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KPSC AEE

**Previous Year Paper
(Specific) Paper-II
16 Jun, 2023**



1. Some amount of chlorides are allowed in drinking water because :

- A. They help in killing bacteria.
- B. Small quantity of chloride adds to the taste.
- C. They are not injurious to human health.
- D. It is not economical to remove them completely.

Which of the above statements are correct ?

- (1) A, B and D
- (2) A, B and C
- (3) B, C and D
- (4) A, C and D

2. Match the following List I with List II :

List I

List II

- | | |
|---------------------------|-------------------------------|
| A. Chick's Law | I. Discrete particle settling |
| B. Stokes Equation | II. Rate of bacterial kill |
| C. Kozeny-Carman Equation | III. Head loss in filters |

Select the correct answer using the codes given below :

- | | A | B | C |
|-----|-----|-----|-----|
| (1) | III | II | I |
| (2) | III | I | II |
| (3) | II | I | III |
| (4) | II | III | I |

3. The water yielding capacity of a ground formation is represented by its :

- (1) Specific yield
- (2) Field capacity
- (3) Specific capacity
- (4) None of the above

4. Which of the following treatments reduce salinity of water ?

- A. Filtration
- B. Flocculation and Sedimentation
- C. Reverse osmosis
- D. Electrodialysis

Select the correct answer using the codes given below :

- (1) A and C only
- (2) B and C only
- (3) C and D only
- (4) A and D only

5. Which one of the following filters will produce water of higher bacteriological quality ?

- (1) Slow sand filter
- (2) Rapid sand filter
- (3) Pressure filter
- (4) Dual media filter

6. The maximum sound level, beyond which it is certainly regarded as a pollutant, is :
- (1) 40 dB
 - (2) 60 dB
 - ✓(3) 80 dB
 - (4) 100 dB
7. Acceptable noise level for residential and business urban areas as per IS : 4954 – 1968 is
- (1) 20 – 30 dB
 - ✓(2) 40 – 50 dB
 - (3) 50 – 60 dB
 - (4) 60 – 80 dB
8. What are the health hazards which can be caused by E-waste ?
- (1) Lung cancer
 - (2) Brain damage
 - (3) DNA damage
 - (4) All of the above
9. What is the hazardous pollutant released from batteries ?
- (1) Barium
 - (2) Arsenic
 - ✓(3) Cadmium
 - (4) Cobalt
10. The suitable method of forecasting population for a young and rapidly developing city is
- (1) Comparative graphical method
 - ✓(2) Arithmetic mean method
 - ✓(3) Geometric mean method
 - (4) None of the above
11. The Earth's water circulatory system is known as
- (1) Precipitation cycle
 - ✓(2) Hydrological cycle
 - (3) Water cycle
 - (4) None of the above
12. Strainer type tubewells are unsuitable for
- (1) Coarse gravel
 - (2) Hard strata
 - ✓(3) Fine sandy strata
 - (4) Clayey strata
13. Pick up the incorrect statement :
- ✓(1) The water that seeps into the ground reservoir is called infiltration.
 - Ⓐ(2) Surface runoff equals runoff minus base flow.
 - ✓(3) The coarser sand and silt gets deposited near the face of the dam and the finer one away from it.
 - Ⓐ(4) The yield of a drainage basin in depth, when multiplied by the basin area, gives the yearly available water.

14. The cast iron water mains

- (1) are very durable
- (2) can resist very high pressure
- (3) are liable to corrosion
- (4) are unaffected in their discharging capacities over time

15. The appropriate diameter of a water main for supplying 9 MLD of water with a velocity of 1.5 m/s is

- (1) 0.3 m
- (2) 0.9 m
- (3) 1.0 m
- (4) 0.6 m

16. In a water treatment plant, dissolved iron and manganese can be removed from water by

- (1) Aeration and coagulation
- (2) Aeration and sedimentation
- (3) Aeration and flocculation
- (4) Aeration and filtration

17. The various treatment processes in a treatment plant are given below :

- A. Filtration
- B. Chlorination
- C. Sedimentation
- D. Coagulation
- E. Flocculation

The correct sequence of this processes is

- (1) A, B, E, C, D
- (2) A, B, C, D, E
- (3) B, C, A, E, D
- ✓ (4) D, E, C, A, B

18. Pressure relief valve installed along water mains may be provided for relieving

- (1) Water hammer pressure
- (2) Air pressure
- (3) Ice pressure
- (4) None of the above

19. Low lift pumps are generally required to feed the water into

- (1) The distribution system
- (2) The treatment plant
- (3) Both of the above
- (4) Neither of the above

20. Safe water is the one which does **not** contain

- (1) Any colour
- (2) Any taste
- (3) Turbidity
- (4) Pathogenic bacteria

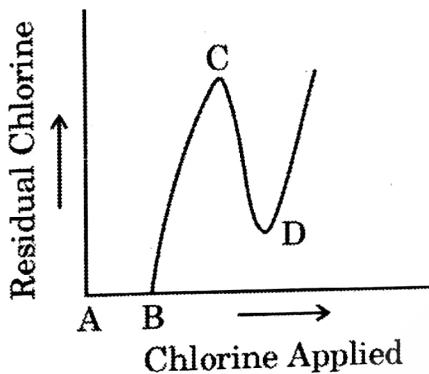
21. pH value of water indicates its

- (1) Alkalinity
- (2) Acidity
- (3) Both (1) and (2) above
- (4) None of the above

