $5/384.WL^3/3EI$
21. The minimum pitch of the rivet shall not be less than :
(1) d (2) $1.5d$ (3) $2.0d$ (4) $2.5d$
22. The structural design method that does not take into account the safety factors on the design loads is :
(1) working stress method (2) load factor method
(3) ultimate load method (4) limit state method
23. The type of bond in a brick masonry containing alternate course of stretcher and headers is called :
(1) Flemish bond (2) English bond (3) Stretched bond (4) Header bond
24. During the process of hydration of cement, due to increase in Dicalcium Silicate 2 (CS) content in cement clinker, the heat of hydration :
(1) increases (2) initially decreases and then increases
(3) does not change (4) decreases

25. PERT technique of network analysis is mainly useful for :
(1) Small projects (2) Large and complex projects
(3) Research and development project (4) Deterministic activities
26. Critical Path Method (CPM) network is :
(1) Activity oriented (2) Event oriented
(3) Both activity as well as event oriented (4) None of these
27. Slack in a PERT network refers to :
(1) Activity (2) Event
(3) Dummy Activity (4) None of the above
28. The type of foundation suitable for under-water structure is :
(1) cast-in-situ concrete piles (2) continuous footing
(3) pier foundation (4) stepped foundation
29. Which of the following represents hardest grade of bitumen ?
(1) 30/40 (2) 60/70 (3) 80/100 (4) 100/120
30. The relation between modulus of rupture (f_{cr}) and characteristic compressive strength (f_{ck}) is
(1) $f_{cr} = 0.7 f_{ck}$ (2) $f_{cr} = 0.7 \sqrt{f_{ck}}$ (3) $f_{cr} = 0.75 f_{ck}$ (4) $f_{cr} = 0.7/f_{ck}$
31. The traffic starts discharging from an approach at an intersection with the signal turning green. The constant headway considered from the fourth or fifth headway position is referred to as :
(1) intersection headway (2) saturation headway
(3) effective headway (4) discharge headway
32. The average density of earth may be taken as :
(1) 5.51 g/cc (2) 5.51 kg/cc
(3) 3.9 g/cc (4) 3.9 kg/cc
33. Soil deposit formed due to transportation by wind is termed as :
(1) aeolian deposit (2) lacustrine deposit
(3) alluvial deposit (4) estuarine deposit

34. Water losses in water supply is assumed as :
(1) 5% (2) 7.5% (3) 10% (4) 15%
35. The smallest sieve size according to Indian standards is :
(1) 0.0045 mm (2) 0.045 mm (3) 0.45 mm (4) 0.154 mm
36. A body floating in a liquid is in a stable state of equilibrium if its :
(1) Metacentre lies above its centre of gravity
(2) Metacentre lies below its centre of gravity
(3) Metacentre coincides with its centre of gravity
(4) Centre of gravity is below its centre of buoyancy
37. What is the recommended shape of camber :
(1) Straight
(2) Parabolic
(3) Straight at edges and parabolic in middle
(4) Parabolic at edges and straight at middle
38. Assumptions made in the Terzaghi's consolidation theory is :
(1) Soil is saturated
(2) Compression is one dimensional
(3) The coefficient of permeability is constant
(4) All of the above
39. Which one of the following products is *not* obtained in anaerobic decomposition of glucose ?
(1) CO_2 (2) CH_4 (3) HS_2 (4) H_2O
40. Consider the statements P and Q related to the analysis/design of retaining walls.
P : When a rough retaining wall moves toward the backfill, the wall friction force/resistance mobilizes in upward direction along the wall.
Q : Most of the earth pressure theories calculate the earth pressure due to surcharge by neglecting the actual distribution of stresses due to surcharge.
Which one of the following options is correct ?
(1) Both P and Q are TRUE (2) P is TRUE and Q is FALSE
(3) Both P and Q are FALSE (4) P is FALSE and Q is TRUE

41. A sample of 500 g dry sand, when poured into a 2 litre capacity cylinder which is partially filled with water, displaces 188 cm^3 of water. The density of water is 1 g/cm^3 . The specific gravity of the sand is :
- (1) 2.66 (2) 2.52
(3) 2.72 (4) 2.55
42. A soil sample having a void ratio of 1.3, water content of 50 % and a specific gravity of 2.60, is a state of :
- (1) Partial saturation (2) Full saturation
(3) over saturation (4) Under saturation
43. Traffic density is defined as :
- (1) The number of vehicles per unit length
(2) The number of vehicles moving in a specific direction per lane per day
(3) The number of vehicles passing a given point in one hour
(4) The number of vehicles moving in a specific direction per hour
44. A dry soil has mass specific gravity of 1.35, if the specific gravity of solids is 2.7, then the void ratio will be :
- (1) 0.5 (2) 1.0
(3) 1.5 (4) 2.0
45. Effective stress on soil :
- (1) Increases voids and decreases permeability
(2) Increases both voids ratio and permeability
(3) Decreases both voids ratio and permeability
(4) Decreases voids ratio and increases permeability
46. Coarse grained soils are best compacted by :
- (1) Vibratory roller (2) Rubber tyred roller
(3) Sheep's foot roller (4) Drum roller
47. When the Adiabatic Lapse Rate (ALR) is more than Environment Lapse Rates (ELR), then the ELR can be called as :
- (1) Super adiabatic lapse rate (2) Sub adiabatic lapse rate
(3) Dry adiabatic lapse rate (4) Wet adiabatic lapse rate

