

10. Methemoglobinemia disease is caused in infants by
- | | | | |
|---|----------|---|----------|
| A | Chloride | B | Sulfur |
| C | Nitrate | D | Fluoride |
11. Theoretical Oxygen Demand of a glucose solution of 900 mg/l is
- | | | | |
|---|-----------|---|-----------|
| A | 900 mg/l | B | 960 mg/l |
| C | 1020 mg/l | D | 1180 mg/l |
12. When white precipitate is formed after addition of MnSO_4 and alkali-iodide reagent in DO test, it indicates
- | | | | |
|---|----------------------|---|---------------------------|
| A | Absence of oxygen | B | Presence of excess oxygen |
| C | Presence of Nitrogen | D | None of these |
13. 1 gram of molecular weight dissolved in 1 liter of water is called
- | | | | |
|---|-----------------|---|----------------|
| A | Molar solution | B | Molal solution |
| C | Normal solution | D | None of these |
14. Size of Dissolved Particles comes in the range
- | | | | |
|---|--|---|--|
| A | $10^{-1} \mu\text{m}$ to $10^{-3} \mu\text{m}$ | B | $10^{-3} \mu\text{m}$ to $10^{-5} \mu\text{m}$ |
| C | $1 \mu\text{m}$ to $100 \mu\text{m}$ | D | $10 \mu\text{m}$ to $10^{-1} \mu\text{m}$ |
15. Tree system of water distribution system is also called
- | | | | |
|---|-----------------|---|------------------|
| A | Dead end system | B | Grid Iron system |
| C | Radial system | D | Ring system |
16. How many moles are found in 10 kg CH_4
- | | | | |
|---|-----|---|------|
| A | 160 | B | 525 |
| C | 625 | D | 1250 |
17. Capacity of ESR in water supply scheme design is calculated by
- | | | | |
|---|-------------------|---|--------------------|
| A | Mass curve method | B | Hardy cross method |
| C | Simplex method | D | None of these |
18. Water boils at room temperature if pressure above it is reduced to
- | | | | |
|---|----------|---|---------------|
| A | 0.4 psia | B | 0.6 psia |
| C | 0.8 psia | D | None of these |
19. Decomposition of radioactive element is simplest example of
- | | | | |
|---|----------------------|---|-----------------------|
| A | First order reaction | B | Second order reaction |
| C | Zero order reaction | D | None of these |
20. Minimum self-cleansing velocity to be maintained in sewer is
- | | | | |
|---|------------|---|-----------|
| A | 0.45 m/sec | B | 1.0 m/sec |
| C | 1.5 m/sec | D | 2.0 m/sec |
21. Crown corrosion in sewer is caused by oxidation of
- | | | | |
|---|----------------------|---|---------------|
| A | CH_4 | B | CUS |
| C | H_2S | D | None of these |

22. Coliform bacteria are determined by
- | | | | |
|---|----------|---|---------------|
| A | MPN test | B | Jar test |
| C | DO test | D | None of these |
23. Shape, size and specific gravity of particles do not changes in the process of
- | | | | |
|---|-------------------|---|----------------------|
| A | Discrete settling | B | Flocculant settling |
| C | Zone settling | D | Compression settling |
24. As per inorganic chemistry, maximum oxidation states of nitrogen can be
- | | | | |
|---|---|---|---|
| A | 3 | B | 4 |
| C | 5 | D | 7 |
25. Mostly used coagulant in India is
- | | | | |
|---|------------------|---|----------------------|
| A | Copperas | B | Alum |
| C | Sodium Aluminate | D | Chlorinated copperas |
26. For colloidal particles, energy barrier in coagulation mechanism is removed by
- | | | | |
|---|---------------------|---|-----------------|
| A | Vaan der waal force | B | Brownian motion |
| C | Electrical charge | D | Water hydration |
27. Settling velocity in primary settling tank depends on
- | | | | |
|---|----------------|---|--------------------------|
| A | Length of tank | B | Width of tank |
| C | Depth of tank | D | Length and Width of tank |
28. Value of velocity gradient(G) taken for the design of blades of flocculator is
- | | | | |
|---|-----------|---|-----------|
| A | 30-60/s | B | 100-150/s |
| C | 200-400/s | D | 400-600/s |
29. What value of velocity gradient shown below can be taken for design of flash mixer
- | | | | |
|---|-------|---|-------|
| A | 50/s | B | 100/s |
| C | 200/s | D | 600/s |
30. Surface overflow rate($\text{m}^3/\text{m}^2/\text{d}$) for Secondary sedimentation tank is in the range
- | | | | |
|---|---------|---|---------|
| A | 25-50 | B | 100-150 |
| C | 200-250 | D | 250-300 |
31. Back washing is generally used in
- | | | | |
|---|------------------|---|-------------------|
| A | Slow sand filter | B | Rapid sand filter |
| C | Pressure filter | D | None of these |
32. What is weir loading for a tank of diameter of 28 m and flow rate entering to tank of $880 \text{ m}^3/\text{hr}$
- | | | | |
|---|-------------------------------------|---|-------------------------------------|
| A | $240 \text{ m}^3/\text{m}/\text{d}$ | B | $340 \text{ m}^3/\text{m}/\text{d}$ |
| C | $440 \text{ m}^3/\text{m}/\text{d}$ | D | $540 \text{ m}^3/\text{m}/\text{d}$ |
33. What is diameter of sewer if hydraulic mean depth is 0.15 m
- | | | | |
|---|-------|---|--------|
| A | 0.3 m | B | 0.45 m |
| C | 0.6 m | D | 0.75 m |

