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| Question Booklet No. : |
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CEEN/2024

Register
Number

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2024

Paper – I

ENVIRONMENTAL ENGINEERING AND CHEMICAL ENGINEERING

(P.G. Degree Standard)

Duration : Three Hours]

[Total Marks : 300

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

1. You will be supplied with this question booklet 15 minutes prior to the commencement of the examination.
2. This question booklet contains 200 questions. Before answering the questions, you shall check whether all the questions are printed serially and ensure that there are no blank pages in the question booklet. If any defect is noticed in the question booklet, it shall be reported to the invigilator within the first 10 minutes and get it replaced with a complete question booklet. If the defect is reported after the commencement of the examination, it will not be replaced.
3. Answer all the questions. All the questions carry equal marks.
4. You must write your register number in the space provided on the top right side of this page. Do not write anything else on the question booklet.
5. An answer sheet will be supplied to you separately by the room invigilator to shade the answers. Instructions regarding filling of answers etc., which are to be followed mandatorily, are provided in the answer sheet and in the memorandum of admission (Hall Ticket).
6. You shall write and shade your question booklet number in the space provided on page one of the answer sheet with **BLACK INK BALL POINT PEN**. If you do not shade correctly or fail to shade the question booklet number, your answer sheet will be invalidated.
7. Each question comprises of five responses (answers) : i.e. (A), (B), (C), (D) and (E). You have to select **ONLY ONE** correct answer from (A) or (B) or (C) or (D) and shade the same in your answer sheet. If you feel that there are more than one correct answer, shade the one which you consider the best. **If you do not know the answer, you have to mandatorily shade (E).** In any case, choose **ONLY ONE** answer for each question. If you shade more than one answer for a question, it will be treated as a wrong answer even if one of the given answers happens to be correct.
8. You should not remove or tear off any sheet from this question booklet. You are not allowed to take this question booklet and the answer sheet out of the examination room during the time of the examination. After the examination, you must hand over your answer sheet to the invigilator. You are allowed to take the question booklet with you only after the examination is over.
9. **You should not make any marking in the question booklet except in the sheets before the last page of the question booklet, which can be used for rough work. This should be strictly adhered to.**
10. Failure to comply with any of the above instructions will render you liable for such action as the Commission may decide at their discretion.

SEAL



SPACE FOR ROUGH WORK



1. Initial EIA surveying can be made on the basis of
- (A) Size, location, infrastructural demand etc.
 - (B) Annual, turn-over of the industry
 - (C) Volume of wastewater recycled
 - (D) Capacity to reuse their effluent
 - (E) Answer not known
2. Assertion [A] : EIA is a systematic approach to assess the total environment, to identify the impacts and decision making of the stakeholders.
- Reason [R] : EIA encountered resistance among most of the planners and Engineers, to change the traditional practice.
- (A) [A] is true but [R] is false
 - (B) Both [A] & [R] are true, and [R] is the correct explanation
 - (C) [A] is false, [R] is true
 - (D) Both [A] and [R] are true, but [R] is not the correct explanation of [A]
 - (E) Answer not known
3. The EIA models proposed a fixed conditions based on the pre-action condition of the various environmental parameters are
- (A) Deterministic models
 - (B) Linear models
 - (C) Decision making models
 - (D) Steady - State models
 - (E) Answer not known

4. The moisture content in the stack determined by
- (A) Pycnometer method ~~(B) Silica gel tube~~
(C) Hot Air oven method (D) Using filter tube
(E) Answer not known
5. Maintenance of harmonious relationship between humans and their environment is given in the _____ Act.
- (A) Air (P & C) Act, 1981
~~(B) The Environment (Protection) Act, 1986~~
(C) Water (P & C) Act, 1974
(D) All the above
(E) Answer not known
6. The type and colour of yellow container for disposing bio-medical wastes are under any one of the following categories?
- (A) Categories : 1, 6 and 7 (B) Categories : 4 and 7
~~(C) Categories : 1, 2, 3 and 6~~ (D) Categories : 5, 9 and 10
(E) Answer not known
7. Choose the right various definitions inclusions of "stream" as per the water (Prevention and Control of Pollution) Act 1974.
1. Sea beyond to such extent as the State Government may specify in this behalf
 2. Trade effluent
 3. River
 4. Sub - terranean waters
- (A) 1 and 2 are correct ~~(B) 3 and 4 are correct~~
(C) 4 and 2 are correct (D) 2 and 3 are correct
(E) Answer not known



8. Match the powers of State Government with their appropriate sections in the Act,

| Sections | Powers |
|-----------|---|
| (a) 20.2 | 1. State Government has the power to collect sample of water |
| (b) 22.4 | 2. May carryout surveys |
| (c) 24.6 | 3. To obtain report of result of the analysis |
| (d) 21(1) | 4. No person shall knowingly allow the entry of any matter into any steam |

- | | (a) | (b) | (c) | (d) |
|----------------|------------------|-----|-----|-----|
| (A) | 4 | 1 | 2 | 3 |
| (B) | 3 | 4 | 1 | 2 |
| (C) | 1 | 2 | 3 | 4 |
| (D) | 2 | 3 | 4 | 1 |
| (E) | Answer not known | | | |

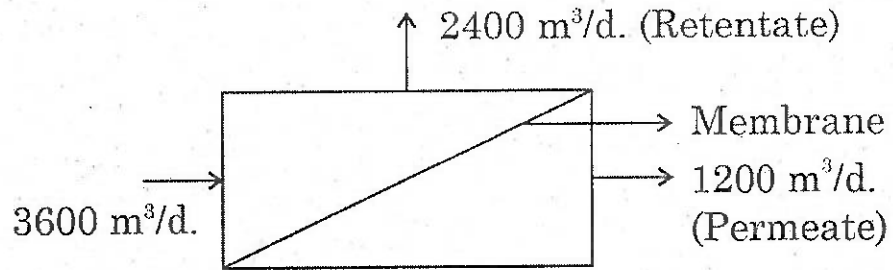
9. The provision for environmental protection in the constitution were made in the year

- | | |
|----------------------|---------------------|
| (A) 1972 | (B) 1976 |
| (C) 1980 | (D) 1995 |
| (E) Answer not known | |

10. The acceptable level of Methane concentration in ambient air

- (A) Should exceed 25% of LEL
- (B) Should exceed 25% of MEL
- ~~(C)~~ Should not exceed 25% of LEL
- (D) Should not exceed 25% of MEL
- (E) Answer not known

11. For the above membrane treatment process, recovery ratio is worked out to be



- (A) $1/2$ (B) $1/3$
(C) $2/3$ (D) $2/5$
(E) Answer not known

12. One of the fouling indices to indicate membrane fouling, Mini-Plugging Factor Index (MPFI) is calculated by which of the following equation where Q = flow ; V = volume ; t_i = time of collect initial 500 ml

t_f = time to collect final 500 ml

T = time between t_i and t_f

- (A) $100\left(1 - \frac{t_i}{t_f}\right)/T$ (B) $(QV)^{-1}$
(C) Q/T (D) $(QV)^{-1}/T$
(E) Answer not known

13. Why the usage of lime stone as filter media in a trickling filter is avoided?

- (A) Soaking of limestone
(B) Gradually break due to the microbial action and weathering
(C) Release of heat
(D) Formation of honey comb structure
(E) Answer not known