48. A vehicle has a wheel base of 6.5 m. What is the off tracking while negotiating a curved path with a mean radius of 32 m :
(1) 0.72 m (2) 0.9 m (3) 0.87 m (4) 0.66 m
49. A sample of soil has liquid limit 45%, Plastic limit 25%, shrinkage limit 17% and natural moisture content 30%. The liquidity index of soil is :
(1) 15/20 (2) 13/20 (3) 8/20 (4) 5/20
50. The phenomenon when soil loses its shear strength due to oscillatory motion is known as :
(1) Consolidation (2) Shear failure (3) Liquefaction (4) Sloughing
51. The water content of a soil remains unchanged during the entire test in :
(1) Drained Test (2) Consolidated drained test
(3) Unconsolidated drained test (4) None of these
52. Bacteria which use carbon dioxide as a source of carbon are known as :
(1) Autotropic (2) Heterotrophic (3) Aerobic (4) Anaerobic
53. Length to diameter ratio for cylindrical specimen of soil for triaxial shear test is :
(1) 1.0 (2) 1.5 (3) 2.0 (4) 2.5
54. In case of potable water the permissible upper limit of chloride content is :
(1) 250 PPM (2) 300 PPM (3) 350 PPM (4) 100 PPM
55. The transverse slope provided to the road surface for drainage of the rain water is known as :
(1) Camber (2) Gradient (3) Super elevation (4) Curve
56. The process of obtaining increased density of soil in a fill by reduction of its pore space by the expulsion of air, is known as :
(1) Soil exploration (2) Soil stabilization
(3) Soil compaction (4) Consolidation
57. The shrinkage index is equal to :
(1) liquid limit + plastic limit (2) plastic limit – liquid limit
(3) liquid limit – shrinkage limit (4) shrinkage limit – liquid limit

58. When was the water (Prevention and Pollution) Act enacted by the Indian Parliament :
(1) 1970 (2) 1974 (3) 1980 (4) 1985
59. Which of the following soil possesses zero plasticity index ?
(1) Clay (2) Clayey silt (3) Sand (4) Silty
60. The strength of a soil is usually identified by :
(1) Direct tensile stress (2) Direct compressive stress
(3) Ultimate shear stress (4) Effective stress
61. For a flow to be irrotational, the vorticity is :
(1) zero (2) one (3) two (4) four
62. Ball pen works on the principle of :
(1) Viscosity (2) Surface tension
(3) Gravitational force (4) Boyle's Law
63. A vessel of 4 m^3 contains an oil which weighs 30 kN. The specific weight of the oil is :
(1) 4.5 kN/m^3 (2) 6 kN/m^3 (3) 7.5 kN/m^3 (4) 10 kN/m^3
64. The unit of kinematic viscosity in S. I. units is :
(1) N-m/s (2) N-s/m² (3) m²/sec (4) N-m
65. The dimension of dynamic viscosity :
(1) ML^0T^{-1} (2) $\text{ML}^{-1}\text{T}^{-2}$ (3) $\text{ML}^{-2}\text{T}^{-2}$ (4) $\text{ML}^{-1}\text{T}^{-2}$
66. A single lane highway has a traffic density of 40 vehicle/km. If the time mean speed and space mean speed are 40 kmph and 30 kmph, respectively, the average headway (in sec) between the vehicle is :
(1) 8.33×10^{-3} (2) 6.25×10^{-4} (3) 2.25 (4) 3.00
67. The bio-chemical treatment of sewage effluent is a process of :
(1) Oxidation (2) Deoxidation (3) Self purification (4) Sedimentation
68. The global warming is mainly caused by :
(1) NO_x (2) SO_x (3) CO_2 (4) O_2

69. What is the acceptable limit for pH of drinking water ?
(1) 7.5 – 9.5 (2) 9.5 – 10.5 (3) 5.5 – 7.5 (4) 6.5 – 8.5
70. The maximum efficiency of transmission through a pipe is :
(1) 50 (2) 56.7 (3) 66.67 % (4) 76.66 %
71. A rectangular channel section will be most efficient when :
(1) Hydraulic radius is equal to half the depth of flow
(2) Hydraulic radius is equal to the depth of flow
(3) Depth of flow is equal to the bottom width
(4) Depth of flow is equal to half the hydraulic radius
72. In a submerged orifice, the effective head is 2 m. If $C_v = 1$, the velocity through the orifice is :
(1) 1.414 m/s (2) 4.43 m/s (3) 4.905 m/s (4) 6.26 m/s
73. The loss of energy at the exit from a pipe is given as :
(1) $h_E = V^2/g$ (2) $h_E = V^2/3g$ (3) $h_E = V^2/2g$ (4) $h_E = 2V^2/g$
74. The water is flowing in a pipe of cross-section area 19.625 m^2 and perimeter 15.7 m. The hydraulic mean diameter is :
(1) 4 m (2) 5 m (3) 6 m (4) 7 m
75. The precipitation is measured in terms of :
(1) Intensity of pressure (2) Depth of water
(3) Quantity of water (4) Volume of water
76. A rainfall is considered acid rain if the pH of rainwater is :
(1) less than 7.0 (2) less than 5.6
(3) less than 4.5 (4) less than 3.0
77. Which of the following is not a common use of unit hydrographs ?
(1) Extending flood flow records based on rainfall
(2) Flood forecasting and warning systems
(3) Estimation of time of concentration
(4) Design of hydraulic structures

