

- From the following options, identify the acid acids which is not responsible for acid rain  
A) Acetic acid  
B) Sulphurous acid  
C) Nitrous acid  
D) Nitric acid
- The dissolved oxygen content in river water is  
A) Around 5 ppm  
B) Around 400 ppm  
C) Around 300 ppm  
D) Always less than 0.1 ppm
- Which of the following is a management option for air pollution?  
A) Transport planning  
B) Emission charges  
C) Regulations & standards  
D) All of the above
- \_\_\_\_\_ causes minimum water pollution among the following nutrients.  
A) Organic matter  
B) Potassium  
C) Nitrogen  
D) Phosphorus
- \_\_\_\_\_ is the tendency of pollutants to become concentrated in successive trophic levels.  
A) Biopiracy  
B) Biorhythm  
C) Biomagnification  
D) Bioremediation
- Out of the following equipments, \_\_\_\_\_ is most suitable for the removal of gaseous pollutants.  
A) Electrostatic precipitator  
B) Fabric filter  
C) Settling chamber  
D) Cyclone separator
- Particulates less than 1 micron remaining suspended in air indefinitely and transported by wind currents are called \_\_\_\_\_

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സിവിൽ എഞ്ചിനീയറിംഗ് പരീക്ഷ പരിശീലന രംഗത്തെ ഏറ്റവും മികച്ച അധ്യാപകർ നയിക്കുന്ന ക്ലാസുകൾ



- A) Fumes  
B) Aerosols  
C) Smoke -  
D) Mist
8. Two litres of sample of activated sludge is allowed to settle for thirty minutes. At the end of the settling time, the sludge volume is 400 mL. The sample has an MLSS concentration of 1600 mg/L. The thirty-minute settled sludge volume ( $SSV_{30}$ ) in mL/L is \_\_\_\_\_ and the sludge volume index is \_\_\_\_\_
- A) 400 ; 250  
B) 40 ; 25  
C) 40 ; 250  
D) 800 ; 500
9. The main industrial source for H<sub>2</sub>S emission is \_\_\_\_\_
- A) Sugar industry  
B) Pulp and Paper industry  
C) Cement industry  
D) Thermal power plants utilizing coal
10. The dissolved oxygen content will be \_\_\_\_\_
- A) Same throughout the day  
B) Maximum at midnight  
C) Maximum at noon  
D) Maximum in the morning
11. Which of the following equipment is suitable for removing fly ash from the flue gases from a cement factory ?
- A) Bag filter  
B) Gravity settling chamber  
C) Cyclone separator  
D) Electrostatic precipitator
12. Which of the following is correct?
- A) Removal of inorganic suspended solids cannot be done using a grit chamber  
B) Trickling filter is an anaerobic attached growth process  
C) In a completely mixed anaerobic reactor the SRT is the same as the HRT  
D) Removal of organic/inorganic settleable solids can be done in a primary sedimentation tank

13. Which of the following is correct with respect to an equalization tank?
- A) The equalization tanks are provided to balance fluctuating flows
  - B) The equalization tanks are provided to balance fluctuating concentrations
  - C) The equalization tanks are provided to assist self-neutralization and to even out the effect of a periodic slug discharge from a batch process
  - D) All of the above
14. During biological nitrification, each molecule of nitrogen needs \_\_\_\_\_ molecules of oxygen but releases back \_\_\_\_\_ molecules in denitrification.
- A) 2.5 4
  - B) 4 2.5
  - C) 2 2
  - D) 44
15. \_\_\_\_\_ is the ideal method which is to be adopted when the solid waste consists of large amounts of organic matter along with high moisture content.
- A) Recycling method
  - B) Composting method
  - C) Incineration method
  - D) Pelletizing method
16. \_\_\_\_\_ is an international treaty designed to protect the ozone layer by hasing out the production of numerous substances that are responsible for ozone depletion.
- A) Vienna Protocol
  - B) Cartagena Protocol
  - C) Montreal Protocol
  - D) Kyoto Protocol
17. The daily waste water production from a certain industry amounts to 6 mega litres with a  $BOD_5$  of 370 mg/L. The average  $BOD_5$  of a person is 0.06 kg/day. The population equivalent is \_\_\_\_\_
- A) 1/37000
  - B) 37000
  - C) 222000
  - D) 470
18. BOD, COD and TOD represent the Biological oxygen demand, Chemical Oxygen demand and Theoretical Oxygen demand of an effluent Which is the correct sequence in the increasing order of their values ?