14. In UASB reactor, which of the toxicity is not pH related toxicity
- (A) Ammonia (B) Volatile fatty acids
(C) Dissolved sulphides ~~(D) Chlorinated compounds~~
(E) Answer not known
15. The sludge drying bed is suitable for
- ~~(A) India and Pakistan~~ (B) England and Ireland
(C) Canada and Germany (D) China and South Korea
(E) Answer not known
16. The content of the aeration tank in an ASP unit has got MLSS concentration of 3000 mg/L. It produces a sludge volume of 100 ml after subjected to setting for 30 minutes in an one litre measuring jar. The Sludge Volume Index (SVI) of the content in (ml/g) is
- (A) 0.333 (B) 1.11
(C) 11.1 ~~(D) 33.3~~
(E) Answer not known
17. If sludge volume index is 125 ml/g find out sludge density index
- (A) 0.20 (B) 0.40
(C) 0.60 ~~(D) 0.80~~
(E) Answer not known
18. If 1% sludge is thickened to 4% sludge the resultant change in volume of sludge is
- (A) 20% decreased ~~(B) 25% decreased~~
(C) 20% increased (D) 25% increased
(E) Answer not known

19. Ion exchange process carries under
- (A) Homogenous reaction process
 - (B) Stoichiometry reaction process
 - (C) Hetrogenous reaction process
 - (D) Exothermic and endo thermic reactor process
 - (E) Answer not known
20. In activated sludge process nitrification proceeds by the action of _____ bacteria.
- (A) Nitrosomonas
 - (B) Pseudomonas
 - (C) Microoccus
 - (D) E.coli
 - (E) Answer not known
21. Which of the following reactors piston flow is followed in the context of reactors?
- (A) Ideal plug flow reactor
 - (B) Batch reactor
 - (C) Completely mixed flow reactor
 - (D) Dispersed flow reactor
 - (E) Answer not known
22. Match the given colour codes of wastewater with their type before Recycling and Reuse
- | | |
|------------------|------------------------------|
| (a) Black water | 1. Water from kitchen |
| (b) Gray water | 2. Water from flash toilets |
| (c) Yellow water | 3. Black water without urine |
| (d) Brown water | 4. From Urinals |
- | | | | |
|--|-----|-----|-----|
| (a) | (b) | (c) | (d) |
| <input checked="" type="radio"/> (A) 2 | 1 | 4 | 3 |
| (B) 1 | 4 | 3 | 2 |
| (C) 4 | 2 | 1 | 3 |
| (D) 3 | 1 | 4 | 2 |
| (E) Answer not known | | | |



23. Match the following colour codes for disposing biomedical wastes :

- | | |
|------------|-------------------------------------|
| (a) Yellow | 1. Plastic bag of microbial waste |
| (b) Red | 2. Plastic bag of incinerated waste |
| (c) Blue | 3. Plastic bag of waste sharps |
| (d) Black | 4. Disinfected container |

- | | (a) | (b) | (c) | (d) |
|----------------|------------------|-----|-----|-----|
| (A) | 4 | 3 | 2 | 1 |
| (B) | 3 | 2 | 1 | 4 |
| (C) | 2 | 1 | 4 | 3 |
| (D) | 1 | 4 | 3 | 2 |
| (E) | Answer not known | | | |

24. E-waste management is required to abide by the provision of

- ~~(A)~~ E - waste management and handling rules : 2011
- (B) E - waste hazardous waste Rules 1989
- (C) E waste solid waste rules 2000
- (D) (A), (B) and (C)
- (E) Answer not known

25. From the cathode ray and LCD tube monitors one can extract _____ metal.

- ~~(A)~~ Copper
- (B) Nickel
- (C) Cadmium
- (D) Aluminum
- (E) Answer not known

26. Preventive environmental management is not involving on the

- (A) Pollution prevention
- (B) Cleaner technology
- ~~(C)~~ Waste Maximization
- (D) Best Operating Practices
- (E) Answer not known

27. The sanitary landfill operation is _____ method of waste treatment.
- (A) Physical dumping
 - (B) Vermi composting
 - (C) Chemical
 - (D) Physical, chemical and biological
 - (E) Answer not known
28. The Process of pyrolysis means burning the in absence of
- (A) Water
 - (B) Air
 - (C) Chemicals
 - (D) Hazardous materials
 - (E) Answer not known
29. Under Ideal conditions, when solid waste materials are combusted (burned) which of the gaseous end product is doesn't formed?
- (A) CO_2
 - (B) H_2O
 - (C) SO_2
 - (D) NH_3
 - (E) Answer not known
30. Choose the correct order of sequence of solid waste management.
- (a) Waste generation \rightarrow Collection and Transport \rightarrow Segregation, dispensing \rightarrow Transfer and Transport \rightarrow Disposal
 - (b) Collection and Transport \rightarrow Waste Generation \rightarrow Segregation, Dispensing \rightarrow Transfer and Transport \rightarrow Disposal
 - (c) Waste generation \rightarrow Collection and Transport \rightarrow Transfer and Transport \rightarrow Segregation, dispensing \rightarrow Disposal
- (A) (c) alone
 - (B) (a) and (c)
 - (C) (b) and (c)
 - (D) (a) alone
 - (E) Answer not known

31. The most toxic chemical dioxin which is produced from waste disposal is obtained from
- (A) Landfills ~~(B)~~ Incinerators
(C) Decomposes (D) Digestors
(E) Answer not known
32. _____ is the practice of solid waste disposal.
- ~~(A)~~ Land fill (B) Landscape
(C) Landslide (D) Gardening
(E) Answer not known
33. Tanneries consume high quantity of _____ salts for their manufacturing processes.
- (A) Sodium sulphide and chromic chloride
~~(B)~~ Sodium chloride and chromic sulphate
(C) Sodium chloride and sodium sulphate
(D) Chromic chloride and chromic sulphate
(E) Answer not known
34. The widely known surfactant which degrades slowly with persistent residue in the environment is
- (A) Tetrapoly hexane sulphate
(B) Tetrahexane Polysulfonate
(C) Tetrafluorosulphate
~~(D)~~ Tetrapropylene benzene sulfonate
(E) Answer not known
35. Identify the intermediate product in cement manufacturing process
- ~~(A)~~ Clinker (B) Miner
(C) Palladium (D) Phthalate
(E) Answer not known

36. The process in which iron bacterial that converts trivalent ferrous ions to sulphuric acid by oxidation is called as
- (A) Leaching (B) Sulphurization
(C) Saponification (D) Chlorination
(E) Answer not known
37. The major disaster that took place in Japan due to mercury pollution is
- (A) Minamata (B) Hiroshima - Nagasaki
(C) Seveso (D) Chernobyl
(E) Answer not known
38. The membrane technology that is used for ion concentration in the treatment of metal plating waste is
- (A) Ultrafiltration (B) Electrodialysis
(C) Reverse osmosis (D) Electro filtration
(E) Answer not known
39. Which of following is known as Fenton's reagent?
- (A) Hydrogen peroxide with an iron catalyst
(B) Sodium Hypochlorite
(C) Calcium Hypochlorite
(D) UV with ozone
(E) Answer not known
40. The purpose of providing an equalisation tank in the treatment system is
- (A) To avoid the emission of foul smell from sewage
 (B) To feed constant quantity of sewage to treatment units
(C) To allow preliminary settling of sewage before actual treatment
(D) To store sewage during emergency conditions
(E) Answer not known