78. The rainfall of five successive days were measured as 100 mm, 80 mm, 60 mm, 40 mm and 20 mm respectively. If the storm loss rate for the catchment area is earlier estimated as 50 mm/day, the total surface run off will be :
(1) 50 mm (2) 60 mm (3) 90 mm (4) 140 mm
79. Which hydrological method is commonly used for estimating flood peaks in ungauged watersheds ?
(1) Rational Method (2) SCS Curve Number Method
(3) HEC-RAS Modeling (4) Unit Hydrograph Method
80. The length of the side of warning sign boards of roads is :
(1) 30 cm (2) 45 cm
(3) 60 cm (4) 75 cm
81. Which of the following are known as the formation constants of an aquifer ?
(1) Storativity and permeability (2) Permeability and specific storage
(3) Specific storage and transmissibility (4) Transmissibility and storativity
82. Hydrology deals with :
(1) process of depletion of water resources of land
(2) process of natural science of water
(3) process of various water phases
(4) all of the above
83. Which of the following is a primary air pollutant ?
(1) Sulphur dioxide (2) Nitrogen dioxide
(3) Carbon monoxide (4) Carbon dioxide
84. The hydrograph of short duration can be converted into hydrograph of longer duration by :
(1) unit hydrograph (2) synthetic unit hydrograph
(3) s-curve method (4) flood routing
85. Wet mix macadam is used for construction of :
(1) sub grade (2) sub base/base
(3) wearing course (4) bearing course

86. An aquiclude is :
(1) A non-artesian aquifer
(2) An artesian aquifer
(3) A solid impermeable layer underlying or overlying an aquifer
(4) A large underground water body
87. The longitudinal joints are provided when the width of road is more than :
(1) 3 m (2) 4 m (3) 5.5 m (4) 6.75 m
88. If the specific capacity of a well is 1.166 litres/sec, then the discharge from this well under a depression head of 3 m head will be :
(1) 1.66 litre/s (2) 3.5 litre/sec (3) 10.5 litre/sec (4) None of the above
89. Which of the following external changes cause the rate of transpiration to decrease ?
(1) Increase in sunlight
(2) Increase in temperature
(3) Increase of carbon dioxide concentration
(4) Increase of available soil water
90. The yield of a well can be obtained by :
(1) a pumping test (2) recuperating test
(3) a chemical test (4) either (1) or (2)
91. A sewer which receives sewage from the collection system and conducts it to a point of final disposal is called a :
(1) Common sewer (2) Trunk sewer (3) Branch sewer (4) Outfall sewer
92. The optimum depth of kor watering for wheat in the plains of North India is :
(1) 13.5 cm (2) 16.5 cm (3) 19 cm (4) 21 cm
93. The internal diameter of the sewer should not be less than :
(1) 15 cm (2) 25 cm (3) 50 cm (4) 75 cm
94. The channel used to bypass the excess water entering a canal is called :
(1) Canal escape (2) Canal regulator
(3) Canal module (4) None of these

95. Which of the following does not include in the phases of highway planning ?
(1) Financing
(2) Showing the phasing of a plan in the five-year plan
(3) Assessment of road length requirement
(4) Preparation of master plan
96. Which of the following is the other name of perennial irrigation system ?
(1) Flood Irrigation
(2) Controlled Irrigation
(3) Direct Irrigation
(4) Storage Irrigation
97. Which of the following type of Irrigation system is practised on small scale in India ?
(1) Lift Irrigation
(2) Flood Irrigation
(3) Natural Sub-irrigation
(4) Artificial Sub-irrigation
98. Lining of Irrigation channels :
(1) May stop leakage water
(2) Creates water logging in near-by areas
(3) Both (1) and (2)
(4) None of the above
99. The main cause of silting in channel is :
(1) non-regime section
(2) inadequate slope
(3) defective head regulator
(4) all of the above
100. The amount of oxygen consumed by sewage from an oxidising agent like potassium dichromate is termed as :
(1) Bio-chemical Oxygen Demand (B.O.D.)
(2) Chemical Oxygen Demand (C.O.D.)
(3) Relative stability
(4) None of the above

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(1) intersection headway (2) saturation headway
(3) effective headway (4) discharge headway
22. The average density of earth may be taken as :
(1) 5.51 g/cc (2) 5.51 kg/cc
(3) 3.9 g/cc (4) 3.9 kg/cc
23. Soil deposit formed due to transportation by wind is termed as :
(1) aeolian deposit (2) lacustrine deposit
(3) alluvial deposit (4) estuarine deposit
24. Water losses in water supply is assumed as :
(1) 5% (2) 7.5% (3) 10% (4) 15%
25. The smallest sieve size according to Indian standards is :
(1) 0.0045 mm (2) 0.045 mm (3) 0.45 mm (4) 0.154 mm
26. A body floating in a liquid is in a stable state of equilibrium if its :
(1) Metacentre lies above its centre of gravity
(2) Metacentre lies below its centre of gravity
(3) Metacentre coincides with its centre of gravity
(4) Centre of gravity is below its centre of buoyancy
27. What is the recommended shape of camber :
(1) Straight
(2) Parabolic
(3) Straight at edges and parabolic in middle
(4) Parabolic at edges and straight at middle