34. What is approximate value of effective size of sand used for slow sand filter
- | | | | |
|---|------------|---|------------|
| A | 0.2-0.4 mm | B | 0.5-0.6 mm |
| C | 0.6-0.8 mm | D | 1-2 mm |
35. To protect contamination in the distribution system, the chemical used is
- | | | | |
|---|-------|---|---------------|
| A | Ozone | B | Chlorine |
| C | Lime | D | None of these |
36. The most widely used adsorbent in India is
- | | | | |
|---|---------|---|------------------|
| A | Silica | B | Activated carbon |
| C | Alumina | D | Lime |
37. What is the approximate velocity to be maintained in horizontal flow in PST
- | | | | |
|---|-----------|---|-----------|
| A | 0.1 m/min | B | 0.3 m/min |
| C | 0.6 m/min | D | 1 m/min |
38. Which method is not used for reducing TDS in softening process is
- | | | | |
|---|-------------------|---|-----------------|
| A | Reverse osmosis | B | Electrodialysis |
| C | Lime -Soda method | D | None of these |
39. In the determination of BOD for 5 days, oxidation of organic matter completed is around
- | | | | |
|---|--------|---|--------|
| A | 30-40% | B | 60-70% |
| C | 75-85% | D | 85-95% |
40. Trunk sewer is also called as
- | | | | |
|---|---------------|---|---------------|
| A | Main sewer | B | Lateral sewer |
| C | Outfall sewer | D | None of these |
41. Basic and main important characteristic of dairy wastewater is
- | | | | |
|---|-----------|---|----------|
| A | High BOD | B | High COD |
| C | Acidic pH | D | High Ph |
42. Process involved to mix two different pH streams of wastewater is
- | | | | |
|---|-----------------|---|---------------------|
| A | Flow control | B | Flow neutralization |
| C | Flow adjustment | D | Flow equalization |
43. Domestic wastewater is directly discharged into the water body if dilution factor is
- | | | | |
|---|--------------------|---|--------------------|
| A | Less than 150 | B | Between 150 to 300 |
| C | Between 300 to 500 | D | Above 500 |
44. The unit, in which the Velocity control device is provided is
- | | | | |
|---|-----------------------|---|-------------------------|
| A | Screen | B | Grit chamber |
| C | Primary settling tank | D | Secondary settling tank |
45. Tolerance limit of TSS for sewage effluent discharged into surface water source is
- | | | | |
|---|----------|---|---------------|
| A | 30 mg/l | B | 100 mg/l |
| C | 200 mg/l | D | None of these |