22. The suitable method of disinfection of swimming pool water is

- (1) Chlorination
- (2) Ultra-violet rays treatment
- ✓ (3) Lime treatment
- (4) Use of potassium permanganate

23. If only ammonia was present in water, the only change in the below diagram would have been that the curve would



- ✓ (1) become parallel to x-axis after D
- (2) be passing through the origin
- (3) be a straight line
- (4) become parallel to x-axis

24. Rapid gravity filters remove bacteria to as much as

- (1) 90 – 95%
- (2) 80 – 90%
- (3) 98 – 99%
- (4) None of the above

25. The velocity of flow through a ground soil sample can be measured by

- ✓ (1) Dupuit's formula
- (2) Varcy's formula
- (3) Manning's formula
- (4) None of these

26. Which of the following treatment methods are necessary for removing suspended solids from water ?

- A. Coagulation
- B. Flocculation
- C. Sedimentation
- D. Disinfection

Select the correct answer using the codes given below :

- (1) A and D only
- (2) A and C only
- (3) A, C and D
- ✓ (4) A, B and C

27. A bar of 30 mm diameter is subjected to a pull of 60 kN. The measured extension on gauge length of 200 mm is 0.1 mm and the change in diameter is 0.004 mm. Calculate the Bulk modulus.

- (1) $1.209 \times 10^5 \text{ MPa}$
- (2) $2.209 \times 10^5 \text{ MPa}$
- (3) $3.259 \times 10^5 \text{ MPa}$
- (4) $5.447 \times 10^5 \text{ MPa}$

28. Find the diameter of a circular bar which is subjected to an axial pull of 160 kN, if the maximum allowable shear stress on any section is 65 N/mm^2 .

- (1) 10.42 mm
- (2) 39.58 mm
- (3) 15.23 mm
- (4) 20.52 mm

29. At a point within a body subjected to two mutually perpendicular directions, the stresses are 80 N/mm^2 (tensile) and 40 N/mm^2 (tensile). Each of the above stresses is accompanied by a shear stress of 60 N/mm^2 . Determine the resultant stress on an oblique plane inclined at an angle of 45° with the axis of minor tensile stress.

- (1) 500.344 N/mm^2
- (2) 400.125 N/mm^2
- (3) 200.555 N/mm^2
- (4) 121.655 N/mm^2

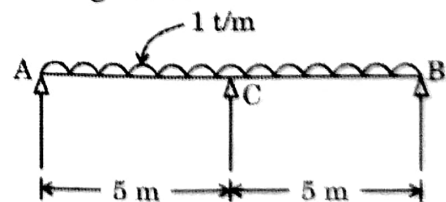
30. A cantilever of length 6 m carries two point loads of 2 kN and 3 kN at a distance of 1 m and 6 m from the fixed end respectively. In addition to this, the beam also carries a UDL of 1 kN/m over a length of 2 m at a distance of 3 m from the fixed end. Find the bending moment at the fixed end.

- (1) 28 kNm
- (2) 50 kNm
- (3) 10 kNm
- (4) 45 kNm

31. A beam 10 m long is simply supported at each end, has a uniformly distributed load of 1000 N/m extending from the left end up to the centre of the beam. There is also an anti-clockwise couple of 15 kNm at 2.5 m from the right end support. Find the bending moment at the centre of the beam.

- (1) 15000 Nm
- (2) 13750 Nm
- (3) 12000 Nm
- (4) 11450 Nm

32. The angle of intersection of a contour and a ridge line is :
 (1) 30°
 (2) 45°
 (3) 60°
 ✓ (4) 90°
33. The whole circle bearing of a line is 150° , the reduced bearing is :
 (1) S 20° E
 (2) S 60° E
 ✓ (3) S 30° E
 (4) S 45° E
34. The magnetic bearing of a line is 42° and magnetic declination is $10^\circ 20'$. The true bearing is :
 (1) $30^\circ 45'$
 ✓ (2) $52^\circ 20'$
 (3) $20^\circ 30'$
 (4) $42^\circ 20'$
35. A sewer is laid from a manhole A to manhole B, 600 m away along a gradient of 1 in 200. If the reduced level of the invert at A is 305.75 m and the height to the boning rod is 3.0 m, the reduced level of the sight rail at B, is
 (1) 300.65 m
 (2) 305.25 m
 (3) 301.75 m
 (4) 305.75 m
36. For a design speed of 80 kmph, the normal radius (m) for 4% super elevation is
 (1) 300 m
 (2) 400 m
 (3) 500 m
 (4) 600 m
37. The value of obliquity of the ecliptic is
 (1) $23^\circ 27'$
 (2) $28^\circ 35'$
 (3) $30^\circ 00'$
 (4) $32^\circ 34'$
38. The scale of a vertical photograph of focal length 1.0 m taken from a height of 400 m above MSL at a point of reduced level 100 m is :
 (1) 1 : 100
 (2) 1 : 200
 (3) 1 : 50
 (4) 1 : 300
39. The maximum deflection of a simply supported beam of length 2.0 m with a central load $W = 300$ N will be
 (1) $40/EI$
 (2) $50/EI$
 (3) $60/EI$
 (4) $80/EI$
40. A short column with external diameter D and internal diameter d , loaded by weight W on its cross-section will have a maximum eccentricity as
 (1) $(D^2 - d^2) / 8d$
 (2) $(D^2 + d^2) / 8D$
 (3) $(D^2 - d^2) / 6D$
 (4) $(D + 2d) / 6D$
41. The reaction at support A of the beam as shown in figure is