41. An example for the physical characteristics of wastewater is
- (A) Chlorides (B) pH
~~(C)~~ Temperature (D) Oxygen
(E) Answer not known
42. The operation which transfers the alkalinity from the digested sludge to the wash water is
- (A) Sedimentation (B) Dialysis
(C) Adsorption ~~(D)~~ Elutriation
(E) Answer not known
43. Creating public awareness on solid waste management through information, education and communication campaign is the responsibility of
- (A) District Collector
(B) Central Pollution Control Board
~~(C)~~ Local Authorities and Village Panchayats
(D) State Pollution Control Board
(E) Answer not known
44. Which of the following is not related with carbon tax?
- (A) This concept is consistent with Polluter Pays Principle (PPP)
~~(B)~~ It's purpose is to internalize externalities associated with natural climate charge
(C) It is necessary for market outcomes to be optimal
(D) A carbon tax is an example of pigouvian tax
(E) Answer not known

45. The submission of Environmental Audit Report in prescribed format was made mandatory under
- (A) Water Pollution and Control Act, 1972
 - (B) Environmental Protection (II Amendment) Rules, 1992
 - (C) Water Pollution and Control Act, 1974
 - (D) Environmental Protection (II Amendment) Rules, 1990
 - (E) Answer not known
46. As per coastal regulation zone rules of MOEF, no industry is allowed for setting up and expansion of industries if the land area from the High Tide Line is within
- (A) 500 m
 - (B) 750 m
 - (C) 1000 m
 - (D) 250 m
 - (E) Answer not known
47. As a part of Environmental audit process, "feedback from the industries" needs to be done. This is coming under which steps in Environmental auditing process.
- (A) Pre audit activities
 - (B) On-site activities
 - (C) Post audit activities
 - (D) Report preparation activities
 - (E) Answer not known
48. The (EIA) Environmental Impact Assessment procedure can be divided into _____ complementary tasks or sub reports.
- (A) 5
 - (B) 4
 - (C) 3
 - (D) 2
 - (E) Answer not known



49. Which of the following is not coming under three pillars of sustainability?
- (A) Social sustainability (B) Cultural sustainability
(C) Environmental sustainability (D) Economic sustainability
(E) Answer not known
50. Among the Sustainable Development Goals (SDG) which of the goal prescribe Affordable and clear energy.
- (A) SDG 7 (B) SDG 8
(C) SDG 9 (D) SDG 10
(E) Answer not known
51. India is one of the participant of IGBP, which estimate to coordinates the needs of an annual budgets of about two million US dollars. Here IGBP stands for
- (A) Indian Geosphere Biodiversity Programme
(B) International Geosphere Biodiversity Programme
 (C) International Geosphere Biosphere Programme
(D) Indian Geosphere Biosphere Programme
(E) Answer not known
52. Brundtland Report is concerned with
- (A) Water conservation (B) Air pollution
(C) Environmental protection (D) Sustainable development
(E) Answer not known
53. According to U.N. Inter Governmental Panel on Climate Change (IPCC) by 2100 average global temperature are projected to increase between
- (A) 1.0° and 3.5° (B) 1.5° and 4.0°
(C) 2.0° and 4.5° (D) 2.5° and 5.0°
(E) Answer not known

54. Choose right matches for basis of classification of algae.

1. Type of chlorophyll
2. Cell wall structure
3. Spores of micro-organism
4. Nature of Carbon reserve material produced by algae cells

- (A) 3 and 4 are correct (B) 1 and 3 are correct
~~(C) 1 and 2 are correct~~ (D) 2 and 3 are correct
(E) Answer not known

55. The endospore structure in a Bacteria are extremely resistance to

- (A) Freezing point
~~(B) Heat and Disinfecting chemicals~~
(C) Heat and Toxic chemicals
(D) Surrounding Atmosphere
(E) Answer not known

56. Which of the following is not grouped into major categories of viruses present in sewage or polluted water?

- ~~(A) Leptospira SPP~~ (B) Reoviruses
(C) Hepatitis viruses (D) Adenoviruses
(E) Answer not known

57. Among the following gases which sequence can be placed interms of heat trapping capacity in global warming

- (A) $\text{CO}_2 > \text{CH}_4 > \text{N}_2\text{O} > \text{CFC}$
~~(B) $\text{CFC} > \text{N}_2\text{O} > \text{CH}_4 > \text{CO}_2$~~
(C) $\text{N}_2\text{O} > \text{CH}_4 > \text{CFC} > \text{CO}_2$
(D) $\text{CH}_4 > \text{CO}_2 > \text{CFC} > \text{N}_2\text{O}$
(E) Answer not known



58. When a mass of cold air displaces the warmer air is known as
- (A) Warm front (B) Polar front
(C) Dold rums ~~(D) Cold front~~
(E) Answer not known
59. The silt particles are intermediate between Sand and Clay but they are more reactive due to their
- (A) High Aeration (B) More Nutrient
(C) Workability ~~(D) High Specific Surface~~
(E) Answer not known
60. When light is passing through the colloidal solution scattering of light is known as
- (A) Hall effect (B) Brownian movement
~~(C) Tyn dall effect~~ (D) Thomson effect
(E) Answer not known
61. Among the following group of ions, which group of ions act as effective enzyme inhibitors.
- (A) Sodium, Potassium (B) Magnesium, Calcium
(C) Zinc, Iron ~~(D) Lead, Cadmium~~
(E) Answer not known
62. In natural waters, which set of ions are found in higher concentration.
- (A) Mg^{2+} , k^{+} ions (B) Fe^{2+} , Zn^{2+} ions
~~(C) Ca^{2+} , Na^{+} ions~~ (D) Other metal ions
(E) Answer not known

63. Among the following methods, which one is more relevant and cost effective on the removal of contamination in waste water treatment.

- (A) Advanced oxidation process (B) Thermal evaporation method
~~(C)~~ Adsorption process (D) Chemical precipitation method
 (E) Answer not known

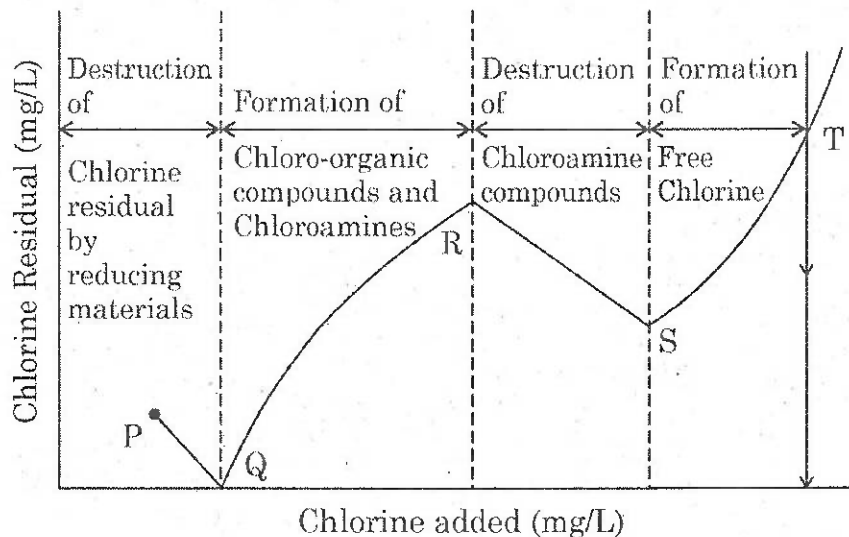
64. In electro-dialysis process the anions move towards _____ electrode.

