

Seat No. \_\_\_\_\_

## SUB: ENVIRONMENTAL ENGINEERING (EN)

Time: 1 Hour 30 minutes

### Instructions:

1. Ensure that all pages are printed.
2. Use Black ball pen only
3. Change in option is not allowed
4. There is no negative marking
5. Use of non-programmable scientific calculator is allowed

1.	In turbidity measurement the value of 40 JTU is approximately equal to 40 NTU when standard used is			
	A	Formazin	B	Silica
	C	Pt-Co	D	Bentonite
2.	Measurement of scattered light at right angle to path of incident light is performed during turbidity determination when unit used is			
	A	JTU	B	NTU
	C	FTU	D	None of these
3.	What is pH of a solution having OH ion concentration of $10^{-3}$ mole/L			
	A	3	B	7
	C	11	D	13
4.	For moderately hard water, hardness is in the range of			
	A	25-50 mg/L	B	50-75 mg/L
	C	75-150 mg/L	D	150-200 mg/L
5.	What is total hardness of water in mg/L as $\text{CaCO}_3$ in a sample having calcium 40 mg/L and magnesium zero mg/L			
	A	80	B	100
	C	200	D	92.2
6.	What is Alkalinity of water in mg/L as $\text{CaCO}_3$ in a sample of 50 ml having consumed titrant of 8 ml when titrated with N/40 sulfuric acid?			
	A	100	B	200
	C	250	D	400

7.	What is minimum level of DO for water bodies for survival of fishes at atmospheric temperature?			
	A	4.0 mg/L	B	9.0 mg/L
	C	15.0 mg/L	D	20 mg/L
8.	How much N/1 acid should be diluted to 1000 ml to get N/50 acid			
	A	20 ml	B	40 ml
	C	50 ml	D	100 ml
9.	Solubility of atmospheric oxygen at 35°C in fresh water is around?			
	A	4.0 mg/L	B	7.0 mg/L
	C	10.0 mg/L	D	14 mg/L
10.	Methemoglobinemia disease is caused in infants by			
	A	Chloride	B	Sulfur
	C	Nitrate	D	Fluoride
11.	Children will have rare problem of Mottling of teeth when fluoride concentration in water is			
	A	Greater than 3.0 mg/l	B	Greater than 1.5 mg/l
	C	Lesser than 1.5 mg/l	D	None of these
12.	“Vibrio Comma” is responsible for the disease named			
	A	Thyroid	B	Jaundice
	C	Dysentery	D	Cholera
13.	When brownish-yellowish precipitate is formed after addition of $\text{MnSO}_4$ and alkali-iodide reagent in DO test, it indicates			
	A	Absence of oxygen	B	Presence of oxygen
	C	Presence of Nitrogen	D	Absence of Nitrogen
14.	Platinum cobalt scale is used to measure			
	A	Dissolved solids	B	Turbidity
	C	Color	D	Odor
15.	TON terminology is basically related to measurement of			

	A	Dissolved solids	B	Turbidity
	C	Color	D	Odor
16.	End point for mineral acidity during acidity lab test occurs at pH?			
	A	2.3	B	4.5
	C	7.5	D	8.3
17.	How many oxidation states of nitrogen are available as per inorganic chemistry			
	A	3	B	4
	C	5	D	7
18.	For colloidal particles, energy barrier in coagulation mechanism is removed by			
	A	Vaander waal force	B	Brownian motion
	C	Electrical charge	D	Water hydration
19.	Which settling phenomena is generally occurred in sludge digester			
	A	Discrete settling	B	Flocculant settling
	C	Zone settling	D	Compression settling
20.	Which of the following coagulant is mostly used in India in the water treatment			
	A	Copperas	B	Alum
	C	Sodium Aluminate	D	Chlorinated copperas
21.	Approximate relation among ThOD, COD and TOC for organic content is			
	A	ThOD< COD <TOC	B	COD<ThOD<TOC
	C	ThOD> COD>TOC	D	TOC> COD>ThOD
22.	One of the reason of finding BOD for 5 days is because after 5 days			
	A	Nitrogen demand appears	B	Bactria starts dying
	C	Substrate becomes nil	D	Organic matter becomes zero
23.	Adsorbent mostly used for color removal in India is			
	A	Silica	B	Activated carbon
	C	Alumina	D	Bauxite