28. Assumptions made in the Terzaghi's consolidation theory is :
- (1) Soil is saturated
 - (2) Compression is one dimensional
 - (3) The coefficient of permeability is constant
 - (4) All of the above
29. Which one of the following products is *not* obtained in anaerobic decomposition of glucose ?
- (1) CO_2 (2) CH_4 (3) HS_2 (4) H_2O
30. Consider the statements P and Q related to the analysis/design of retaining walls.
- P : When a rough retaining wall moves toward the backfill, the wall friction force/resistance mobilizes in upward direction along the wall.
- Q : Most of the earth pressure theories calculate the earth pressure due to surcharge by neglecting the actual distribution of stresses due to surcharge.
- Which one of the following options is correct ?
- (1) Both P and Q are TRUE (2) P is TRUE and Q is FALSE
- (3) Both P and Q are FALSE (4) P is FALSE and Q is TRUE
31. Creep of concrete under compression is defined as the
- (1) increase in the magnitude of strain under constant stress
 - (2) increase in the magnitude of stress under constant strain
 - (3) decrease in the magnitude of strain under constant stress
 - (4) decrease in the magnitude of stress under constant strain
32. A jet of water having a velocity of 20 m/s strikes a series of plates fixed radially on a wheel revolving in the same direction as the jet at 15 m/s. What is the percentage efficiency of the plates ? (round off to one decimal place)
- (1) 37.5 (2) 66.7 (3) 50.0 (4) 88.9
33. The shape of the most commonly deigned highway vertical curve is :
- (1) Spiral
 - (2) Parabolic
 - (3) Circular (same radius)
 - (4) Circular (different radius)

34. An amount of 35.67 mg HCl is added to distilled water and the total solution volume is made to one litre. The atomic weights of H and Cl are 1 and 35.5, respectively. Neglecting the dissociation of water, the pH of the solution, is :
(1) 2.50 (2) 3.50 (3) 2.01 (4) 3.01
35. A highway designed for 80 km/h speed has a horizontal curve section with radius 250 m. If the design lateral friction is assumed to develop fully, the required super elevation is :
(1) 0.02 (2) 0.05 (3) 0.09 (4) 0.07
36. As per IS 456 : 2000, the pH value of water for concrete mix shall not be less than :
(1) 4.5 (2) 6.0 (3) 5.5 (4) 5.0
37. Wind blown silt having little or no stratification is called :
(1) Talus (2) Drift (3) Peat (4) Loess
38. The ratio of lateral strain to linear strain is known as :
(1) Modulus of elasticity (2) Modulus of rigidity
(3) Poisson's ratio (4) Elastic limit
39. A glass rod have an elastic modulus of 90 GPa and Poisson's ratio of 0.2 will have its bulk modulus (in GPa) :
(1) 50 (2) 108 (3) 270 (4) 91
40. If a simply supported beam of span L carries a point load W at the mid span, then downward deflection under the load will be :
(1) $WL^3/3EI$ (2) $WL^3/8EI$ (3) $WL^3/48EI$ (4) $5/384.WL^3/3EI$
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60. The maximum efficiency of transmission through a pipe is :
(1) 50 (2) 56.7 (3) 66.67 % (4) 76.66 %
61. Which of the following are known as the formation constants of an aquifer ?
(1) Storativity and permeability
(2) Permeability and specific storage
(3) Specific storage and transmissibility
(4) Transmissibility and storativity

62. Hydrology deals with :
- (1) process of depletion of water resources of land
 - (2) process of natural science of water
 - (3) process of various water phases
 - (4) all of the above
63. Which of the following is a primary air pollutant ?
- (1) Sulphur dioxide
 - (2) Nitrogen dioxide
 - (3) Carbon monoxide
 - (4) Carbon dioxide
64. The hydrograph of short duration can be converted into hydrograph of longer duration by :
- (1) unit hydrograph
 - (2) synthetic unit hydrograph
 - (3) s-curve method
 - (4) flood routing
65. Wet mix macadam is used for construction of :
- (1) sub grade
 - (2) sub base/base
 - (3) wearing course
 - (4) bearing course
66. An aquiclude is :
- (1) A non-artesian aquifer
 - (2) An artesian aquifer
 - (3) A solid impermeable layer underlying or overlying an aquifer
 - (4) A large underground water body
67. The longitudinal joints are provided when the width of road is more than :
- (1) 3 m
 - (2) 4 m
 - (3) 5.5 m
 - (4) 6.75 m
68. If the specific capacity of a well is 1.166 litres/sec, then the discharge from this well under a depression head of 3 m head will be :
- (1) 1.66 litre/s
 - (2) 3.5 litre/sec
 - (3) 10.5 litre/sec
 - (4) None of the above
69. Which of the following external changes cause the rate of transpiration to decrease ?
- (1) Increase in sunlight
 - (2) Increase in temperature
 - (3) Increase of carbon dioxide concentration
 - (4) Increase of available soil water

70. The yield of a well can be obtained by :
(1) a pumping test (2) recuperating test
(3) a chemical test (4) either (1) or (2)
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(1) Increases voids and decreases permeability
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 (1) $f_{cr} = 0.7 f_{ck}$ (2) $f_{cr} = 0.7 \sqrt{f_{ck}}$ (3) $f_{cr} = 0.75 f_{ck}$ (4) $f_{cr} = 0.7/f_{ck}$
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P. T. O.

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Total No. of Printed Pages : 13

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SET-Y

C

Ph.D-EE-December, 2024
Civil Engineering

10007

Sr. No.