- (A) -Ve electrodes (B) Neutral electrodes
 (C) Membrane ~~(D)~~ +Ve electrodes
 (E) Answer not known

65. Among which of the following membrane unit “Molecular Weight Cut Off” (MWCO) is Exclusively used to identify the membrane.

- (A) Ion exchange ~~(B)~~ Ultrafiltration (UF)
 (C) Nanofiltration (NF) (D) Eletrodialysis (RO)
 (E) Answer not known

66.



Identify Break Point Chlorination from above diagram.

- (A) P (B) Q
~~(C)~~ S (D) R
 (E) Answer not known

67. Choose correct answer for coalescence occurring dependent factors
1. Opportunity for antagonism
 2. Depth of basin
 3. Turbulance
 4. Velocity gradients in the system
- (A) 2 and 3 are correct (B) 1 and 3 are correct
(C) 1 and 4 are correct ~~(D)~~ 2 and 4 are correct
(E) Answer not known
68. _____ constructed of silica sand and anthracite coal in filtration process.
- (A) Mixed Media Filter ~~(B)~~ Dual-Media Filter
(C) Diatomaceous Earth Filter (D) Slow-Sand Filter
(E) Answer not known
69. Built-up of head loss in a rapid sand filter system is due to the
- (A) Efficiency loss of filter bed
~~(B)~~ Accumulation of suspended impurities in the pores of the sand grains
(C) Mud ball formation in the filter
(D) Cracking of the filter
(E) Answer not known
70. If the primary sedimentation tank is designed to remove 100 mg/l of suspended solids, calculate the quantity of sludge formed. Assume that the sludge is to contain 5% of solids.
- ~~(A)~~ 2000 lit (B) 3000 lit
(C) 4000 lit (D) 5000 lit
(E) Answer not known

71. The designed velocity and specific gravity of grit chamber is
- (A) 0.25 to 0.3 m/sec and 2.65 (B) < 0.2 m/sec and 2.65
(C) 1 to 2 m/sec and 2.36 (D) 1.5 m/sec and 2.36
(E) Answer not known
72. The square grit chambers how the solids are removed?
- (A) By manually to sump at the side
 (B) By a rotating raking mechanism to sump at the side of the tank
(C) By a sucking pump
(D) By the centrifugal separation of solids
(E) Answer not known
73. Giardia lamblia is a _____ category of organism responsible for contamination of water
- (A) Virus (B) Protozoa
(C) Bacteria (D) Helminths
(E) Answer not known
74. Chlorination, Hypochlorination, ozonation and land treatment systems are done to remove
- (A) Biodegradable organics (B) Heavy metals
(C) Dissolved inorganic solids (D) Pathogens
(E) Answer not known
75. 2nd stage BOD of a sewage is the measure of
- (A) Organic matter (B) Biological organic matter
 (C) Nitrogenous matter (D) Carbonaceous matter
(E) Answer not known



76. Choose the correct precautionary measures to be taken to overcome problems due to indoor pollution because of Artificial Building materials and poor ventilation

- (1) Cautionary labels should be attached to construction materials that contain resins
 - (2) Architects and construction engineers must make sure that air flow is not reduced to a danger point
 - (3) The air pollution regulations, should have provisions for compulsory testing of at that point of manufacture
 - (4) Municipal authorities should not be authorised to test
- (A) (1) and (4) are correct
(B) (3) and (4) are correct
(C) (2) and (4) are correct
~~(D) (2) and (3) are correct~~
(E) Answer not known

77. The exhaust temperature in Wankel engine is

- (A) $70^{\circ}\text{C} - 90^{\circ}\text{C}$
- (B) $40^{\circ}\text{C} - 60^{\circ}\text{C}$
- ~~(C) Greater than 150°C~~
- (D) Less than 120°C
- (E) Answer not known

78. In the automobile pollution control, three way catalytic converter is used to control

- (A) CO_2 , SO_2 , pb
- ~~(B) CO, NO_x , hydrocarbons~~
- (C) H_2S , H_2O , HCl
- (D) CH_4 , CO_2 , HNO_3
- (E) Answer not known



79. Electrostatic precipitators are effective in the collection of particles size range
- (A) 0.7μ (B) $0.2 - 2.0 \mu$
(C) $0.01 - 10 \mu$ (D) 7μ
(E) Answer not known
80. How emission limits prescribed are expressed in Air Pollution?
- (A) Concentration of capacity per unit area of air under standard or normal conditions
(B) Concentration of pollutants per unit volume of air under standard or normal conditions
(C) Volume of the gas drawn through sampling train
(D) Concentration of pollutants per unit area of air under standard or normal conditions
(E) Answer not known
81. _____ is commonly associated with inversions, because the temperature of the air at ground level falls below the dew point of the water vapour in the air.
- (A) Smog (B) Fog
(C) Mist (D) Precipitation
(E) Answer not known
82. Bhopal tragedy is associated with
- (A) SO_3 gases (B) CH_3CN gases
(C) NH_3 gases (D) CH_3NCO gases
(E) Answer not known
83. Which of the following called the Secondary Pollutant
- (A) Peroxy Acetyl Nitrate (PAN) (B) CO_2 , Carbon Dioxide
(C) SO_2 Sulfur Dioxide (D) CO Carbon Monoxide
(E) Answer not known

84. One of the more notorious manifestations of surface water contamination is the reduction of

- (A) pH
- ~~(C)~~ Dissolved Oxygen
- (E) Answer not known
- (B) Salt
- (D) Pathogens

85. In which phase high BOD removal rates are observed in biological waste water treatment process?

- (A) Los phase
- (B) Exponential growth phase
- ~~(C)~~ Declining or retarded growth phase
- (D) Endogenous growth or death phase
- (E) Answer not known

86. Fischer longitudinal dispersion coefficient for streams and rivers (where U = velocity, m/s; B = width, m; H = mean depth m ; U^* = shear velocity m/s; g = acceleration due to gravity; s = channel slope), $E = \text{—————} \text{ m}^2/\text{s}$

- (A) $0.011 \frac{U^2 B^2}{g H s}$
- ~~(C)~~ $0.011 \frac{U^2 B^2}{H \sqrt{g H s}}$
- (E) Answer not known
- (B) $0.011 \frac{U B^2}{H U^*}$
- (D) $0.011 \frac{U^2 B}{H U^*}$

87. Which among the fertilizers/manures used in agriculture, that will cause the heavy metal (Cadmium) pollution in soil and crop?