46. Recirculation factor(F) for wastewater for R/I of 1.4 for trickling filter is
- | | | | |
|---|------|---|------|
| A | 2.85 | B | 2.4 |
| C | 0.85 | D | 1.85 |
47. Range of value of MCRT for conventional Activated sludge process is
- | | | | |
|---|---------|---|---------|
| A | 5-15 d | B | 15-25 d |
| C | 25-35 d | D | 20-30 d |
48. What is HRT for ASP, when the inflow is 30 MLD and volume of 5000 m³
- | | | | |
|---|---------|---|--------|
| A | 2.5 hrs | B | 4 hrs |
| C | 6 hrs | D | 12 hrs |
49. For DWW, percentage of CH₄ generated from solids of sludge digestion tank is
- | | | | |
|---|--------|---|--------|
| A | 30-40% | B | 40-50% |
| C | 60-70% | D | 80-90% |
50. Lowest BOD/COD ratio is generally found in
- | | | | |
|---|-----------------------|---|---------------------------|
| A | Dairy wastewater | B | Tannery wastewater |
| C | Distillery wastewater | D | Paper and pulp wastewater |
51. "Black liquor" is generated in the process of digestion in the
- | | | | |
|---|--------------------|---|---------------------------|
| A | Dairy wastewater | B | Tannery wastewater |
| C | Textile wastewater | D | Paper and pulp wastewater |
52. What is BOD of sample if 5 ml of sample is diluted to 500 ml and loss of DO during test is 2 mg/l.
- | | | | |
|---|----------|---|----------|
| A | 30 mg/l | B | 100 mg/l |
| C | 200 mg/l | D | 250 mg/l |
53. What is the percentage contribution of CO₂ in greenhouse effect in troposphere?
- | | | | |
|---|-----|---|-----|
| A | 20% | B | 30% |
| C | 50% | D | 70% |
54. Depletion of ozone in the atmosphere is mainly caused by
- | | | | |
|---|----------------------|---|-----------------------|
| A | Aerometric compounds | B | PAN |
| C | Chlorofluorocarbons | D | Nitrogenous compounds |
55. Dobson unit is used to measure
- | | | | |
|---|-----------------|---|-----------------|
| A | O ₃ | B | SO _x |
| C | NO _x | D | CO ₂ |
56. PAN is air pollutant, which is in the category of
- | | | | |
|---|---------------------------|---|-------------------------|
| A | Primary air pollutant | B | Secondary air pollutant |
| C | Stationary air pollutants | D | None of these |
57. Oxygen carrying capacity of blood is reduced by which air pollutant
- | | | | |
|---|-----------------|---|-----------------|
| A | CO | B | CO ₂ |
| C | SO _x | D | O ₃ |

58. Which air pollutant has no contribution in Global warming
- | | | | |
|---|------------------|---|-----------------|
| A | CH ₄ | B | CO ₂ |
| C | H ₂ S | D | O ₃ |
59. When mist is dense enough to obscure vision it is
- | | | | |
|---|------------|---|-------|
| A | Dense mist | B | Fog |
| C | Fume | D | Smoke |
60. In air pollution the meaning of “soot” is as
- | | | | |
|---|---|---|---|
| A | Release of carbon particles after incomplete combustion | B | Release of carbon particles after complete combustion |
| C | Release of SO _x and NO _x from exhaust of vehicles | D | Release of SO _x and NO _x from exhaust of vehicles |
61. Air pollutant causing yellowish pattern in plant leaves is called
- | | | | |
|---|------------|---|-----------|
| A | Necrosis | B | Chlorosis |
| C | Abscission | D | Epinasty |
62. Arsines pollutants can cause
- | | | | |
|---|-------------------|---|----------------|
| A | Damages to Kidney | B | Nausea |
| C | Asthma | D | Eye irritation |
63. Particulates as well as gaseous pollutants are simultaneously removed by
- | | | | |
|---|--------------------|---|------------------|
| A | Scrubbers | B | Fabric filters |
| C | Cyclone separators | D | Gravity settlers |
64. As per ambient air quality standards SO₂ concentration in 24 hrs in air is
- | | | | |
|---|----------------------|---|-----------------------|
| A | 40 µg/m ³ | B | 60 µg/m ³ |
| C | 80 µg/m ³ | D | 120 µg/m ³ |
65. Carbon monoxide concentration in 8 hrs in atmosphere, as per ambient air quality is
- | | | | |
|---|----------------------|---|----------------------|
| A | 2 µg/m ³ | B | 10 µg/m ³ |
| C | 20 µg/m ³ | D | 30 µg/m ³ |
66. How many times more reactive is CO compared to O₂ with hemoglobin
- | | | | |
|---|-----|---|-----|
| A | 50 | B | 100 |
| C | 150 | D | 200 |
67. Metal used as catalyst along with Platinum to prevent lead poisoning in exhaust of cars
- | | | | |
|---|--------|---|-----------|
| A | Copper | B | Gold |
| C | Bronze | D | Palladium |
68. Low intensity sounds are measured on scales as
- | | | | |
|---|-----|---|----|
| A | dBA | B | dB |
| C | dBC | D | dB |
69. Noise level for rail traffic is around
- | | | | |
|---|-----------|---|------------|
| A | 50-60 dB | B | 70-80 dB |
| C | 90-110 dB | D | 120-150 dB |