Time : 1½ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) _____ (in words) _____

Name _____ Date of Birth _____

Father's Name _____ Mother's Name _____

Date of Examination _____

(Signature of the Candidate)

(Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. **All questions are compulsory.**
2. The candidates **must return** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
5. The candidate **must not** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **must not** be ticked in the question booklet.
6. **There shall be negative marking. A deduction of 0.25 marks shall be there for each wrong answer. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
7. Use only **Black** or **Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.
8. **Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.**

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 (1) 50 (2) 56.7 (3) 66.67 % (4) 76.66 %
51. The traffic starts discharging from an approach at an intersection with the signal turning green. The constant headway considered from the fourth or fifth headway position is referred to as :
 (1) intersection headway (2) saturation headway
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52. The average density of earth may be taken as :
(1) 5.51 g/cc (2) 5.51 kg/cc
(3) 3.9 g/cc (4) 3.9 kg/cc
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(1) aeolian deposit (2) lacustrine deposit
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54. Water losses in water supply is assumed as :
(1) 5% (2) 7.5% (3) 10% (4) 15%
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(1) 0.0045 mm (2) 0.045 mm (3) 0.45 mm (4) 0.154 mm
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(3) The coefficient of permeability is constant
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59. Which one of the following products is *not* obtained in anaerobic decomposition of glucose ?
(1) CO_2 (2) CH_4 (3) HS_2 (4) H_2O

60. Consider the statements P and Q related to the analysis/design of retaining walls.
- P : When a rough retaining wall moves toward the backfill, the wall friction force/resistance mobilizes in upward direction along the wall.
- Q : Most of the earth pressure theories calculate the earth pressure due to surcharge by neglecting the actual distribution of stresses due to surcharge.

Which one of the following options is correct ?

- (1) Both P and Q are TRUE (2) P is TRUE and Q is FALSE
(3) Both P and Q are FALSE (4) P is FALSE and Q is TRUE
61. A rectangular channel section will be most efficient when :
- (1) Hydraulic radius is equal to half the depth of flow
(2) Hydraulic radius is equal to the depth of flow
(3) Depth of flow is equal to the bottom width
(4) Depth of flow is equal to half the hydraulic radius
62. In a submerged orifice, the effective head is 2 m. If $C_v = 1$, the velocity through the orifice is :
- (1) 1.414 m/s (2) 4.43 m/s (3) 4.905 m/s (4) 6.26 m/s
63. The loss of energy at the exit from a pipe is given as :
- (1) $h_E = V^2/g$ (2) $h_E = V^2/3g$ (3) $h_E = V^2/2g$ (4) $h_E = 2V^2/g$
64. The water is flowing in a pipe of cross-section area 19.625 m^2 and perimeter 15.7 m. The hydraulic mean diameter is :
- (1) 4 m (2) 5 m (3) 6 m (4) 7 m
65. The precipitation is measured in terms of :
- (1) Intensity of pressure (2) Depth of water
(3) Quantity of water (4) Volume of water
66. A rainfall is considered acid rain if the pH of rainwater is :
- (1) less than 7.0 (2) less than 5.6
(3) less than 4.5 (4) less than 3.0

C

67. Which of the following is not a common use of unit hydrographs ?
 (1) Extending flood flow records based on rainfall
 (2) Flood forecasting and warning systems
 (3) Estimation of time of concentration
 (4) Design of hydraulic structures
68. The rainfall of five successive days were measured as 100 mm, 80 mm, 60 mm, 40 mm and 20 mm respectively. If the storm loss rate for the catchment area is earlier estimated as 50 mm/day, the total surface run off will be :
 (1) 50 mm (2) 60 mm (3) 90 mm (4) 140 mm
69. Which hydrological method is commonly used for estimating flood peaks in ungauged watersheds ?
 (1) Rational Method (2) SCS Curve Number Method
 (3) HEC-RAS Modeling (4) Unit Hydrograph Method
70. The length of the side of warning sign boards of roads is :
 (1) 30 cm (2) 45 cm
 (3) 60 cm (4) 75 cm
71. Which of the following are known as the formation constants of an aquifer ?
 (1) Storativity and permeability (2) Permeability and specific storage
 (3) Specific storage and transmissibility (4) Transmissibility and storativity
72. Hydrology deals with :
 (1) process of depletion of water resources of land
 (2) process of natural science of water
 (3) process of various water phases
 (4) all of the above
73. Which of the following is a primary air pollutant ?
 (1) Sulphur dioxide (2) Nitrogen dioxide
 (3) Carbon monoxide (4) Carbon dioxide

74. The hydrograph of short duration can be converted into hydrograph of longer duration by :
- (1) unit hydrograph
 - (2) synthetic unit hydrograph
 - (3) s-curve method
 - (4) flood routing
75. Wet mix macadam is used for construction of :
- (1) sub grade
 - (2) sub base/base
 - (3) wearing course
 - (4) bearing course
76. An aquiclude is :
- (1) A non-artesian aquifer
 - (2) An artesian aquifer
 - (3) A solid impermeable layer underlying or overlying an aquifer
 - (4) A large underground water body
77. The longitudinal joints are provided when the width of road is more than :
- (1) 3 m
 - (2) 4 m
 - (3) 5.5 m
 - (4) 6.75 m
78. If the specific capacity of a well is 1.166 litres/sec, then the discharge from this well under a depression head of 3 m head will be :
- (1) 1.66 litre/s
 - (2) 3.5 litre/sec
 - (3) 10.5 litre/sec
 - (4) None of the above
79. Which of the following external changes cause the rate of transpiration to decrease ?
- (1) Increase in sunlight
 - (2) Increase in temperature
 - (3) Increase of carbon dioxide concentration
 - (4) Increase of available soil water
80. The yield of a well can be obtained by :
- (1) a pumping test
 - (2) recuperating test
 - (3) a chemical test
 - (4) either (1) or (2)
81. Creep of concrete under compression is defined as the
- (1) increase in the magnitude of strain under constant stress
 - (2) increase in the magnitude of stress under constant strain
 - (3) decrease in the magnitude of strain under constant stress
 - (4) decrease in the magnitude of stress under constant strain
- Ph. D. EE-December, 2024/(Civil Engg.)(SET-Y)/(C)