- (A) Nitrogenous fertilizers
- (C) Organic manures
- (E) Answer not known
- ~~(B)~~ Phosphatic fertilizers
- (D) Bio manures

88. Which one of the following is an example of receptor model of air pollution and prediction?

- (A) CMAQ model
- (B) Box model
- (C) Chemical mass Balance model
- (D) Gaussian plume model
- (E) Answer not known

89. The dispersion co-efficients σ_y & σ_z are not influenced by which of the following parameter.

- (A) Atmospheric stability
- (B) Pollution load
- (C) Source height
- (D) Surface roughness
- (E) Answer not known

90. The expression of dispersion index calculated to test the departure of the distribution from randomness are

- (A) $I_D = \frac{s^2(n-1)}{\bar{x}}$
- (B) $I_D = \frac{\bar{x}(n-1)}{s^2}$
- (C) $I_D = \frac{s^2(n+1)}{\bar{x}}$
- (D) $I_D = \frac{s^2(\bar{x}-1)}{n}$
- (E) Answer not known

91. Coagulation with alum followed by filtration removes

- (A) Aldrin
- (B) DDT
- (C) BHC
- (D) Malathion
- (E) Answer not known



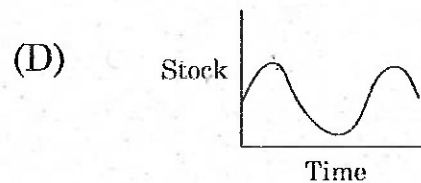
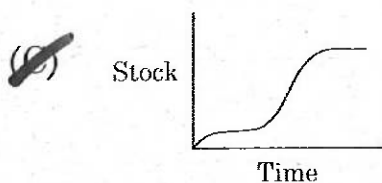
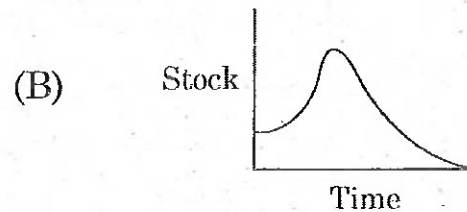
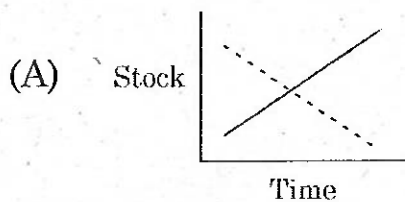
92. In water quality model, the degree to which space, time and matter are segmented is called

- (A) Segmentation ~~(B) Model resolution~~
(C) Validation (D) Confirmation
(E) Answer not known

93. How the water-flow rate is useful in conventional models?

- (A) For predicting velocity
(B) To estimate the amount of contaminant that will be transported along with solids
~~(C) To estimate the amount of pollutant which was carried along with the water~~
(D) To find Reynolds number
(E) Answer not known

94. Identify the logistic growth patterns in dynamic systems



- (E) Answer not known

95. Which of the following is a key input variable in a land use regression model for air quality analysis?

- (A) Wind speed ~~(B) Land cover type~~
(C) Emission rates (D) Solar radiation
(E) Answer not known

96. _____ is a summary of the environmental inventory and the findings of the environmental assessment.
- (A) Environmental impact statement
 - (B) Environmental mapping
 - (C) Environmental assessment
 - (D) Environmental auditing
 - (E) Answer not known
97. The magnitude and intensity of earthquake measured in Richter scale leads to total destruction when its value is than
- (A) 7.1
 - (B) 8.1
 - (C) 9.1
 - (D) 10.1
 - (E) Answer not known
98. In Risk assessment and risk management process which of the following is not part of uncertainty
- (A) Model
 - (B) Environmental
 - (C) Data
 - (D) Monitoring
 - (E) Answer not known
99. Select the correct risk assessment formula from the following :
- (A) Severity = Relative Risk × Livelyhood
 - (B) Livelyhood × Severity = Relative Risk
 - (C) $Livelyhood = \frac{Severity}{Relative\ Risk}$
 - (D) $Relative\ risk = \frac{Livelyhood}{Severity}$
 - (E) Answer not known

100. Which one of the following is / are not included in the Disaster Management Act, 2005?

- (A) National Disaster Response Force
- (B) National Disaster Management Authority
- ~~(C)~~ Ministry of External Affairs
- (D) National Institute of Disaster Management
- (E) Answer not known

101. Farmer's Lung is an allergic disease caused by

- ~~(A)~~ Breathing in dust environment
- (B) Exposure to radiation
- (C) Exposure to high decibel sound
- (D) Exposure to pesticides / Fertilizers
- (E) Answer not known

102. The communities living in Kasar Gao, Kerala who have been poisoned by

- ~~(A)~~ Endosulfan
- (B) Biopesticides
- (C) Parquet
- (D) Nano fertilizers
- (E) Answer not known

103. If people breathe in dust containing the spores of special, heat-tolerating bacteria or moulds what sort of disease they get?

- (A) Silicosis
- (B) Pneumoconiosis
- (C) Byssinosis
- ~~(D)~~ Farmer's lung
- (E) Answer not known

104. _____ is aim to promote and maintain the highest degree of physical, chemical and social well being of workers in all sectors.

- (A) Human Harassment Cell
- ~~(B)~~ Occupational Health and Safety
- (C) Worker's grievance system
- (D) Labours safety
- (E) Answer not known

105. The process of identification of significant environment impacts begins with the stage of
- (A) Scoping
 - ~~(B) Screening~~
 - (C) Baseline data collection
 - (D) Evaluation of impacts and mitigation measures
 - (E) Answer not known
106. Why Public participation is important in EIA?
- (A) To create the awareness
 - (B) To increase the economical standard of the local people
 - ~~(C) Influence the formulation of rules of regulation~~
 - (D) To reduce the friction between Govt. and Public
 - (E) Answer not known
107. What are the data required for predicting the effect of pollutant on fish behaviour through simulation under experimental modeling?
- (A) Quantity of inorganic deposits
 - (B) River flow and temperature only
 - (C) Quantity of water and its direction
 - ~~(D) River flow and present water quality~~
 - (E) Answer not known
108. Choose the correct parameters present in the structure of EIA report
- (a) Project description, description of environment
 - (b) Anticipated environmental impacts
 - (c) Analysis of alternative technology
 - (d) Environmental cost benefit analysis
 - ~~(A) (a), (b), (c) and (d)~~ (B) (a), (c), and (d)
 - (C) (b) and (c) (D) (c) and (d)
 - (E) Answer not known



109. Match the following articles in the institution with their Acts.

List I

List II

(a) Article 252

1. Environment (Protection) Act, 1986

(b) Article 235

2. Water (P & C) Act, 1974

(c) Article 253

3. Air (P & C) Act, 1981

(a) (b) (c)

(A) 1 2 3

~~(B)~~ 2 3 1

(C) 3 1 2

(D) 2 1 3

(E) Answer not known

110. Under the EPA 1986, which ministry has issued several notifications to tackle the problem of Hazardous waste management?

(A) MOES

~~(B)~~ MOEF

(C) MOUD

(D) Rurban Mission

(E) Answer not known

111. How will you dispose the inert and non - biodegradable waste of the cities and towns located in hilly region?

(A) Pelletisation

(B) Incineration

(C) Refuse Derived fuel

~~(D)~~ For building roads and/or filling up of appropriate areas

(E) Answer not known

112. Which kind of analysis in Life Cycle Assessment is used to derive quantitative data to establish the levels and types of energy and materials input to an industrial system and also the product output?