- A) BOD, COD, TOD  
B) COD, BOD, TOD  
C) TOD, COD, BOD  
D) BOD, TOD, COD
19. \_\_\_\_\_ is the most common unit for measuring total ozone concentration  
A) Dobson Unit  
B) Formazin Nephelometric Unit  
C) Dalton  
D) Henry
20. The theoretical COD of ethanol is \_\_\_\_\_  
A) 3.09  
B) 2.09  
C) 1.09  
D) 4.09
21. Winkler's method with azide modification is used for measuring \_\_\_\_\_ for water quality test.  
A) Nitrate  
B) Nitrite  
C) Total alkalinity  
D) Dissolved oxygen
22. For the determination of \_\_\_\_\_ in water quality test \_\_\_\_\_ being applied.  
A) Sulphates ; Argentometric method  
B) Chlorides ; EDTA titrimetric method  
C) Chlorides ; Argentometric method  
D) Fluorides ; Stannous chloride method
23. Methemoglobinemia is a disease caused by the excess concentration of \_\_\_\_\_ in drinking water.  
A) Nitrates  
B) Sulphates  
C) Chlorides  
D) Carbonates
24. The maximum permissible limit of fluoride in drinking water is \_\_\_\_\_ and highest desirable limit is \_\_\_\_\_ as per Indian standard drinking water specification  
A) 35 ppm, 25 ppm

- B) 20 ppm 10 ppm  
C) 1.5 ppm 1 ppm  
D) 400 ppm 350 ppm
25. The Streeter-Phelps equation describes how \_\_\_\_\_ distance in a river or stream along a certain decreases by degradation of \_\_\_\_\_  
A) COD BOD  
B) TOD COD  
C) TODBOD  
D) DO, BOD
26. Poly Aluminium Chloride is used as a \_\_\_\_\_ in water treatment plants  
A) Coagulant  
B) Disinfectant  
C) Dispersant  
D) Chlorinator
27. Fresh sewage is \_\_\_\_\_ and septic sewage is \_\_\_\_\_  
A) Alkaline acidic  
B) Acidic alkaline  
C) Neutral alkaline  
D) Acidic neutral
28. The disinfection efficiency will \_\_\_\_\_  
A) Increase at higher pH of water  
B) Decrease at higher pH of water  
C) Remain unaffected with change in pH of water  
D) Be highest at neutral pH
29. 175 kg of bleaching powder contains \_\_\_\_\_ kg of chlorine stoichiometrically  
A) 96  
B) 75  
C) 71  
D) 48
30. Match the following and choose the correct answer  
(i) Skimming (i) Removal of settleable solids, colloids and phosphorus  
(ii) Flocculation (ii) Improvement of hydraulic distribution  
(iii) Chemical precipitation (iii) Removal of lighter floating solids grease, soap etc



36. For the flow of Newtonian fluid through a circular pipe, the shear stress at the centre \_\_\_\_\_
- A) Exhibit a parabolic variation
  - B) Will be equal to that at the wall
  - C) Is zero at the wall and increases linearly towards centre
  - D) Is zero at the centre and varies linearly along the radius
37. The specific speed of a radial flow centrifugal pump is \_\_\_\_\_
- A) Greater than that of an axial flow centrifugal pump
  - B) Lower than that of an axial flow pump
  - C) Lower than positive displacement pump
  - D) Proportional to the discharge rate at the point of best efficiency
38. The specific speed of a pump is
- A) Proportional to the square of the velocity at the point of best efficiency
  - B) Proportional to the square root of the velocity at the point of best efficiency
  - C) Inversely proportional to the square of the velocity at the point of best efficiency
  - D) Proportional to the total head per stage at the point of best efficiency
39. \_\_\_\_\_ is used to measure surface tension.
- A) Dosimeter
  - B) Profilometer
  - C) Zymometer
  - D) Stalagmometer
40. The hydraulic diameter of a rectangular air conditioning duct having a cross section of 1m x 50 cm is \_\_\_\_\_
- A) 25 cm
  - B) 20 cm
  - C) 40 cm
  - D) 80 cm
41. A \_\_\_\_\_ and \_\_\_\_\_ pump is generally used for irrigation purposes.
- A) Small capacity low head
  - B) Small capacity high head
  - C) Large capacity low head
  - D) Large capacity high head
42. \_\_\_\_\_ equation is used to obtain the pressure drop in \_\_\_\_\_ a for laminar flow.
- A) Kozney-Karman ; fluidized bed