- (1) 1 T
 (2) 10 T
 (3) 4 T
 (4) 6 T

42. If shear stress at a section of an I-joist with web depth 0.10 m and moment of inertia I about its neutral axis, the difference between the maximum and mean shear stress in the web is :

- (1) $\frac{1}{10} I$
- (2) $\frac{1}{20} I$
- (3) $\frac{1}{30} I$
- (4) $\frac{1}{40} I$

43. Match the following List I with List II :

List I (Euler's formula)	List II (Conditions of long columns)
A. $P = \pi^2 EI / I^2$	I. One end fixed
B. $P = \pi^2 EI / 4I^2$	II. Both ends fixed
C. $P = 4\pi^2 EI / I^2$	III. Both ends hinged
D. $P = 2\pi^2 EI / I^2$	IV. One end hinged

Select the correct answer using the codes given below :

	A	B	C	D
(1)	I	IV	III	II
(2)	III	II	IV	I
(3)	III	I	II	IV
(4)	IV	III	I	II

44. Network of activities are shown in Figure 1 and Figure 2.

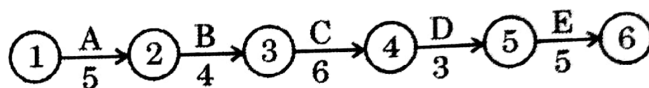


Figure 1

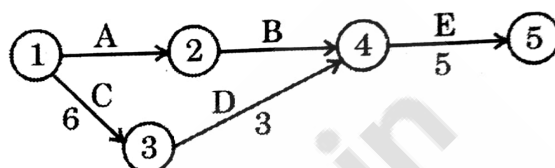
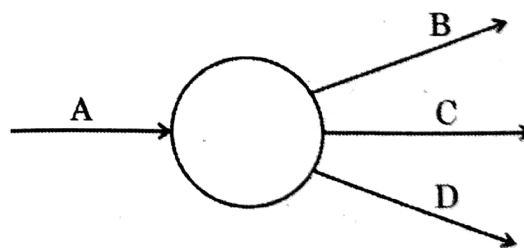


Figure 2

Network shown in

- (1) Figure 1 is economical
- (2) Figure 2 is economical
- (3) Figure 2 is economical because it saves 9 units of time
- (4) Figure 1 is economical because it depicts continuity of activities

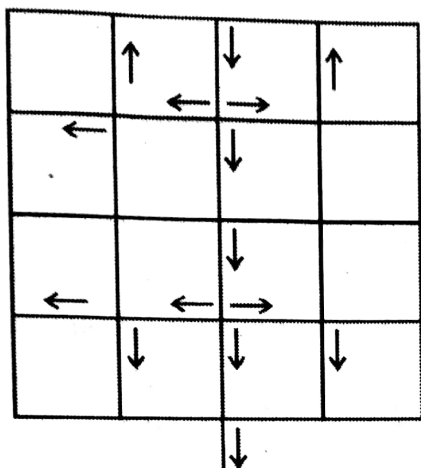
45. Following figure indicates :



- (1) A merge
- (2) An event
- (3) A burst
- (4) An activity

46. The following distribution system is called

48. In case of water supply, pick up the correct statement :



- (1) Dead End System
- ~~(2)~~ Grid Iron System
- (3) Ring System
- (4) Radial System

47. Which of the following would contain water with maximum amount of turbidity ?

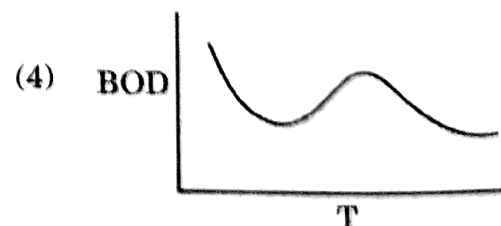
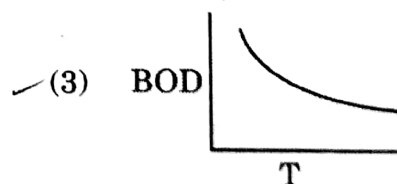
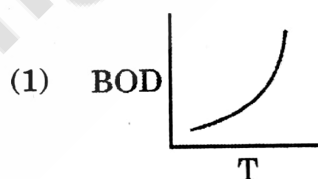
- (1) Ponds
- ✓(2) Rivers
- (3) Lakes
- (4) Overhead tanks

48. In case of water supply, pick up the correct statement :

- A. Pipes are classified according to their size and quality.
- B. Cutting through walls and floors are included with the items.
- C. Pipes laid in trenches and pipes fixed to walls are measured separately.
- D. In laying pipes the method of joining and fixing is specifically specified.

- (1) A only
- (2) B only
- (3) C only
- (4) A, B, C and D

49. The correct graphical representation of BOD and time is given by



50. The settling tank of surface overflow ratio of $4.5 \times 10^{-4} \text{ m}^3/\text{m}^2/\text{s}$ is used for design discharge of $3.0 \text{ m}^3/\text{s}$. What is the surface area (m^2) of the settling tank ?