~~(A)~~ Inventory analysis

(B) Impact analysis

(C) Life Cycle analysis

(D) Product analysis

(E) Answer not known

113. Noise was recognized specifically as a pollutant under the section
- (A) Section 2(b) Air Pollution Act 1987
 - (B) 1981 under section 2(b)
 - (C) Section 6(2)(b) Air Pollution Act 1987
 - (D) 1987 under section 7(c)
 - (E) Answer not known
114. Identify one of the following actions which are related to water pollution
- (A) Discharge of sewage or trade effluent
 - (B) Discharge of excess water
 - (C) Discharge of treated effluent
 - (D) Both (A) and (B)
 - (E) Answer not known
115. Under the Act, the Environmental Protection Act, 1986, are companies must possess a type of
- (A) Air pollutants, release from their industries
 - (B) Spill prevention control and counter measures plan
 - (C) Standards for industries
 - (D) Fire retardant devices
 - (E) Answer not known



116. Choose the correct advantages of using aerobic thermophilic digestion in dual digestion

1. increased methane gas generation in the anaerobic digester
2. decreased level of pathogen reduction
3. improved overall volatile solids reduction
4. more organic material in and more odours produced

(A) 2 and 4 are correct

~~(B)~~ 1 and 3 are correct

(C) 4 and 1 are correct

(D) 2 and 3 are correct

(E) Answer not known

117. Membrane process separate

(A) Suspended and dissolved substances

(B) Suspended and colloidal substances

~~(C)~~ Colloidal and dissolved substances

(D) Suspended and micro particles

(E) Answer not known

118. The digested sludge is dewatered, dried up and used as

(A) Minerals

~~(B)~~ Fertilizer and Fuel

(C) Reducing agents

(D) Oxidizing agents

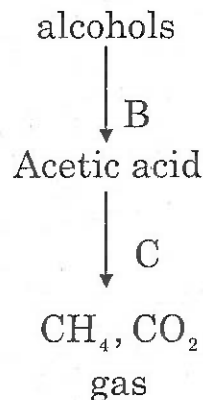
(E) Answer not known



119. BOD left in the effluent, of a conventional trickling filter is _____ and moisture content is _____.

- (A) 20 mg/L and 92% (B) 30 mg/L and 90%
(C) 15 mg/L and 85% (D) 10 mg/L and 83%
(E) Answer not known

120. Organic waste \xrightarrow{A} organic acids (or)



Identify A, B, C in correct sequence?

- (A) Hydrolysis, acetogenetic, methanogenic
(B) Acetogenetic, hydrolysis, methanogenic
(C) Acetogenetic, methanogenic, hydrolysis
(D) Methanogenic, Acetogenetic, hydrolysis
(E) Answer not known

121. Which of the following is used for electron acceptor in anoxic process of biological wastewater treatment?

- (A) O₂ (B) NO₃
(C) CO₂ (D) SO₂
(E) Answer not known



122. What is the mechanism lies behind the removal of colloidal ad solids in suspension in activated sludge process?

- (A) Physico chemical adsorption (B) Physico chemical absorption
(C) Biological removal (D) Denitrification
(E) Answer not known

123. An aerated lagoon is to be provided to treat raw sewage from 40,000 people at a rate of 180 L / person / day. A detention time of 5 days is to be provided, if we provide an effective depth of 4.0 m, the surface area of the lagoon required is?

- (A) 1800 m² (B) 7200 m²
 (C) 9000 m² (D) 10125 m²
(E) Answer not known

124. From stoichiometry point of view for cell oxidation the quantity of oxygen required per kg of cells is

- (A) 1.42 kg of O₂ (B) 2.84 kg of O₂
(C) 4.56 kg of O₂ (D) 4.52 kg of O₂
(E) Answer not known

125. For completely mixed flow reactors with no solid recycle, relation between Solid Residence Time (SRT) and Hydraulic Retention Time (HRT) is

- (A) SRT = HRT
(B) SRT > HRT
(C) SRT < HRT
(D) Both SRT and HRT can't be correlated for this case
(E) Answer not known

126. _____ symbol is usually practiced to mean the recyclable plastics.

- (A) Two - arrows
- (B) Recyclable two arrows
- ~~(C) Three - arrow~~
- (D) Recyclable three arrows
- (E) Answer not known

127. For the application of recycled plastics in fence post, park benches, docks, etc., _____ is used.

- (A) PE
- ~~(B) Plastic lumber~~
- (C) PP
- (D) PS
- (E) Answer not known

128. Identify the correct statements regarding recycling of plastics.

- (i) Primary recycling is where the same plastic product is manufactured again
- (ii) Secondary recycling is where the material is reprocessed to a new product
- (iii) Tertiary recycling is where the plastic material is completely processed to a new form

- (A) Only (i) is correct
- (B) Both (i) and (ii) are correct
- (C) Both (ii) and (iii) are correct
- ~~(D) All (i), (ii) and (iii) are correct~~
- (E) Answer not known

129. During recycling of glass _____ is not mixed with the container glasses.

- (A) Optical glass
- ~~(B) Pyrex glass~~
- (C) Soda glass
- (D) Lead crystal glass
- (E) Answer not known

130. The new S.I. unit absorbed radiation is

- (A) Gray (B) Red
(C) Joule (D) Watt
(E) Answer not known

131. In the integrated waste management of 4Rs' principles which one is most preferred for plastic waste management

- (A) Reuse (B) Recycling
 (C) Reduction at source (D) Recover
(E) Answer not known

132. Which type of incinerator system can be widely used for both municipal and industrial waste incineration?

- (A) Open-pit incinerators (B) Tepee burners
(C) Controlled air incinerators (D) Rotary kiln incinerator
(E) Answer not known

133. The destructive distillation of solid waste is called

- (A) Pyrolysis (B) Incineration
(C) Composting (D) Bioremediation
(E) Answer not known

134. Pick out odd methodology in waste management from the following :

- (i) Gasification
(ii) Composting
(iii) Pyrolysis
(iv) Plasma
- (A) (iii) and (iv) (B) (i) and (iv)
 (C) (ii) alone (D) (iv) alone
(E) Answer not known

135. Household wastes are governed by

- (A) Hazardous Waste Rules, 1989
- ~~(B)~~ Municipal Solid Waste Rules, 2000
- (C) Biomedical Waste Rules, 1998
- (D) Water (P & C) Act, 1974
- (E) Answer not known

136. Pick out the correct statement from the following with respect to the principle of solid waste management.

- (a) Helps in cleaning surrounding
 - (b) Increase waste management cost
 - (c) Makes good business opportunities
 - (d) Dip in economic growth
- (A) (a) and (d) (B) (b) and (c)
~~(C)~~ (a) and (c) (D) (b) and (d)
(E) Answer not known

137. In chemical composition of solid waste which of the following is not coming under proximately analysis

- (A) Moisture (B) Ash
~~(C)~~ Density (D) Fixed carbon
(E) Answer not known

138. Which type of waste is disposed through ocean dumping?

- (A) Plastic (B) E-waste
~~(C)~~ Radioactive waste (D) Agricultural waste
(E) Answer not known



139. Which of following pollution control equipment is less likely to be used in control of pollution from cement industry?