- B) Burke-Plummer ; packed bed  
C) Kozney-Karman ; packed bed  
D) Kunii - Levenspiel ; packed bed
43. Out of the following techniques used for project scheduling. \_\_\_\_\_ is considered to be a simulation technique  
A) Monte Carlo analysis method  
B) GERT analysis  
C) PERT analysis  
D) Critical path method
44. The principle of continuous improvement is the basis of  
A) PMI  
B) PMIS  
C) ERP  
D) TOM
45. \_\_\_\_\_ is not a key feature of Total Quality Management  
A) Continuous improvement  
B) Identifying customers and their needs  
C) Establishing clear specifications  
D) Using quality tools and techniques
46. The standard deviation of a PERT diagram can be calculated by taking the  
A) Square of the sum of the variances on the nodes on the critical path  
B) Square root of the sum of the variances on the nodes on the critical path  
C) Sum of the standard deviations of all the nodes  
D) Sum of the squares of variances of all the nodes and divide by 2
47. Which of the following is not correct?  
A) CPM uses activity oriented network  
B) PERT uses event oriented Network  
C) Deterministic concept is used in CPM, whereas PERT uses Probabilistic model concept  
D) The cost is directly proportional to time in CPM
48. A mercury manometer connected across an orifice meter fitted in a pipe containing a flowing liquid indicates reading of 4 cm. When the manometer fluid is changed with a fluid of specific gravity=1.36, without changing the flow rate the new manometer reads \_\_\_\_\_

- A) 2.94 cm  
B) 5.44 cm  
C) 40 cm  
D) 76 cm
49. The flow of an incompressible fluid with bi-shear force is called as \_\_\_\_\_  
A) Creeping flow  
B) Potential flow  
C) Viscous flow  
D) Couette flow
50. What percentage of the total distribution are 3 sigma from the mean equal to?  
A) 95.46%  
B) 99.73%  
C) 68.26%  
D) 99.99%
51. Two persons were to be assigned to perform a task, full time, to be completed in two weeks. But the project manager could assign one person to this task. At the end of two weeks, the person assigned could complete 60% of the task. The cost performance index is \_\_\_\_\_  
A. 0.60  
B. 60  
C. 1.2  
D. 120
52. If the speed of a centrifugal pump is doubled, the \_\_\_\_\_  
A. Head developed will also be doubled  
B. Head developed will be halved  
C. Head developed will be quadrupled  
D. Head developed will remain unchanged
53. Pick the wrong statement.  
A. Bar chart shows the activity start and end dates as well as the expected durations.  
B. Bar chart shows dependencies between tasks and is a weak planning tool but is good for tracking and reporting progress to the project team.  
C. Milestone chart is easy to understand and good for reporting to senior management, but it provides no progress information.  
D. Network diagram is a good reporting format, because the time frame is very clear and is not at all confusing.

54. The \_\_\_\_\_ is the most suitable flow measuring device for the fluid flow measurement in a very large diameter pipeline.
- A. Venturimeter
  - B. Pitot tube
  - C. V. Notch
  - D. Rotameter
55. The Noise Pollution (Regulation and Control) Rules was enacted in India in the year
- A) 1991
  - B) 1987
  - C) 2000
  - D) 2003
56. Pick the correct statement.
- A. The wall drag is 33.3% of the total drag in the Stoke's law range
  - B. The wall drag is 50% of the total drag in the Stoke's law range
  - C. The wall drag is 66.67% of the total drag in the Stoke's law range
  - D. The wall drag is 25% of the total drag in the Stoke's law range
57. The National Research Council Equation (NRC Equation) is used to design
- A. Oxidation pond
  - B. Anaerobic digesters
  - C. Trickling filters
  - D. Activated sludge process
58. Check out the wrong statement
- A. Rapid EIA studies refer to the assessment based on a one-season or 3month monitoring of baseline data.
  - B. Comprehensive EIA studies relate to the assessment based on a three seasons or 9 month monitoring of baseline data
  - C. Rapid EIA does not facilitate decision-making in situations where a fair amount of knowledge exists about the proposed site or the impacts of the proposed development.
  - D. Rapid and comprehensive EIA studies differ with respect to time frames required for baseline data collection.
59. The ratio of thermal boundary layer thickness to concentration boundary layer thickness is
- A. Sherwood number
  - B. Froude number
  - C. Lewis number