82. A jet of water having a velocity of 20 m/s strikes a series of plates fixed radially on a wheel revolving in the same direction as the jet at 15 m/s. What is the percentage efficiency of the plates ? (round off to one decimal place)
- (1) 37.5 (2) 66.7 (3) 50.0 (4) 88.9
83. The shape of the most commonly deigned highway vertical curve is :
- (1) Spiral (2) Parabolic
(3) Circular (same radius) (4) Circular (different radius)
84. An amount of 35.67 mg HCl is added to distilled water and the total solution volume is made to one litre. The atomic weights of H and Cl are 1 and 35.5, respectively. Neglecting the dissociation of water, the pH of the solution, is :
- (1) 2.50 (2) 3.50 (3) 2.01 (4) 3.01
85. A highway designed for 80 km/h speed has a horizontal curve section with radius 250 m. If the design lateral friction is assumed to develop fully, the required super elevation is :
- (1) 0.02 (2) 0.05 (3) 0.09 (4) 0.07
86. As per IS 456 : 2000, the pH value of water for concrete mix shall not be less than :
- (1) 4.5 (2) 6.0 (3) 5.5 (4) 5.0
87. Wind blown silt having little or no stratification is called :
- (1) Talus (2) Drift (3) Peat (4) Loess
88. The ratio of lateral strain to linear strain is known as :
- (1) Modulus of elasticity (2) Modulus of rigidity
(3) Poisson's ratio (4) Elastic limit
89. A glass rod have an elastic modulus of 90 GPa and Poisson's ratio of 0.2 will have its bulk modulus (in GPa) :
- (1) 50 (2) 108 (3) 270 (4) 91
90. If a simply supported beam of span L carries a point load W at the mid span, then downward deflection under the load will be :
- (1) $WL^3/3EI$ (2) $WL^3/8EI$ (3) $WL^3/48EI$ (4) $5/384.WL^3/3EI$

91. The water content of a soil remains unchanged during the entire test in :
(1) Drained Test (2) Consolidated drained test
(3) Unconsolidated drained test (4) None of these
92. Bacteria which use carbon dioxide as a source of carbon are known as :
(1) Autotropic (2) Heterotrophic (3) Aerobic (4) Anaerobic
93. Length to diameter ratio for cylindrical specimen of soil for triaxial shear test is :
(1) 1.0 (2) 1.5 (3) 2.0 (4) 2.5
94. In case of potable water the permissible upper limit of chloride content is :
(1) 250 PPM (2) 300 PPM (3) 350 PPM (4) 100 PPM
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96. The process of obtaining increased density of soil in a fill by reduction of its pore space by the expulsion of air, is known as :
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97. The shrinkage index is equal to :
(1) liquid limit + plastic limit (2) plastic limit – liquid limit
(3) liquid limit – shrinkage limit (4) shrinkage limit – liquid limit
98. When was the water (Prevention and Pollution) Act enacted by the Indian Parliament :
(1) 1970 (2) 1974 (3) 1980 (4) 1985
99. Which of the following soil possesses zero plasticity index ?
(1) Clay (2) Clayey silt (3) Sand (4) Silty
100. The strength of a soil is usually identified by :
(1) Direct tensile stress (2) Direct compressive stress
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(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU
ARE ASKED TO DO SO)

D

Ph.D-EE-December, 2024

SET-Y

Civil Engineering

10004

Sr. No.

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) _____ (in words) _____

Name _____ Date of Birth _____

Father's Name _____ Mother's Name _____

Date of Examination _____

(Signature of the Candidate)

(Signature of the Invigilator)

**CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE
STARTING THE QUESTION PAPER.**

1. **All questions are compulsory.**
2. The candidates **must return** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
5. The candidate **must not** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **must not** be ticked in the question booklet.
6. **There shall be negative marking. A deduction of 0.25 marks shall be there for each wrong answer. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
7. Use only **Black or Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.
8. **Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.**

Ph.D-EE-December, 2024/(Civil Engg.)(SET-Y)/(D)

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11. A sewer which receives sewage from the collection system and conducts it to a point of final disposal is called a :
(1) Common sewer (2) Trunk sewer (3) Branch sewer (4) Outfall sewer
12. The optimum depth of kor watering for wheat in the plains of North India is :
(1) 13.5 cm (2) 16.5 cm (3) 19 cm (4) 21 cm
13. The internal diameter of the sewer should not be less than :
(1) 15 cm (2) 25 cm (3) 50 cm (4) 75 cm
14. The channel used to bypass the excess water entering a canal is called :
(1) Canal escape (2) Canal regulator
(3) Canal module (4) None of these
15. Which of the following does not include in the phases of highway planning ?
(1) Financing
(2) Showing the phasing of a plan in the five-year plan
(3) Assessment of road length requirement
(4) Preparation of master plan
16. Which of the following is the other name of perennial irrigation system ?
(1) Flood Irrigation (2) Controlled Irrigation
(3) Direct Irrigation (4) Storage Irrigation
17. Which of the following type of Irrigation system is practised on small scale in India ?
(1) Lift Irrigation (2) Flood Irrigation
(3) Natural Sub-irrigation (4) Artificial Sub-irrigation