- (A) Electrostatic precipitator (B) Pulse Jet filters
~~(C)~~ Gravity settler (D) Baghouses
(E) Answer not known

140. Pollution concentration (C_z) in Z direction in a Gaussian pulse model is given by

~~(A)~~ $C_z = n \exp \left\{ -\left(\frac{Z-H}{\sigma_z} \right)^2 + \exp \left(-\frac{Z+H}{\sigma_z} \right)^2 \right\}$

(B) $C_z = n \exp \left\{ \left(\frac{Z-H}{\sigma_z} \right)^2 + \exp \left(\frac{Z+H}{\sigma_z} \right)^2 \right\}$

(C) $C_z = n \exp \left\{ \exp \left(\frac{Z+H}{\sigma_z} \right)^2 - \left(\frac{Z-H}{\sigma_z} \right)^2 \right\}$

(D) $C_z = n \exp \left\{ \exp \left(\frac{Z+H}{\sigma_z} \right)^2 + \left(\frac{Z-H}{\sigma_z} \right)^2 \right\}$

(E) Answer not known

141. What are the vitamins produced by the pharmaceutical industry based on fermentation process?

- (A) A, D and K ~~(B)~~ B₂ and B₁₂ and C
(C) A, B, and E (D) A, C and D
(E) Answer not known

142. How will you separate chromium compounds from the spent liquor of Tannery industry wastewater?

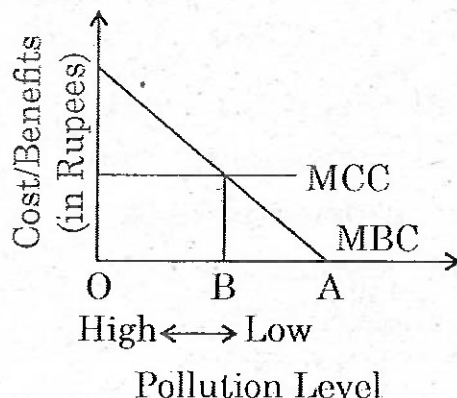
- ~~(A)~~ Electro dialysis (B) Coagulation
(C) Floatation (D) Sedimentation
(E) Answer not known



143. The Bhopal disaster during 1984 was due to the release of
- (A) Methyl mercury (B) Methyl Triethyl lead
(C) Mercuric chloride ~~(D) Methyl isocyanate~~
(E) Answer not known
144. Which of following parameter is a measure of rate at which sludge can be dewatered?
- (A) Wet density (B) Dry density
(C) Specific gravity ~~(D) Specific resistance~~
(E) Answer not known
145. The organic synthesis industry that make use of vegetative raw material is known as
- (A) Vegetative chemistry (B) Microbial chemistry
~~(C) Saccharine chemistry~~ (D) Organic Chemistry
(E) Answer not known
146. Which Indian metropolitan city generate the highest amount of Municipal Solid Waste (MSW)?
- (A) Delhi (B) Calcutta
(C) Kanpur ~~(D) Mumbai~~
(E) Answer not known
147. Which of the following is the leading cause of death and disease in worldwide?
- (A) Radioactive pollution ~~(B) Water pollution~~
(C) Air pollution (D) Soil pollution
(E) Answer not known



148. Choose the correct statement in reference to the graph, when the removal of pollution is below OB



- (A) $MBC = MCC$ ~~(B)~~ $MBC > MCC$
(C) $MCC > MBC$ (D) $MBC = 0$
(E) Answer not known
149. In a cost benefit analysis of a hydro power generation project, discounting can be applied to find _____ value of benefits.
- (A) Gross value ~~(B)~~ Net value
(C) Summative value (D) Total value
(E) Answer not known
150. Which of the following organization is not doing circular economy work?
- (A) European union
(B) National institute of standards and technology
~~(C)~~ Organisation for people welfare
(D) US chamber of commerce foundation
(E) Answer not known
151. Which component of Environmental Audit gives better understanding of inputs and outputs of a unit operation?
- ~~(A)~~ Material Balance (B) Mass Balance
(C) Energy Balance (D) Environment Balance
(E) Answer not known

152. Which of the following environmental audit deals with a company's environmental performance and environmental responsibility practices? Whether the company has complied with legal requirements and other requirements such as ISO 14001.
- (A) Environmental compliance audit
 - (B) Environmental management audit
 - (C) Functional environmental audit
 - (D) Environmental practice audit
 - (E) Answer not known
153. While an environmental auditing being made an auditor in a school campus, which of the following informations need not be considered?
- (A) Reforestation with indigenous varieties
 - (B) Shelter and food provision for wild life
 - (C) Waste water recycling
 - (D) Student strength enhance strategies
 - (E) Answer not known
154. Which of the following is not one of variants of Life Cycle Assessment (LCA)?
- (A) Cradle to grave
 - (B) Cradle to product
 - (C) Cradle to gate
 - (D) Cradle to cradle
 - (E) Answer not known
155. Which of the following section is not coming under EPA, 1986?
- (A) Power to appoint officers
 - (B) Penalty for contravention of the provisions of the act and the rules, orders and directions
 - (C) To collaborate with CPCB in organising the training of persons
 - (D) Power to enter and search
 - (E) Answer not known



156. Assessing simultaneously all routes and exposure pathways involved for a single compound

- (A) Cumulative exposure
- (B) Aggregate exposure
- (C) Inhalation exposure
- (D) Dermal exposure
- (E) Answer not known

157. Name a technology from the following for bioremediation of soils contaminated with explosives such as trinitrotoluene.

- (A) Filtration
- (B) Composting
- (C) Incineration
- (D) Dilution
- (E) Answer not known

158. Choose the correct role of rotifiers in activated sludge.

1. They help remove flocculated bacteria
2. They contribute to floc formation
3. They do not contribute to floc formation
4. They help remove freely suspended bacteria

- (A) 1 and 2 are correct
- (B) 2 and 4 are correct
- (C) 3 and 1 are correct
- (D) 3 and 4 are correct
- (E) Answer not known

159. Gaseous pollutants are collected in the sampler containing pollutant absorbing solution at a particular interval of time is known as (time interval is less than one minute)
- (A) Condensation Sampling (B) Adsorption Sampling
~~(C)~~ Grab Sampling (D) Absorption Sampling
(E) Answer not known
160. The water sample taken for COD analysis is preserved by adding
- ~~(A)~~ H_2SO_4 (B) NaOH
(C) H_3PO_4 (D) HCl
(E) Answer not known
161. Permeability affects the transport of Chemicals through soil? Hence which of the following is required?
- ~~(A)~~ Soil texture and structure (B) Concentration of chemicals
(C) Quality of water (D) Both (B) and (C)
(E) Answer not known
162. Troposphere is the lowest zone of atmosphere and extend upto an average of 14 km. But the height limits varies for different areas. In polar regions it extend upto _____ kms.
- (A) 12 km (B) 16 km
~~(C)~~ 8 km (D) 6 km
(E) Answer not known
163. Soil with nearly black, humic rich surface horizons and good supply of exchangeable, mostly divalent, cations is called
- (A) Alfisols ~~(B)~~ Mollisols
(C) Aridisols (D) Ultisols
(E) Answer not known