70. What is the limit of sound level in Industrial area as per ambient noise standards
- | | | | |
|---|-----------|---|------------|
| A | 45-55 dB | B | 65-75 dB |
| C | 95-105 dB | D | 105-120 dB |
71. What is the range of moisture content during the composting process
- | | | | |
|---|--------|---|--------|
| A | 10-20% | B | 30-40% |
| C | 50-60% | D | 70-80% |
72. Waste minimization, resource conservation and recovery of by product is a major goal of
- | | | | |
|---|------|---|-----|
| A | EIA | B | EPA |
| C | CPCB | D | WHO |
73. For any project EIS report is prepared for
- | | | | |
|---|-------------------------|---|----------------------------------|
| A | Feedback of people | B | Approval or rejection of project |
| C | Sustainable development | D | None of these |
74. In which method of the following, there is sludge generation problem
- | | | | |
|---|-------------------|---|-----------------|
| A | Reverse osmosis | B | Electrodialysis |
| C | Lime -Soda method | D | None of these |
75. Main cause of rising sludge in ASP is
- | | | | |
|---|---------------|---|-----------------|
| A | Nitrification | B | Denitrification |
| C | Acidification | D | Neutralization |
76. Detention time for high rate digestion process is around
- | | | | |
|---|------|---|------|
| A | 15 d | B | 30 d |
| C | 45 d | D | 60 d |
77. Well designed and operated sludge thickeners should at least reduce sludge volume by
- | | | | |
|---|-----|---|-----|
| A | 10% | B | 20% |
| C | 30% | D | 50% |
78. Typical Indian solid waste has calorific value which is in the range of
- | | | | |
|---|-------------------|---|-------------------|
| A | 500-800 kcal/kg | B | 800-1000 kcal/kg |
| C | 1200-1800 kcal/kg | D | 2000-2500 kcal/kg |
79. Complete destruction of pathogens from solid waste is achieved in the process of
- | | | | |
|---|--------------|---|------------------------|
| A | Incineration | B | Open window Composting |
| C | Land filling | D | Mechanical composting |
80. Which of these solid waste disposal technologies is Environmental friendly?
- | | | | |
|---|-----------------------|---|-----------------------|
| A | Mechanical composting | B | Incineration |
| C | Plasma Pyrolysis | D | Sanitary land filling |
81. Laplace Transform is a.....
- | | | | |
|---|---------------------|---|--------------------|
| A | Linear transform | B | Binomial transform |
| C | Canonical transform | D | None of these |

82. The Particular Integral of $(D^2 + D - 2)y = e^x$
- A $\frac{xe^2}{3}$ B $\frac{xe^2}{4}$
- C $\frac{xe^2}{5}$ D $\frac{xe^2}{6}$
83. Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?
- A $\frac{1}{2}$ B $\frac{2}{5}$
- C $\frac{8}{15}$ D $\frac{9}{20}$
84. If $f(x) = x[\sqrt{x} - \sqrt{x+1}]$ then
- A $f(x)$ is continuous but not differentiable at $x=0$. B $f(x)$ is differentiable at $x=0$
- C $f(x)$ is not differentiable at $x=0$ D None of these
85. If $f(x) = \begin{cases} 1, & x < 0 \\ 1 + \sin x, & 0 \leq x \leq \pi/2 \end{cases}$ then at $x=0$, the derivative $f'(x)$ is.
- A 1 B 0
- C Infinite D does not exist
86. Which of the following substitution reduce the differential equation $\frac{dz}{dx} + \frac{z}{x} \log z = \frac{z}{x^2} (\log z)^2$ in to the form $\frac{du}{dx} + P(x)u = Q(x)$?
- A $u = \log z$ B $u = e^z$
- C $u = (\log z)^{-1}$ D $u = (\log z)^2$
87. Which of the following could represent a function, $f(x, y)$, with first-order partial derivatives? $f_x(x, y, z) = 3xy(xy + 2)$, $f_y(x, y, z) = x^2(2xy + 3)$
- A $f = x^2y(xy + 3) - 6$ B $f = xy(x^2y + 3)$
- C $f = x^3y^2 + 2x^2y^3 + 1$ D None of these