18. Lining of Irrigation channels :
- (1) May stop leakage water
 - (2) Creates water logging in near-by areas
 - (3) Both (1) and (2)
 - (4) None of the above
19. The main cause of silting in channel is :
- (1) non-regime section
 - (2) inadequate slope
 - (3) defective head regulator
 - (4) all of the above
20. The amount of oxygen consumed by sewage from an oxidising agent like potassium dichromate is termed as :
- (1) Bio-chemical Oxygen Demand (B.O.D.)
 - (2) Chemical Oxygen Demand (C.O.D.)
 - (3) Relative stability
 - (4) None of the above
21. A rectangular channel section will be most efficient when :
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Q : Most of the earth pressure theories calculate the earth pressure due to surcharge by neglecting the actual distribution of stresses due to surcharge.
Which one of the following options is correct ?
(1) Both P and Q are TRUE (2) P is TRUE and Q is FALSE
(3) Both P and Q are FALSE (4) P is FALSE and Q is TRUE

51. The minimum pitch of the rivet shall not be less than :
(1) d (2) $1.5d$ (3) $2.0d$ (4) $2.5d$
52. The structural design method that does not take into account the safety factors on the design loads is :
(1) working stress method (2) load factor method
(3) ultimate load method (4) limit state method
53. The type of bond in a brick masonry containing alternate course of stretcher and headers is called :
(1) Flemish bond (2) English bond (3) Stretched bond (4) Header bond
54. During the process of hydration of cement, due to increase in Dicalcium Silicate 2 (CS) content in cement clinker, the heat of hydration :
(1) increases (2) initially decreases and then increases
(3) does not change (4) decreases
55. PERT technique of network analysis is mainly useful for :
(1) Small projects (2) Large and complex projects
(3) Research and development project (4) Deterministic activities
56. Critical Path Method (CPM) network is :
(1) Activity oriented (2) Event oriented
(3) Both activity as well as event oriented (4) None of these
57. Slack in a PERT network refers to :
(1) Activity (2) Event
(3) Dummy Activity (4) None of the above
58. The type of foundation suitable for under-water structure is :
(1) cast-in-situ concrete piles (2) continuous footing
(3) pier foundation (4) stepped foundation
59. Which of the following represents hardest grade of bitumen ?
(1) 30/40 (2) 60/70 (3) 80/100 (4) 100/120

60. The relation between modulus of rupture (f_{cr}) and characteristic compressive strength (f_{ck}) is
- (1) $f_{cr} = 0.7 f_{ck}$ (2) $f_{cr} = 0.7 \sqrt{f_{ck}}$ (3) $f_{cr} = 0.75 f_{ck}$ (4) $f_{cr} = 0.7/f_{ck}$
61. A sample of 500 g dry sand, when poured into a 2 litre capacity cylinder which is partially filled with water, displaces 188 cm^3 of water. The density of water is 1 g/cm^3 . The specific gravity of the sand is :
- (1) 2.66 (2) 2.52
(3) 2.72 (4) 2.55
62. A soil sample having a void ratio of 1.3, water content of 50 % and a specific gravity of 2.60, is a state of :
- (1) Partial saturation (2) Full saturation
(3) over saturation (4) Under saturation
63. Traffic density is defined as :
- (1) The number of vehicles per unit length
(2) The number of vehicles moving in a specific direction per lane per day
(3) The number of vehicles passing a given point in one hour
(4) The number of vehicles moving in a specific direction per hour
64. A dry soil has mass specific gravity of 1.35, if the specific gravity of solids is 2.7, then the void ratio will be :
- (1) 0.5 (2) 1.0
(3) 1.5 (4) 2.0
65. Effective stress on soil :
- (1) Increases voids and decreases permeability
(2) Increases both voids ratio and permeability
(3) Decreases both voids ratio and permeability
(4) Decreases voids ratio and increases permeability
66. Coarse grained soils are best compacted by :
- (1) Vibratory roller (2) Rubber tyred roller
(3) Sheep's foot roller (4) Drum roller

D

67. When the Adiabatic Lapse Rate (ALR) is more than Environment Lapse Rates (ELR), then the ELR can be called as :
- (1) Super adiabatic lapse rate (2) Sub adiabatic lapse rate
(3) Dry adiabatic lapse rate (4) Wet adiabatic lapse rate
68. A vehicle has a wheel base of 6.5 m. What is the off tracking while negotiating a curved path with a mean radius of 32 m :
- (1) 0.72 m (2) 0.9 m (3) 0.87 m (4) 0.66 m
69. A sample of soil has liquid limit 45%, Plastic limit 25%, shrinkage limit 17% and natural moisture content 30%. The liquidity index of soil is :
- (1) 15/20 (2) 13/20 (3) 8/20 (4) 5/20
70. The phenomenon when soil loses its shear strength due to oscillatory motion is known as :
- (1) Consolidation (2) Shear failure (3) Liquefaction (4) Sloughing
71. For a flow to be irrotational, the vorticity is :
- (1) zero (2) one (3) two (4) four
72. Ball pen works on the principle of :
- (1) Viscosity (2) Surface tension
(3) Gravitational force (4) Boyle's Law
73. A vessel of 4 m³ contains an oil which weighs 30 kN. The specific weight of the oil is :
- (1) 4.5 kN/m³ (2) 6 kN/m³ (3) 7.5 kN/m³ (4) 10 kN/m³
74. The unit of kinematic viscosity in S. I. units is :
- (1) N-m/s (2) N-s/m² (3) m²/sec (4) N-m
75. The dimension of dynamic viscosity :
- (1) ML⁰T⁻¹ (2) ML⁻¹T⁻² (3) ML⁻²T⁻² (4) ML⁻¹T⁻²
76. A single lane highway has a traffic density of 40 vehicle/km. If the time mean speed and space mean speed are 40 kmph and 30 kmph, respectively, the average headway (in sec) between the vehicle is :
- (1) 8.33×10^{-3} (2) 6.25×10^{-4} (3) 2.25 (4) 3.00