24.	Highest biodegradability i.e. BOD/COD ratio is generally found in			
	A	Dairy wastewater	B	Tannery wastewater
	C	Distillery wastewater	D	Paper and pulp wastewater
25.	First stage BOD is basically caused by			
	A	Carbonaceous organic matter	B	Nitrogenous organic matter
	C	Both A and B	D	Aromatic organic matter
26.	During which settling phenomena, the shape, size and specific gravity of particles do not changes			
	A	Discrete settling	B	Flocculant settling
	C	Zone settling	D	Compression settling
27.	The term used to present the process of mixing two different pH streams of wastewater is			
	A	Flow control	B	Flow neutralization
	C	Flow adjustment	D	Flow equalization
28.	Whose presence cause Crown Corrosion in sewer pipe line			
	A	CH <sub>4</sub>	B	CFC
	C	H <sub>2</sub> S	D	CO
29.	In which process, the generation of high sludge problem generally occurs more			
	A	Reverse osmosis	B	Electrodialysis
	C	Lime -Soda method	D	Zeolite method
30.	The tree system used in water distribution network, is also called as			
	A	Radial system	B	Grid Iron system
	C	Ring system	D	Dead end system
31.	For the design of Rapid mix unit in WTP, the value of velocity gradient(G) to be taken is around			
	A	30-60/s	B	100-150/s
	C	200-400/s	D	500-800/s
32.	The process of surface washing in WTP for cleaning of filter is mostly used in			
	A	Slow sand filter	B	Rapid sand filter

	C	Pressure filter	D	Trickling filter
33.	What is weir length for a rectangular PST of surface area 250 sqm and B:L ratio 1:2.5			
	A	5 m	B	10 m
	C	25 m	D	50 m
34.	As per Indian standards for drinking water desirable limit of chlorides is			
	A	150 mg/L	B	250 mg/L
	C	400 mg/L	D	500 mg/L
35.	In water supply scheme design, the capacity of Elevated service reservoir is calculated by			
	A	Mass curve method	B	Hardy cross method
	C	Simplex method	D	Newton Rawson method
36.	Surface overflow rate for Secondary sedimentation tank is in the range of			
	A	25-50 m <sup>3</sup> /m <sup>2</sup> /d	B	80-100m <sup>3</sup> /m <sup>2</sup> /d
	C	100-150m <sup>3</sup> /m <sup>2</sup> /d	D	200-300m <sup>3</sup> /m <sup>2</sup> /d
37.	What is weir loading for a tank of diameter of 28 m and flow rate entering to tank of 880 m <sup>3</sup> /hr			
	A	80 m <sup>3</sup> /m/d	B	140 m <sup>3</sup> /m/d
	C	240 m <sup>3</sup> /m/d	D	300 m <sup>3</sup> /m/d
38.	What is the approximate range of effective size of sand used for Rapid sand filter			
	A	0.2-0.4 mm	B	0.5-0.6 mm
	C	0.8-1.0 mm	D	1-2 mm
39.	What is radius of sewer line pipe which is used to dispose wastewater if hydraulic mean depth is 25 cm			
	A	0.25 m	B	0.30 m
	C	0.40 m	D	0.50 m
40.	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

41.	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
42.	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
43.	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	50 mg/l	B	100 mg/l
	C	200 mg/l	D	300 mg/l
44.	Normally grit chambers for wastewater treatment are designed for detention time of			
	A	30-60 sec	B	30- 60 min
	C	30- 60hours	D	30- 60 days
45.	In ASP process, wastewater having BOD <sub>5</sub> =250 mg/L, MLVSS = 2000 mg/l and HRT of 6 hours how much will be F/M ratio			
	A	0.5/d	B	0.75/d
	C	1.0/d	D	1.5/d
46.	During water supply, approximate dose of residual chlorine to be used in distribution network is around			
	A	0.02 mg/L	B	0.20 mg/L
	C	2 mg/L	D	4 mg/L
47.	What is approximate percentage contribution of CO <sub>2</sub> in greenhouse effect in troposphere?			
	A	20%	B	30%
	C	50%	D	70%
48.	PAN is air pollutant, which is treated in the category of			
	A	Primary air pollutant	B	Secondary air pollutant
	C	Stationary air pollutants	D	None of these
49.	Around how many times more reactive is CO compared to O <sub>2</sub> with hemoglobin			