- (1) 5000 m^2
- ✓(2) 6000 m^2
- (3) 7000 m^2
- (4) 8000 m^2

51. Septic conditions are responsible for

- (1) increasing the discharge in concrete sewers
- ✓(2) causing erosion in concrete sewers
- (3) choking the sewers
- (4) None of the above

52. Plume is

- ✓(1) Path taken by continuous discharge of gaseous effluent emitted from a chimney
- (2) Movement of silt water in rivers and canals
- (3) Process to check smoke from chimney
- (4) Movement of sand by air in deserts

53. The most efficient cross-section of sewers in a separate sewerage system is

- (1) parabolic
- ✓(2) circular
- (3) rectangular
- (4) new egged

54. Consider the following statements regarding the working of coagulation sedimentation plant :

- A. Mixing the chemical coagulant
- B. Agitating the mixture of chemical coagulant and raw water
- C. Coagulation of floc in flocculation
- D. Allowing the flocculated water to enter into sedimentation tank

The correct sequence of operations is

- (1) D, B, C, A
- (2) A, B, D, C
- ✓(3) A, B, C, D
- (4) C, B, D, A

55. The maximum permissible hardness for public supplies is

- (1) 95 mg/L
- (2) 105 mg/L
- (3) 115 mg/L
- (4) 125 mg/L

56. Match the following List I with List II :

List I

List II

- | | |
|-----------------------|---|
| A. Energy content | I. Bomb calorimetry |
| B. Proximity analysis | II. Moisture content, ash content, fixed carbon |
| C. Ultimate analysis | III. C, H, O, N, S |
| D. Filled capacity | IV. Moisture content retained |
| | V. Moisture content, carbon, fixed carbon |

Select the correct answer using the codes given below :

- | | A | B | C | D |
|-----|----|-----|-----|-----|
| (1) | IV | I | V | III |
| (2) | V | III | I | IV |
| (3) | I | II | III | IV |
| (4) | IV | III | V | I |

57. Which among the following unit operations are considered for the analysis of solid waste collection systems ?

- (1) Pick up, haul, at site, off route
- (2) At site, economic, hydrogeological, distance to airport
- (3) Groundwater table level, haul, pick up
- (4) At site, moisture analysis, density

58. Engineering facility for the disposal of solid waste is

- (1) Secured landfill
- (2) Sanitary landfill
- (3) Cell method
- (4) Moderate slope embankment

59. Incineration of solid waste is the best option only if :

- (1) Calorific value > 1500 kcal/kg, Total inert < 25%
- (2) Temperature of solid-waste < 28°C, moisture < 45%
- (3) Calorific value > 1500 kcal/kg, Total inert < 35%, moisture < 45%
- (4) Calorific value > 1300 kcal/kg, Total inert < 35%, moisture < 55%

60. Which of the following is more suitable for composting : Final compost _____ .

- (1) Stable and free of pathogens
- (2) Contains metals
- (3) Contains seeds and metals, high moisture content
- (4) Completely dry and colourless

61. Pick any two characteristics of Hazardous waste :

- (1) Corrositivity and ignitability
- (2) Ash content, fixed carbon
- (3) Toxicity, acidity
- (4) Reactivity, density

62. The landfill gas emissions model, LandGEM Model, is developed by

- (1) Bureau of Indian Standards
- (2) Central Pollution Control Board
- (3) Environmental Protection Agency
- (4) None of the above

63. Stabilization of sludge is beneficial for

- ✓(1) inhibiting microbial growth
- (2) increasing moisture content
- (3) increasing density of sludge
- (4) enhancing aeration rate

64. Sludge conditioning is required for which of the following reasons ?

- ✓(1) To improve field capacity of sludge
- (2) To improve dewatering characteristics ✗
- (3) To increase moisture content ✗
- (4) To alter physical characteristics of sludge

65. The number of Trophic levels is always restricted to :

- (1) 5 or 8
- (2) 2 or 3
- ✓(3) 4 or 5
- (4) 8 or 9

66. Match the following List I with List II :

<i>List I</i>	<i>List II</i>
A. Pyramid of energy	I. The energy flow in an ecosystem
B. Functional attributes of ecosystem	II. Chemical cycling and energy flow
C. Dynamics of ecosystem	III. Ecosystem regulation and development
D. Energy flow	IV. Second trophic level
	V. Multidirectional
	VI. Unidirectional

Select the correct answer using the codes given below :

	A	B	C	D
(1)	II	VI	V	III
(2)	I	III	VI	V
(3)	IV	II	V	I
✓(4)	I	III	II	VI

67. With reference to biodiversity, consider the following statements :

- A. Wide diversity of species in ecosystem sustains all living things.
- B. All species provide at least one function in the ecosystem.
- C. Fuel, carbon sequestration, recreation are examples of benefits of biodiversity.
- D. Alpha richness refers to the rate of change across large landscape.

Which of the above statements are correct ?

- (1) A and C only
- (2) B, C and D only
- (3) C and D only
- (4) A, B and C only

68. "Option Value" in Biodiversity refers to

- (1) Service provided by ecosystem such as prevention of soil erosion and floods
- (2) Number of species found in a small homogeneous area
- (3) Potentials of biodiversity that are presently unknown and need to be explored
- (4) Biogeographic region with a significant reservoir of biodiversity

69. Environmental Impact Assessment is required for the following reason(s) :

- (1) To adopt sustainable environmental management
- (2) To increase emission of greenhouse gases
- (3) To study about climate change
- (4) To maintain global relationship

70. People involved in Environmental Impact Assessment are

- (1) Decision makers, Proponent
- (2) Chairman, Head of the Institute
- (3) Local public, pilots
- (4) Proponent, reviewers, collectors

71. Match the following List I with List II :

List I	List II
A. Scoping	I. Mapping the environment consequences
B. Impact prediction	II. Determines the requirements of EIA
C. Baseline data	III. Identifies the key issues and impacts
D. Screening	IV. Describes the existing environment state of the identified study area

Select the correct answer using the codes given below :

	A	B	C	D
(1)	IV	III	II	I
(2)	II	IV	I	III
(3)	III	I	IV	II
(4)	I	II	III	IV

72. The waste stabilization ponds can be

- ✓(1) Only anaerobic
- (2) Only aerobic
- (3) Facultative
- (4) Any of the above

73. Disposal of sewage by land treatment will be most favorable where

- (1) Area is hilly
- (2) Rivers are not perennial
- ✓(3) Subsoil water table is high
- (4) Climate is wet and rate of evaporation is low

74. A trickling filter (TF) is designed with a unit organic loading of $0.15 \text{ kg/m}^3/\text{day}$. The BOD of a sewage entering is 150 mg/L and the effluent BOD is 30 mg/L . Determine the efficiency of the TF.