77. The bio-chemical treatment of sewage effluent is a process of :
 (1) Oxidation (2) Deoxidation (3) Self purification (4) Sedimentation
78. The global warming is mainly caused by :
 (1) NO_x (2) SO_x (3) CO_2 (4) O_2
79. What is the acceptable limit for pH of drinking water ?
 (1) 7.5 – 9.5 (2) 9.5 – 10.5 (3) 5.5 – 7.5 (4) 6.5 – 8.5
80. The maximum efficiency of transmission through a pipe is :
 (1) 50 (2) 56.7 (3) 66.67 % (4) 76.66 %
81. The degree of static indeterminacy of a rigid-jointed space frame is :
 (1) $m + r - 2j$ (2) $m + r - 3j$ (3) $3m + r - 3j$ (4) $6m + r - 6j$
82. Which of the following are indeterminate structures ?
 (1) 3-hinged arch (2) Continuous Beam
 (3) Redundant frame (4) Both (2) and (3)
83. The stress carried by the King-Post of a King-Post roof truss is :
 (1) Tensile (2) Compressive
 (3) Tensile and Bending (4) Compressive and Bending
84. Match the following :
- | List I | List II |
|---------------------------------|--------------------------|
| P. Slope deflection method | I. Force Method |
| Q. Moment distribution method | II. Displacement Method |
| R. Method of three moments | |
| S. Castigliano's second theorem | |
| (1) P-I, Q-II, R-I, S-II | (2) P-I, Q-I, R-II, S-II |
| (3) P-II, Q-II, R-I, S-I | (4) P-II, Q-I, R-II, S-I |
85. For the administration of road transport, a Motor Vehicle Act was enacted in :
 (1) 1927 (2) 1934 (3) 1939 (4) 1947

86. The Muller-Breslau principle is the straight application of :
- (1) Kani's theorem
 - (2) Maxwell reciprocal theorem
 - (3) Moment area method
 - (4) Unit load method
87. In conjugate beam, the loading is equal to :
- (1) Shear force diagram of actual beam
 - (2) Bending moment diagram of actual beam
 - (3) Loading of actual beam
 - (4) M/EI diagram of actual beam
88. The horizontal component of a reaction at both lower end of a 3-hinged arch is known as :
- (1) Thrust
 - (2) Pull
 - (3) Bending
 - (4) Shear
89. The resultant of two perpendicular forces each equal to $P/2$ will be equal to :
- (1) $P/\sqrt{2}$
 - (2) $\sqrt{2}$
 - (3) $2P$
 - (4) $\sqrt{2}P$
90. A block of weight 20 kN just begins to move along a horizontal surface on application of 5 kN horizontal force. The coefficient of friction between block and surface is :
- (1) 0.10
 - (2) 0.20
 - (3) 0.25
 - (4) 0.50
91. Which of the following are known as the formation constants of an aquifer ?
- (1) Storativity and permeability
 - (2) Permeability and specific storage
 - (3) Specific storage and transmissibility
 - (4) Transmissibility and storativity
92. Hydrology deals with :
- (1) process of depletion of water resources of land
 - (2) process of natural science of water
 - (3) process of various water phases
 - (4) all of the above
93. Which of the following is a primary air pollutant ?
- (1) Sulphur dioxide
 - (2) Nitrogen dioxide
 - (3) Carbon monoxide
 - (4) Carbon dioxide

94. The hydrograph of short duration can be converted into hydrograph of longer duration by :
(1) unit hydrograph (2) synthetic unit hydrograph
(3) s-curve method (4) flood routing
95. Wet mix macadam is used for construction of :
(1) sub grade (2) sub base/base
(3) wearing course (4) bearing course
96. An aquiclude is :
(1) A non-artesian aquifer
(2) An artesian aquifer
(3) A solid impermeable layer underlying or overlying an aquifer
(4) A large underground water body
97. The longitudinal joints are provided when the width of road is more than :
(1) 3 m (2) 4 m (3) 5.5 m (4) 6.75 m
98. If the specific capacity of a well is 1.166 litres/sec, then the discharge from this well under a depression head of 3 m head will be :
(1) 1.66 litre/s (2) 3.5 litre/sec (3) 10.5 litre/sec (4) None of the above
99. Which of the following external changes cause the rate of transpiration to decrease ?
(1) Increase in sunlight
(2) Increase in temperature
(3) Increase of carbon dioxide concentration
(4) Increase of available soil water
100. The yield of a well can be obtained by :
(1) a pumping test (2) recuperating test
(3) a chemical test (4) either (1) or (2)

Answer keys of PH.D (CIVIL)-UIET entrance exam dated 05.12.2024

Q. NO.	A	B	C	D
1	4	1	1	1
2	4	4	2	1
3	2	3	1	2
4	3	2	2	4
5	3	2	3	2
6	2	2	1	2
7	4	3	2	4
8	1	3	4	3
9	1	2	4	1
10	3	2	2	3
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44	2	1	3	4
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46	1	2	4	1
47	2	4	1	3
48	4	1	3	4
49	4	4	4	3
50	2	2	3	4

M-2

J. Kumar

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Answer keys of PH.D (CIVIL)-UIET entrance exam dated 05.12.2024

Q. NO.	A	B	C	D
51	3	1	2	4
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95	1	3	1	2
96	2	2	4	3
97	4	4	3	2
98	1	1	2	2
99	4	1	3	3
100	2	3	3	4