	A	50	B	100
	C	150	D	200
50.	Which pollutant causes the maximum reduction in Oxygen carrying capacity of blood			
	A	CO	B	CO <sub>2</sub>
	C	SO <sub>x</sub>	D	O <sub>3</sub>
51.	Which air pollutant has no contribution in Global warming			
	A	CH <sub>4</sub>	B	CO <sub>2</sub>
	C	H <sub>2</sub> S	D	O <sub>3</sub>
52.	Incomplete combustion in vehicles may cause release of carbon particles, known as			
	A	PAN	B	Soot
	C	Fume	D	Aerosol
53.	SO <sub>2</sub> concentration in 24 hrs in the air, as per ambient air quality standards is			
	A	20 µg/m <sup>3</sup>	B	40 µg/m <sup>3</sup>
	C	80 µg/m <sup>3</sup>	D	100 µg/m <sup>3</sup>
54.	Effect of air pollution on plants called “Necrosis” means			
	A	Bleaching of leaves	B	Killing of plant tissues
	C	Rapid growth of leaves	D	None of these
55.	Epinasty disease in plants caused due to air pollution represented by			
	A	Bleaching of leaves	B	Killing of plant tissues
	C	Rapid growth of leaves	D	None of these
56.	Ozone depletion in atmosphere is mainly caused by			
	A	Aerometric compounds	B	PAN
	C	Chlorofluorocarbons	D	Nitrogenous compounds
57.	The equipment used to remove particulates as well as gaseous pollutants is			
	A	Wet cyclone Scrubber	B	Fabric filters
	C	Gravity settlers	D	All of these

58.	Fabric filters are used as air pollution control device particularly when removal of			
	A	Particulate is essential	B	Gaseous removal is essential
	C	Both A and B are essential	D	None of these
59.	Metal used as catalyst along with Platinum to prevent lead poisoning in exhaust of cars			
	A	Copper	B	Gold
	C	Bronze	D	Palladium
60.	Air pollutant which is in category of Arsines pollutants mainly responsible for			
	A	Damages to Kidney	B	Nausea
	C	Asthma	D	Eye irritation
61.	Ozone layer which prevents us from harmful UV radiation is measured in the unit of			
	A	Dobson	B	Decibel
	C	PPM	D	Nano meter
62.	humans health is treated Hazardous for around PSI value of			
	A	200	B	400
	C	600	D	800
63.	Acid rain is due to high concentration in the atmosphere of			
	A	SO <sub>2</sub> and NO <sub>2</sub>	B	CO <sub>2</sub> and CO
	C	O <sub>2</sub> and N <sub>2</sub>	D	CO and NO
64.	Noise level for rail traffic is around			
	A	30-50 dB	B	50-70 dB
	C	80-120 dB	D	>150 dB
65.	Low intensity sounds are measured on scales as			
	A	dBA	B	dB
	C	dB	D	dB
66.	Basic and main important characteristic of dairy wastewater is			
	A	High BOD	B	High COD



	C	Acidic pH	D	High pH
67.	Sizing and de-sizing activities are involved in the generation of			
	A	Dairy wastewater	B	Textile wastewater
	C	Distillery wastewater	D	Paper mill wastewater
68.	Which term is not included in the basic concept of 4R			
	A	Recycle	B	Reuse
	C	Restrict	D	Reduce
69.	Generally CFC is replaced by HCFC in freezing units as it is less dangerous because of			
	A	Azo bond	B	Covalent bond
	C	Electro bond	D	Hydrogen bond
70.	The method in which due to heat in oxygen free environment solid waste split to all three (solid, liquid and gaseous fractions) stages is			
	A	Incineration	B	Pyrolysis
	C	Open land filling	D	Mechanical composting
71.	Under normal conditions, what thickness of ozone layer exist in the earth atmosphere			
	A	50 DU	B	100 DU
	C	300 DU	D	500 DU
72.	“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
73.	Hazardous wastewater may exhibit the characteristic of			
	A	Ignitability	B	Toxicity and reactivity
	C	Both of these	D	None of these
74.	Domestic solid waste after segregation may be best utilized in the process of			
	A	Incineration	B	Open land filling
	C	Filling of depressions	D	Mechanical composting
75.	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
76.	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
77.	Which of these solid waste disposal technologies is Environmental friendly?			
	A	Mechanical composting	B	Incineration
	C	Plasma Pyrolysis	D	Sanitary land filling
78.	EIS report is important because it is prepared for			
	A	Feedback of people	B	Approval or rejection of project
	C	Sustainable development	D	None of these
79.	Average domestic consumption of water in India for design of water supply ranges as			
	A	30-80 lit/c/d	B	80-120 lit/c/d
	C	135-200 lit/c/d	D	200-400 lit/c/d
80.	What is economic diameter of rising main for discharging flow of 15 m <sup>3</sup> /min			
	A	0.25 m	B	0.5 m
	C	0.75 m	D	1.0 m
81.	The differential equation $x \frac{dx}{dy} + 7y = 36$ is.....			
	A	neither homogeneous nor separable	B	both homogeneous and separable.
	C	Linear and not separable	D	separable but not linear
82.	One of the solutions of $x^2 \left( \frac{dy}{dx} \right)^2 + 2xy \frac{dy}{dx} + y^2 - x^6 = 0$ is .....			
	A	$xy - \frac{x^3}{3} - c = 0$	B	$y + \frac{x^4}{4} - c = 0$
	C	$xy + \frac{x^4}{4} - c = 0$	D	None of these