- (1) 56%
- (2) 68%
- (3) 75%
- (4) 80%

75. The relative stability of a sewage sample whose dissolved oxygen equals the total oxygen required to satisfy its BOD, is

- ✓(1) 100%
- (2) Infinity
- (3) 1%
- (4) Cannot be determined

76. The BOD of sewage incubated for one day at 30°C has been found to be 100 mg/L . What will 5-day 20°C BOD be ? Assume $K_{20} = 0.2/\text{d}$ (base 10)

- (1) 194.5 mg/L
- (2) 158.3 mg/L
- (3) 175.26 mg/L
- (4) K_{20} is $0.2/\text{d}$, hence, BOD cannot be determined here

77. Choose the correct statement(s) :

- (1) The specific gravity of sewage is slightly less than 1.
- ✓(2) The specific gravity of sewage is slightly greater than 1.
- (3) The specific gravity of sewage is zero.
- (4) The specific gravity of sewage is equal to one.

78. Determine the detention time available for a settling tank with diameter of 22 m and a 1.5 m side water depth for a flow rate of $11000 \text{ m}^3/\text{day}$. Effluent weir is located on the periphery of the tank.

- (1) 1.41 h
- (2) 2.98 h
- (3) 1.244 h
- (4) 3.5 h

79. Pick the correct statement.

Alum when mixed with water as a coagulant

- (1) Increases pH value of water
- ✓(2) Decreases pH value of water
- (3) Does not affect pH value of water
- (4) None of the above

80. If 30 mL of an odorous water sample is needed in 200 mL of odour-free distilled water to produce 230 mL of mixture, then the threshold odour number (TON) is

- (1) 10.31
- (2) 9.00
- (3) 7.66
- (4) 12.9

81. Design a rapid mixing unit to treat a flow of 10 MLD with detention time 1 min. Find its diameter if the depth of the tank is 1 m. Also find velocity gradient if mixing unit imparts a power of 1000 Watts. Assume $\mu = 10^{-3}$ kg/m-s

- (1) $D = 2.97$ and $G = 379.3/s$
- (2) $D = 3.28$ and $G = 412.4/s$
- (3) $D = 1.54$ and $G = 216.7/s$
- (4) $D = 4.54$ and $G = 186.9/s$

82. A rod, which tapers uniformly from 40 mm diameter to 20 mm diameter in a length of 400 mm is subjected to an axial load of 5000 N. If $E = 2.1 \times 10^5$ N/mm², the extension of the rod is

- (1) 0.01515 mm
- (2) 0.001515 mm
- (3) 0.1515 mm
- (4) 1.1515 mm

83. Bulk Modulus (K) is defined as

- (1) $\frac{\text{Longitudinal stress}}{\text{Lateral stress}}$
- (2) $\frac{\text{Shear stress}}{\text{Volumetric strain}}$
- (3) $\frac{\text{Change in volume}}{\text{Original volume}}$
- ✓(4) $\frac{\text{Direct stress}}{\text{Volumetric strain}}$

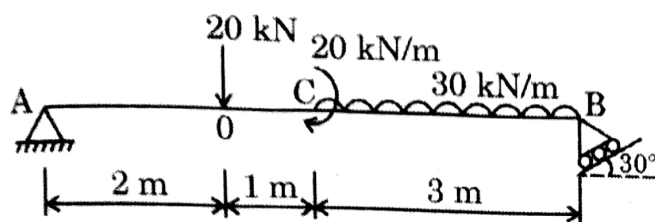
84. Find the modulus of elasticity of a rod, which tapers uniformly from 40 mm to 30 mm diameter in a length of 400 mm. The rod is subjected to an axial load of 5000 N and extension of rod is 0.072 mm.

- (1) 2.825×10^5 N/mm²
- (2) 2.1965×10^5 N/mm²
- (3) 2.5165×10^5 N/mm²
- (4) 2.965×10^5 N/mm²

85. The bulk modulus of a material for which Young's modulus is 1.4×10^5 N/mm² and Poisson's ratio is 0.29, will be

- (1) 2.1×10^5 N/mm²
- ✓(2) 1.6×10^5 N/mm²
- (3) 1.06×10^5 N/mm²
- (4) 2.06×10^5 N/mm²

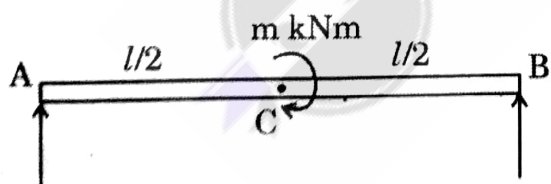
86. A simply supported beam 'AB' is loaded as shown in the figure. Find the reaction at support 'B'.