- D. Eckert number
60. The equation given below is..... and the unit of each term in SI system is..... Here  $v$  is the velocity,  $p$  the pressure and  $\rho$ , the density.
- $$\rho \frac{DV}{Dt} = \nabla P - \mu \nabla^2 v + \rho g$$
- A. Navier-Stokes equation :  $\text{N/m}^3$   
B. Euler equation :  $\text{kg/m}^3$   
C. Bernoulli equation :  $\text{N/m}^2$   
D. Stokes-Einstein equation :  $\text{N/m}^2$
61. When the pH of a solution is decreased to 2 from 4, its hydrogen ion concentration will be.....
- A. Increased by 100 times  
B. Reduced by 100 times  
C. Halved  
D. Doubled
62. The line of action of the buoyant force passes through the centre of gravity of the
- A. Volume of fluid vertically above the body  
B. Submerged body  
C. Horizontal projection of the body  
D. Displaced volume of the fluid
63. The SI unit of specific weight is.....
- A.  $\text{kg/m}^3$   
B.  $\text{N/kg}$   
C.  $\text{N/m}^3$   
D.  $\text{m}^3/\text{kg}$
64. The power required to drive water at  $20^\circ\text{C}$  flowing through a pipe at 3280 litres/s with a friction head loss of 1 ft is approximately.
- A. 10 kW  
B. 1 kW  
C. 328 W  
D. 32800 W
65. A 3 cm water jet produces a force of 23 N on a plate when it strikes the plate. What is the average velocity of water in the jet?
- A. 7.2 m/s  
B. 8.1

- C. 5.7 m/s  
D. 23 m/s
66. The centre of pressure of an immersed body.
- A. Lies below the centre of gravity
  - B. Lies above the centre of gravity
  - C. Lies at the centre of gravity
  - D. Either above or below the centre of gravity but depends on the shape of the body.
67. The pressure drop in a packed bed is nearly \_\_\_\_\_ for turbulent flow.
- A. Proportional to the square of the superficial velocity
  - B. Proportional to the superficial velocity
  - C. Inversely proportional to the superficial velocity
  - D. Remaining constant
68. Power number is the ratio of \_\_\_\_\_
- A. Inertial forces to drag forces
  - B. Gravitational forces to drag forces
  - C. Drag forces to inertial forces
  - D. Drag forces to buoyant forces
69. Industrial electrostatic precipitators employ an ionization potential in the range of
- A. 230 to 500 Volt AC
  - B. 230 to 250 Volt DC
  - C. 30 to 70 kVolt AC
  - D. 30 to 70 kVolt DC
70. ....can be used to treat polluted water if the water is having a low BOD
- A. Oxidation ponds
  - B. Clarifier
  - C. Sedimentation tank
  - D. Sludge digester
71. When the Reynolds number for the flow around a sphere is ....., the flow is called.....
- A. Less than 2100 : potential flow
  - B. Less than 0.1 : creeping flow
  - C. Less than 1 : vortex flow
  - D. Less than  $5 \times 10^5$  : stream line flow

72. .... is the ratio of the oxygen available to the oxygen required for the stabilization of the sewage.
- A. Theoretical oxygen demand ratio
  - B. Oxygen ion concentration ratio
  - C. Maintenance coefficient
  - D. Relative stability
73. The decibel level during normal conversation among men is.....
- A. 45
  - B. 8
  - C. 90
  - D. 120
74. The term specific cake resistance is associated with filtration. Out of the following which represents the unit of specific cake resistance?
- A.  $\text{kg/m}^2$
  - B.  $\text{m/kg}$
  - C.  $\text{m/kg}^2$
  - D.  $\text{m}^3/\text{kg}$
75. .... used to remove traces of solid from a liquid
- A. Thickener
  - B. Clarifier
  - C. Classifier
  - D. Rotary drum vacuum filter
76. The environmental lapse rate is found to be
- A.  $-6.5^\circ\text{C/m}$
  - B.  $-5.6^\circ\text{C/m}$
  - C.  $-6.5^\circ\text{C/km}$
  - D.  $8.6^\circ\text{C/km}$
77. The ratio of COD to BOD of sewage
- A. Will be always greater than 1
  - B. Will be always lesser than 1
  - C. Will be always equal to 1
  - D. Will be always 0.5 for fresh sewage
78. .... poisoning leads to..... in human beings.