88. The fixed point of the transformation $W = Z^2$ are
- | | | | |
|---|------|---|---------|
| A | 0,1 | B | 0,-1 |
| C | -1,1 | D | $i, -i$ |
89. Following are the values of a function $y(x): y(-1)=5, y(0), y(1)=8$ $\frac{dy}{dt}$ at $x=0$ as per Newton's central difference scheme is
- | | | | |
|---|-----|---|-----|
| A | 0 | B | 1.5 |
| C | 2.0 | D | 3.0 |
90. $L(t^2 \sin(2t))$.
- | | | | |
|---|----------------------------------|---|----------------------------------|
| A | $\frac{12s^2 - 16}{(s^2 + 4)^4}$ | B | $\frac{3s^2 - 4}{(s^2 + 4)^3}$ |
| C | $\frac{12s^2 - 16}{(s^2 + 4)^6}$ | D | $\frac{12s^2 - 16}{(s^2 + 4)^3}$ |
91. To solve $(D^2 + 16)y = \tan 4x$ by Variation of parameter, then wronskian W is :
- | | | | |
|---|---|---|---------------|
| A | 4 | B | 3 |
| C | 2 | D | None of these |
92. If $f(x, y, z) = x^2 + y^2 + z - 9 = 0$ then the tangent plane at the point $P_0(1,2,4)$ is
- | | | | |
|---|--------------------|---|--------------------|
| A | $2x + 4y + z = 14$ | B | $2x - 4y + z = 14$ |
| C | $2x + 4y - z = 14$ | D | $2x + 2y + z = 14$ |
93. The general solution of $(x+1)^2 y'' + (x+1)y' + y = 0$ is :
- | | | | |
|---|---------------------------|---|-------------------------------------|
| A | $C_1 \cos x + C_2 \sin x$ | B | $C_1 \cos(\ln x) + C_2 \sin(\ln x)$ |
| C | $(C_1 + C_2 x)e^x$ | D | None of these |
94. A Partial differential equation has.
- | | | | |
|---|----------------------------------|---|--|
| A | One independent variable | B | Two or more independent variables |
| C | More than one dependent variable | D | Equal number of dependent and independent variables. |
95. The partial differential equation $5\frac{\partial^2 u}{\partial x^2} + 6\frac{\partial^2 u}{\partial y^2} = xy$ is classified as
- | | | | |
|---|------------|---|--------------------|
| A | elliptic | B | Parabolic |
| C | hyperbolic | D | None of the above. |
96. The root of $x^3 - 2x - 5 = 0$ correct to three decimal places by using Newton-Raphson method is.
- | | | | |
|---|--------|---|--------|
| A | 2.0946 | B | 1.0404 |
| C | 1.7321 | D | 0.701. |

97. Find the equations of normal line to the surface $x^2 + 2y^2 + z = 3$ at point $(2,1,-3)$
- A $\frac{x-2}{4} = -\frac{y-1}{1} = \frac{z+3}{1}$ B $\frac{x-2}{8} = \frac{y-1}{1} = \frac{z+3}{1}$
- C $\frac{x-2}{4} = \frac{y-1}{1} = \frac{z+3}{2}$ D $\frac{x-2}{4} = \frac{y-1}{4} = \frac{z+3}{1}$
98. The general solution of $(x^2 D^2 - 3x D + 4)y = 0$ is :
- A $C_1 e^{2x} + C_2 e^{-2x}$ B $(C_1 + C_2 x)e^{2x}$
- C $(C_1 + C_2 \ln x)x^2$ D None of these
99. Number of observations are 30 and value of arithmetic mean is 15 then sum of all values is
- A 15 B 450
- C 200 D 45
100. In which of the following methods, proper choice of initial value is very important?
- A Bisection method B False position
- C Newton-Raphson D Bairsto method