- (1) 79.50 kN
(2) 69.50 kN
(3) 80.40 kN
(4) 89.49 kN
87. In a beam subjected to loading at the point of contraflexure

- (1) Shear force is zero
✓(2) Bending moment is zero
(3) Shear force is maximum
(4) Bending moment is maximum

88. For a beam subjected to couple at its centre 'C'



- (1) B.M. changes at 'C'
(2) S.F. is unaltered at 'C'
✓(3) Both (1) and (2) hold
(4) None of the above

89. For a beam subjected to uniformly distributed load for the whole span, the shape of Bending Moment Diagram will be

- ✓(1) Hyperbola
(2) Triangular
(3) Parabola
(4) Uniformly varying

90. Functions of Management are

- (1) Administrative, financial and Technical control and co-ordination
(2) Planning, recruitment, training, procurement
✓(3) Both (1) and (2)
(4) Contingency planning and scheduling

91. Basic types of inventory control systems are

- (1) Perpetual and visual inventory system
(2) Periodic and partial control system
✓(3) Both (1) and (2)
(4) CPM Network control system

92. Types of Project Plans are

- (1) Pre-tender planning – Contact planning – Strategic planning
✓(2) Pre planning – Detailed planning – Monitoring planning
(3) Standard planning – Single use planning – Strategic planning
(4) Primary planning – Secondary planning – Control planning

93. The use(s) of construction scheduling is/are

- ✓(1) Systematic implementation of project
(2) Checking of actual progress of the work
(3) To get quantity of work involved, labour, material and equipment
(4) All of the above

94. An undisturbed rock sample has an oven dry weight of 0.655 kg. After saturation with kerosene its weight is 0.732 kg. It is then immersed in kerosene and found to displace 0.301 kg. What is the porosity of the sample ?
- (1) 20.5%
 - (2) 25.5%
 - (3) 30.5%
 - (4) 33.5%
95. Which of the following formations does **not** contain any groundwater ?
- (1) Aquifer
 - (2) Aquitard
 - ✓(3) Aquifuge
 - (4) Aquiclude
96. The drawdown is 3 m in an observation well 10 m away from the pumping well (drilled in an artesian aquifer) after 10 min of pumping. What is the time since pumping started, for the same drawdown in another observation well 20 m away from the pumping well ?
- (1) 20 min
 - (2) 30 min
 - (3) 40 min
 - (4) 50 min
97. In the case of a water table well, the piezometric surface
- ✓(1) is below the water level in the well.
 - (2) is above the ground level.
 - ✓(3) coincides with the water level in the well.
 - (4) is between the water level in the well and ground level.
98. The moisture content of a sludge is reduced from 85% to 80% in a sludge digestion tank. What is the percentage decrease in the volume of sludge ?
- ✓(1) 75%
 - (2) 70%
 - (3) 30%
 - (4) 50%
99. Data from an unseeded domestic wastewater BOD test are : 5 mL of waste in a 300 mL bottle, initial DO of 7.8 mg/L, and 5-day DO equal to 4.3 mg/L. What is the BOD of wastewater ?
- (1) 150 mg/L
 - (2) 160 mg/L
 - (3) 190 mg/L
 - ✓(4) 210 mg/L
100. High lift pumps are generally required to feed water into the
- ✓(1) Distribution system
 - (2) Treatment plant
 - (3) Both of the above
 - (4) Neither of the above

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Examination held on 16-06-2023 (AN)

Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'O'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	1	26	1	51	2	76	3
2	2	27	2	52	3	77	1
3	4	28	3	53	2	78	3
4	1	29	3	54	3	79	3
5	2	30	3	55	1	80	3
6	3	31	1	56	1	81	2
7	3	32	2	57	4	82	4
8	2	33	3	58	2	83	3
9	3	34	1	59	3	84	3
10	3	35	1	60	4	85	2
11	1	36	3	61	2	86	3
12	4	37	1	62	3	87	3
13	4	38	2	63	3	88	1
14	2	39	3	64	3	89	1
15	3	40	4	65	4	90	2
16	1	41	4	66	3	91	4
17	3	42	3	67	4	92	1
18	3	43	1	68	2	93	2
19	3	44	1	69	3	94	4
20	2	45	3	70	3	95	3
21	2	46	4	71	3	96	2
22	4	47	2	72	1	97	2
23	2	48	4	73	4	98	3
24	2	49	1	74	1	99	2
25	2	50	3	75	3	100	4

Note: Every question for which wrong answer has been given by the candidate, $\frac{1}{4}$ th (0.25) of the marks assigned for that question will be deducted.

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Examination held on 16-06-2023 (AN)

Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'P'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	3	26	1	51	1	76	4
2	1	27	1	52	2	77	3
3	2	28	4	53	4	78	3
4	3	29	2	54	1	79	2
5	1	30	3	55	2	80	3
6	1	31	2	56	4	81	3
7	3	32	3	57	2	82	1
8	1	33	3	58	3	83	4
9	2	34	3	59	3	84	4
10	3	35	1	60	3	85	2
11	4	36	4	61	4	86	3
12	4	37	1	62	3	87	1
13	3	38	3	63	4	88	3
14	1	39	3	64	1	89	3
15	1	40	1	65	1	90	3
16	3	41	3	66	2	91	2
17	4	42	3	67	4	92	2
18	2	43	3	68	1	93	4
19	4	44	2	69	2	94	2
20	1	45	4	70	4	95	2
21	3	46	3	71	3	96	2
22	2	47	3	72	2	97	1
23	3	48	2	73	2	98	2
24	2	49	3	74	3	99	3
25	3	50	3	75	2	100	3