- A. Cadmium : Bright's disease  
B. Hydrogen cyanide : Hiroshima episode  
C. Lead : Osteosclerosis disease  
D. Mercury : Mina-mata disease
79. There is no drag force on a body moving with constant velocity in an inviscid. This is called.....
- A. Reynold's paradox  
B. d'Alembert's paradox  
C. Euler's paradoxX  
D. Poiseuille's paradox
80. The flow of water through a pipe or diameter of 1 cm with a flow rate of 0.1 m/s
- A. Is laminar  
B. Is turbulent  
C. Is transitional  
D. Is infinity
81. Unless you had warned me in advance, I \_\_\_\_\_ prepared for such an unexpected turn of events.
- A. would have been  
B) would be  
C. wouldn't have been  
D. wouldn't be
82. Many a young regularly social networking sites these days.
- A. men, visit  
B. man, visits  
C. men, visits  
D. man, visit
83. Hardly had he reached the ticket counter.....the last ticket was Sold out.
- A. then  
B. and  
C. than  
D. when
84. Select the pair of words that best expresses a relationship similar to the in the given pair.  
CYNICAL - HOPE

- A. Magnanimous sympathy
- B. Ridiculous reason
- C. Scintillating- smile
- D. Infuriated anger

85. What time does a train 108 meters long running at a speed of 36 km/hour take to cross a bridge of 92 meters length

- A. 22 seconds
- B. 24 seconds
- C. 20seconds
- D. 18 seconds

Answer the questions 86 and 87 based on the data given in the following table, which presents the performance of the department of Surgery in a hospital from January to May in a year.

Month	Total successful operations	Total un successful operations	Total number of operations up to the end of the month
January	15	5	20
February	19	6	45
March	14	6	65
April	17	3	85
May	12	3	100

86. What percentage of the operations was successful during the given period ?

- A. 70%
- B. 77%
- C. 60%
- D. 23%

87. Deration performance of which month can be termed the best ?

- A. January
- B. February
- C. May
- D. April

88. Who has been appointed as the Vice-Chairman of the newly constituted NITI Aayog ?

- A. Suresh Prabhu
- B. Bibek Debroy
- C. V.K. Saraswat
- D. Arvind Panagariya



89. India Gate in New Delhi was built to commemorate
- A. The sacrifice of Indian Soldiers in World War I
  - B. The martyrs of the Indian Independence struggle
  - C. The establishment of Indian Union
  - D. The visit of King George V and Queen Mary to India
90. The Southernmost point of Indian Republic is in/at
- A. Dhanushkodi
  - B. Rameswaram
  - C. Andaman Nicobar Islands
  - D. Kanyakumari
91. The best measure of central tendency of data is given by
- A. arithmetic mean
  - B. median
  - C. mode
  - D. geometric mean
92. The sum of squares of deviations of observations in a data set is minimum when the deviations are taken from its
- A. median
  - B. mode
  - C. mean
  - D. range
93. What is the probability that a leap year selected at random has 53 Sundays?
- A.  $53/365$
  - B.  $53/366$
  - C.  $1/7$
  - D.  $2/7$
94. For normal distribution, which of the following relations holds for its measures of central tendency ?
- A.  $\text{mean} > \text{median} > \text{mode}$
  - B.  $\text{mean} < \text{median} < \text{mode}$
  - C.  $\text{mean} = \text{median} = \text{mode}$
  - D. mean, median and mode are different

95. For which of the following probability distributions, mean and variance are same?
- A) binomial
  - B) poisson
  - C) uniform
  - D) exponential
96. For exponential distribution, failure rate function is
- A) a constant
  - B) decreasing
  - C) increasing
  - D) increasing or decreasing
97. The slope of the curve  $y = \sqrt{x}$  at (4,2) is
- A) 1/4
  - B) 1/2
  - C) 2
  - D)  $1/\sqrt{2}$
98. Which of the following is not true about the function  $f(x) = x^3 - 3x^2 + 3$ ?
- A)  $f(x)$  has a local maximum at  $x = 0$
  - B)  $f(x)$  has a local minimum at  $x = 2$
  - C)  $f(x)$  is monotonic increasing on  $[3,4]$
  - D)  $f(x)$  is monotonic decreasing on  $\left[-\frac{1}{2}, \frac{1}{2}\right]$
99. The area of the region bounded by the parabola  $y = x^2$  and the line  $y = x$  is
- A) 1/6
  - B) 1/2
  - C)  $1/\sqrt{3}$
  - D) 1
100. Which of the following partial differential equation is a hyperbolic partial differential equation?
- A)  $y^2 \frac{\partial^2 u}{\partial x^2} + x^2 \frac{\partial^2 u}{\partial y^2} = 0$
  - B)  $x^2 \frac{\partial^2 u}{\partial x^2} - y^2 \frac{\partial^2 u}{\partial y^2} = 0, x \neq 0, y \neq 0$
  - C)  $\frac{\partial^2 u}{\partial x^2} - 2x \frac{\partial^2 u}{\partial x \partial y} + x^2 \frac{\partial^2 u}{\partial y^2} - 2 \frac{\partial u}{\partial y} = 0$
  - D)  $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$