83.	If $y = e^{2x}$ is a solution of $\frac{d^2 y}{dx^2} - 5\frac{dy}{dx} + ky = 0$ , what is the value of $k$ ?			
	A	2	B	6
	C	0	D	5
84.	If we solve the equation $\frac{d^2 y}{dx^2} + y = \sec x$ by the method of variation of parameters then the value of Wronskin is.....			
	A	1	B	0
	C	$2x$	D	3
85.	For what value of $k$ , the function $f(x + iy) = x^2 - y^2 + kxyi$ is analytic.....			
	A	1	B	-2
	C	0	D	2
86.	$\oint_C e^z dz = \text{_____}$ , where $C$ is any closed path.			
	A	0	B	$2\pi i$
	C	$e^{i\pi}$	D	None of these
87.	Laplace transform of $e^{4t} \cosh 3t$ is.....			
	A	$\frac{s+4}{s^2-s+7}$	B	$\frac{s-4}{s^2-8s+7}$
	C	$\frac{s-4}{s^2-8s-7}$	D	None of these
88.	$\int_0^\infty te^{-2t} \cos t dt$ equals.....			
	A	$\frac{6}{25}$	B	$\frac{7}{25}$
	C	$\frac{3}{25}$	D	None of these
89.	By Newton-Raphson method, the solution of $\sqrt[3]{11}$ correct to three decimal places is.....			
	A	2.224	B	2.407
	C	2.536	D	2
90.	In Newton-cotes formula, if $f(x)$ is interpolated at equally spaced nodes by a polynomial of degree one then it represents.....			
	A	trapezoidal rule	B	Simpson's one-third rule

	C	Simpson's three-eighth rule	D	Weddle's rule
91.	In .....method, the elements above and below the diagonal are simultaneously made zero.			
	A	Gauss-Jacobi	B	Gauss-Seidel
	C	Gauss-Jordon elimination	D	relaxation
92.	For a particular binomial distribution, if $\mu=4$ and $\sigma=\sqrt{3}$ then $p = \dots\dots$			
	A	$\frac{1}{2}$	B	$\frac{1}{4}$
	C	$\frac{1}{5}$	D	$\frac{1}{3}$
93.	If the grouped data is open end classes, one cannot measure			
	A	Median	B	mode
	C	quartiles	D	Mean
94.	If A and B are two mutually exclusive events and $p(A) = \frac{1}{3}$ , $p(B) = \frac{1}{2}$ then the probability that neither A nor B is			
	A	$\frac{5}{6}$	B	$\frac{1}{6}$
	C	0	D	$\frac{1}{5}$
95.	If $A = \begin{bmatrix} -1 & 1 & 2 \\ 0 & -2 & 1 \\ 0 & 0 & -3 \end{bmatrix}$ then the eigen values of $A^2$ are.....			
	A	-1, -2, -3	B	-1, -4, -9
	C	1, 4, 9	D	1, 2, 3
96.	$\int_0^{\frac{\pi}{2}} \cos^7 x \sin^9 x dx$ is equal to .....			
	A	1	B	$\frac{1}{560}$

	C	$\frac{1}{63}$	D	63
97.	If the symbol $\gamma$ stands for gamma function then the value of $\gamma\left(\frac{1}{4}\right)\gamma\left(\frac{3}{4}\right)$ is.....			
	A	$\gamma\pi$	B	$\sqrt{\pi}$
	C	$2\sqrt{\pi}$	D	$\pi\sqrt{2}$
98.	The local maximum value of $f(x, y) = x + y + \frac{1}{x} + \frac{1}{y}$ is .....			
	A	4	B	both 4 and - 4
	C	-4	D	does not exist
99.	The vector field $\vec{F} = y^2 \hat{i} + 2xy \hat{j} - z^2 \hat{k}$ is solenoidal at a point.....			
	A	(1, 2, 0)	B	(1, 2, -1)
	C	(-1, 2, 1)	D	None of these
100.	The partial differential equation $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$ is.....			
	A	parabolic	B	elliptic
	C	hyperbolic	D	None of these

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