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Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'Q'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	3	26	2	51	3	76	1
2	3	27	3	52	1	77	1
3	2	28	3	53	2	78	4
4	3	29	3	54	3	79	2
5	3	30	4	55	1	80	3
6	1	31	3	56	1	81	2
7	4	32	4	57	3	82	3
8	4	33	1	58	1	83	3
9	2	34	1	59	2	84	3
10	3	35	2	60	3	85	1
11	1	36	4	61	4	86	4
12	3	37	1	62	4	87	1
13	3	38	2	63	3	88	3
14	3	39	4	64	1	89	3
15	2	40	3	65	1	90	1
16	2	41	2	66	3	91	3
17	4	42	2	67	4	92	3
18	2	43	3	68	2	93	3
19	2	44	2	69	4	94	2
20	2	45	4	70	1	95	4
21	1	46	1	71	3	96	3
22	2	47	2	72	2	97	3
23	3	48	4	73	3	98	2
24	3	49	1	74	2	99	3
25	4	50	2	75	3	100	3

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Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'R'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	4	26	1	51	3	76	3
2	2	27	4	52	4	77	1
3	3	28	1	53	4	78	4
4	3	29	3	54	3	79	4
5	3	30	3	55	1	80	2
6	4	31	1	56	1	81	3
7	3	32	3	57	3	82	1
8	4	33	3	58	4	83	3
9	1	34	3	59	2	84	3
10	1	35	2	60	4	85	3
11	2	36	4	61	1	86	2
12	4	37	3	62	3	87	2
13	1	38	3	63	2	88	4
14	2	39	2	64	3	89	2
15	4	40	3	65	2	90	2
16	3	41	3	66	3	91	2
17	2	42	3	67	1	92	1
18	2	43	1	68	1	93	2
19	3	44	2	69	4	94	3
20	2	45	3	70	2	95	3
21	4	46	1	71	3	96	1
22	2	47	1	72	3	97	2
23	3	48	3	73	3	98	4
24	3	49	1	74	2	99	1
25	3	50	2	75	3	100	2

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Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'S'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	2	26	2	51	3	76	1
2	3	27	4	52	3	77	1
3	3	28	3	53	2	78	3
4	3	29	2	54	2	79	4
5	1	30	2	55	4	80	2
6	4	31	3	56	2	81	4
7	1	32	2	57	2	82	1
8	3	33	4	58	2	83	3
9	3	34	1	59	1	84	2
10	1	35	2	60	2	85	3
11	3	36	4	61	3	86	2
12	3	37	1	62	3	87	3
13	3	38	2	63	3	88	1
14	2	39	3	64	1	89	1
15	4	40	3	65	2	90	4
16	3	41	2	66	3	91	2
17	3	42	3	67	1	92	3
18	2	43	3	68	1	93	4
19	3	44	1	69	3	94	2
20	3	45	4	70	1	95	3
21	1	46	4	71	2	96	3
22	1	47	2	72	3	97	3
23	2	48	3	73	4	98	4
24	4	49	1	74	4	99	3
25	1	50	3	75	3	100	4

Note: Every question for which wrong answer has been given by the candidate, $\frac{1}{4}$ th (0.25) of the marks assigned for that question will be deducted.

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Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'T'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	1	26	4	51	2	76	3
2	1	27	2	52	3	77	3
3	2	28	3	53	4	78	4
4	4	29	1	54	4	79	3
5	1	30	3	55	3	80	4
6	2	31	3	56	1	81	2
7	4	32	3	57	1	82	3
8	3	33	2	58	3	83	3
9	2	34	2	59	4	84	3
10	2	35	4	60	2	85	1
11	3	36	2	61	4	86	4
12	2	37	2	62	1	87	1
13	4	38	2	63	3	88	3
14	1	39	1	64	2	89	3
15	2	40	2	65	3	90	1
16	4	41	3	66	2	91	3
17	1	42	3	67	3	92	3
18	2	43	3	68	1	93	3
19	3	44	1	69	1	94	2
20	3	45	2	70	4	95	4
21	2	46	3	71	2	96	3
22	3	47	1	72	3	97	3
23	3	48	1	73	4	98	2
24	1	49	3	74	2	99	3
25	4	50	1	75	3	100	3

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Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'U'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	2	26	1	51	1	76	2
2	2	27	3	52	3	77	4
3	1	28	2	53	3	78	1
4	2	29	3	54	1	79	2
5	3	30	2	55	3	80	4
6	3	31	3	56	3	81	1
7	3	32	1	57	3	82	2
8	1	33	1	58	2	83	3
9	2	34	4	59	4	84	3
10	3	35	2	60	3	85	2
11	1	36	3	61	3	86	3
12	1	37	4	62	2	87	3
13	3	38	2	63	3	88	1
14	1	39	3	64	3	89	4
15	2	40	3	65	1	90	4
16	3	41	3	66	1	91	2
17	4	42	4	67	2	92	3
18	4	43	3	68	4	93	1
19	3	44	4	69	1	94	3
20	1	45	2	70	2	95	3
21	1	46	3	71	4	96	3
22	3	47	3	72	3	97	2
23	4	48	3	73	2	98	2
24	2	49	1	74	2	99	4
25	4	50	4	75	3	100	2

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Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'V'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	4	26	3	51	2	76	2
2	2	27	1	52	2	77	4
3	4	28	4	53	3	78	2
4	1	29	1	54	2	79	2
5	3	30	3	55	4	80	2
6	2	31	3	56	1	81	1
7	3	32	1	57	2	82	2
8	2	33	3	58	4	83	3
9	3	34	3	59	1	84	3
10	1	35	3	60	2	85	3
11	1	36	2	61	3	86	1
12	4	37	4	62	3	87	2
13	2	38	3	63	2	88	3
14	3	39	3	64	3	89	1
15	4	40	2	65	3	90	1
16	2	41	3	66	1	91	3
17	3	42	3	67	4	92	1
18	3	43	1	68	4	93	2
19	3	44	1	69	2	94	3
20	4	45	2	70	3	95	4
21	3	46	4	71	1	96	4
22	4	47	1	72	3	97	3
23	2	48	2	73	3	98	1
24	3	49	4	74	3	99	1
25	3	50	3	75	2	100	3

Note: Every question for which wrong answer has been given by the candidate, $\frac{1}{4}$ th (0.25) of the marks assigned for that question will be deducted.

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Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'W'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	3	26	4	51	2	76	3
2	3	27	1	52	1	77	2
3	1	28	2	53	2	78	3
4	3	29	4	54	3	79	2
5	3	30	1	55	3	80	3
6	3	31	2	56	3	81	1
7	2	32	3	57	1	82	1
8	4	33	3	58	2	83	4
9	3	34	2	59	3	84	2
10	3	35	3	60	1	85	3
11	2	36	3	61	1	86	4
12	3	37	1	62	3	87	2
13	3	38	4	63	1	88	3
14	1	39	4	64	2	89	3
15	1	40	2	65	3	90	3
16	2	41	3	66	4	91	4
17	4	42	1	67	4	92	3
18	1	43	3	68	3	93	4
19	2	44	3	69	1	94	2
20	4	45	3	70	1	95	3
21	3	46	2	71	3	96	3
22	2	47	2	72	4	97	3
23	2	48	4	73	2	98	1
24	3	49	2	74	4	99	4
25	2	50	2	75	1	100	1

Note: Every question for which wrong answer has been given by the candidate, $\frac{1}{4}$ th (0.25) of the marks assigned for that question will be deducted.

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Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'X'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	2	26	2	51	2	76	4
2	2	27	4	52	4	77	1
3	4	28	1	53	3	78	3
4	2	29	2	54	3	79	2
5	2	30	4	55	2	80	3
6	2	31	2	56	3	81	2
7	1	32	3	57	3	82	3
8	2	33	3	58	3	83	1
9	3	34	3	59	1	84	1
10	3	35	4	60	2	85	4
11	3	36	3	61	3	86	2
12	3	37	4	62	1	87	3
13	2	38	2	63	1	88	2
14	3	39	3	64	3	89	2
15	3	40	3	65	1	90	3
16	1	41	3	66	2	91	2
17	4	42	1	67	3	92	4
18	4	43	4	68	4	93	1
19	2	44	1	69	4	94	1
20	3	45	3	70	3	95	2
21	1	46	3	71	1	96	4
22	3	47	1	72	1	97	1
23	3	48	3	73	3	98	2
24	3	49	3	74	4	99	4
25	1	50	3	75	2	100	3

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Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'Y'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	3	26	2	51	3	76	1
2	1	27	3	52	3	77	4
3	2	28	3	53	1	78	4
4	3	29	3	54	1	79	2
5	4	30	4	55	2	80	3
6	4	31	3	56	4	81	1
7	3	32	4	57	1	82	3
8	1	33	2	58	2	83	3
9	1	34	3	59	4	84	3
10	3	35	3	60	3	85	2
11	4	36	3	61	2	86	2
12	2	37	1	62	2	87	4
13	4	38	4	63	3	88	2
14	1	39	1	64	2	89	2
15	3	40	3	65	4	90	2
16	2	41	3	66	1	91	1
17	3	42	1	67	2	92	2
18	2	43	3	68	4	93	3
19	3	44	3	69	1	94	3
20	1	45	3	70	2	95	3
21	1	46	2	71	3	96	1
22	4	47	4	72	3	97	2
23	2	48	3	73	2	98	3
24	3	49	3	74	3	99	1
25	4	50	2	75	3	100	1

Note: Every question for which wrong answer has been given by the candidate, $\frac{1}{4}$ th (0.25) of the marks assigned for that question will be deducted.

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Specific Paper (Paper - 2) (Subject Code: 533)

KEY CHART

Question Booklet Series - 'Z'

Total Marks : 300

3 Mark for each question

Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer	Question Number	Key Answer
1	3	26	1	51	3	76	2
2	2	27	1	52	4	77	3
3	4	28	3	53	2	78	3
4	3	29	1	54	3	79	2
5	3	30	2	55	3	80	3
6	2	31	3	56	3	81	3
7	3	32	4	57	4	82	1
8	3	33	4	58	3	83	4
9	1	34	3	59	4	84	4
10	1	35	1	60	2	85	2
11	2	36	1	61	3	86	3
12	4	37	3	62	3	87	1
13	1	38	4	63	3	88	3
14	2	39	2	64	1	89	3
15	4	40	4	65	4	90	3
16	3	41	1	66	1	91	2
17	2	42	3	67	3	92	2
18	2	43	2	68	3	93	4
19	3	44	3	69	1	94	2
20	2	45	2	70	3	95	2
21	4	46	3	71	3	96	2
22	3	47	1	72	1	97	1
23	1	48	1	73	2	98	2
24	2	49	4	74	4	99	3
25	3	50	2	75	1	100	3

Note: Every question for which wrong answer has been given by the candidate, $\frac{1}{4}$ th (0.25) of the marks assigned for that question will be deducted.

Sd/-

Controller of Examination

Karnataka Public Service Commission

Bengaluru.