164. The main goal of Green Chemistry is
- (A) Minimize the chemical process
 - ~~(B)~~ Sustainable development via pollution prevention and Resource conservation
 - (C) To increase the production in Industries
 - (D) To develop new Technology
 - (E) Answer not known
165. Choose which of the following that does not comes under the 12 principles of green chemistry :
1. Use non-renewable feedstock
 2. Maximise atom economy
 3. Use chemicals and products that are non-biodegradable
 4. Design less hazardous chemical synthesis
- (A) 1 and 2
 - ~~(B)~~ 1 and 3
 - (C) 2 and 3
 - (D) 2 and 4
 - (E) Answer not known
166. Which among the following is the green solvent?
- (A) Ether
 - (B) Acetone
 - (C) Benzene
 - ~~(D)~~ N-Alkylpyridinium salt
 - (E) Answer not known
167. In the reverse osmosis process, which one is moving from higher concentration to lower concentration through semipermeable membranes?
- (A) Cations only
 - (B) Anions only
 - ~~(C)~~ Water
 - (D) Non-ionic compounds
 - (E) Answer not known

168. In which type of Treatment process A Thin $\left(\frac{1}{180}^{\text{th}}\right)$ of a cm resin is used?

- (A) Reverse osmosis process
- (B) Desalination process
- ~~(C)~~ Electro dialysis process
- (D) Osmosis process
- (E) Answer not known

169. Choose correct process that are used to recover the adsorptive capacity of spent Carbon, exclusive of reactivation.

1. Chemicals to reduce the adsorbed material
2. Solvents
3. Biological conversion process
4. Resins

- (A) 1 and 4 are correct
- (B) 4 and 2 are correct
- (C) 3 and 4 are correct
- ~~(D)~~ 2 and 3 are correct
- (E) Answer not known

170. In which type of Sedimentation tank, the depth of the tank is referred to as Side Water Depth (SWD)

- (A) Rectangular Sedimentation tank
- (B) Square Sedimentation tank
- ~~(C)~~ Circular Sedimentation tank
- (D) Elevated Sedimentation tank
- (E) Answer not known



171. Which unit provides the dampening and uniform flow of waste water in the domestic waste water treatment plant?

- (A) Flootation unit
- (B) ~~Equalization basin~~
- (C) Flocculation unit
- (D) Sedimentation tank
- (E) Answer not known

172. Choose the right answer for the factors that influences larger volume of equalization basin in practice than theoretically determined.

- (1) Discontinuous operation of aeration and mixing equipment will allow complete drawdown
- (2) Some contingency should be provided for unforeseen changes in diurnal flow
- (3) The equalization basin is open
- (4) Volume must be provided to accommodate the concentrated plant recycle streams that are expected, if such flows are returned to the equalization basin

- (A) (1) and (4) are correct
- (B) (2) and (3) are correct
- (C) ~~(4) and (2) are correct~~
- (D) (3) and (4) correct
- (E) Answer not known

173. Organic compounds that have a boiling point $\leq 100^\circ\text{C}$ (or) vapour pressure $> 1 \text{ mm Hg}$ at 25°C considered as

- (A) Total organic compounds
- (B) ~~Volatile organic compounds~~
- (C) Chlorinated organic compounds
- (D) Inorganic compounds
- (E) Answer not known

174. When it comes to screening, (one of the primary treatments process) Identify the wrong statement.

- (A) The detection period should be assumed as zero
- (B) Incineration is one of the method of disposal of screenings
- (C) Length of trough should match with length of screen
- (D) The screened residues contain good fertilising value and with precautions, they may be used as fertiliser
- (E) Answer not known

175. Silence zone means _____ meters away around Hospitals, educational Institutions religious places, courts etc.

- (A) 100
- (B) 200
- (C) 300
- (D) 400
- (E) Answer not known

176. A change of sound pressure atleast 40 dB within 0.5 sec with a duration of < 1 sec is called as

- (A) Intermitten noise
- (B) Impulse noise
- (C) Normal noise
- (D) Continuous noise
- (E) Answer not known

177. Noise emission levels carried out at specified distances as per standard code

- (A) IS 800 – 1978
- (B) IS 456 – 2000
- (C) IS 4758 – 1968
- (D) IS 10120 – 2000
- (E) Answer not known



178. Choose the right advantage of cyclones.

- (1) Simple construction and operation
 - (2) Equipment is subject to minimum deterioration
 - (3) Continuous disposal of solid particulates
 - (4) High collection efficiency for particles below 5-10 μ in diameter
- (A) (1) and (2) are correct ~~(B) (1) and (3) are correct~~
(C) (2) and (4) are correct (D) (2) and (3) are correct
(E) Answer not known

179. An electronic cleaning system can be adopted in

- (A) Fabric Filters ~~(B) Electrostatic precipitators~~
(C) Scrubbers (D) Spray towers
(E) Answer not known

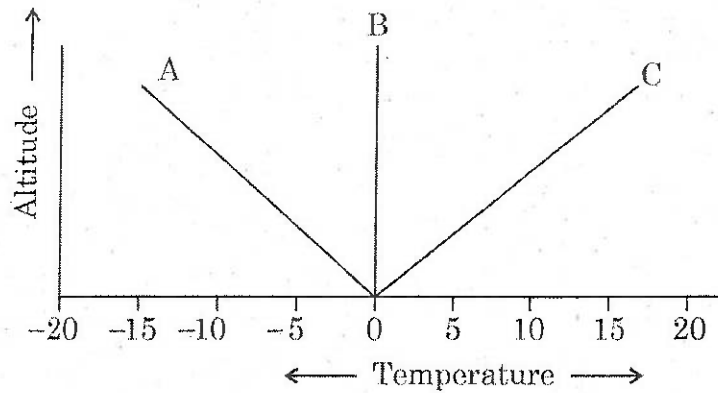
180. 10g of polluted air allowed 10 passes through Bag house filters. It is estimated that 4g of pollutant is deposited during purification. Calculate the collection efficiency of the device.

- (A) 20% ~~(B) 40%~~
(C) 4% (D) 0.4%
(E) Answer not known

181. Air quality standard for Suspended Particulate Matter (SPM) as recommended by CPCB in industrial area is .

- (A) 100 $\mu\text{g}/\text{m}^3$ ~~(B) 500 $\mu\text{g}/\text{m}^3$~~
(C) 300 $\mu\text{g}/\text{m}^3$ (D) 200 $\mu\text{g}/\text{m}^3$
(E) Answer not known

182.



Identify A, B and C?

- (A) Isothermal, Positive lapse rate, negative lapse rate
- (B) Negative lapse rate, Isothermal, dry adiabatic lapse rate
- (C) Negative lapse rate, isothermal, positive lapse rate
- ~~(D)~~ Positive lapse rate, isothermal, negative lapse rate
- (E) Answer not known

183. Photochemical smog is also known as

- ~~(A)~~ Los angeles smog
- (B) London smog
- (C) Classical smog
- (D) Toronto smog
- (E) Answer not known

184. Select the correct answer in the given below list :

| Air pollutant | Effect |
|---------------------|-----------------------|
| (a) CO | 1. Acid rain |
| (b) CO ₂ | 2. Acute toxicity |
| (c) SO ₂ | 3. Ozone liberation |
| (d) NO _x | 4. Green house effect |

- | | (a) | (b) | (c) | (d) |
|----------------|------------------|-----|-----|-----|
| (A) | 2 | 4 | 3 | 1 |
| (B) | 2 | 4 | 1 | 3 |
| (C) | 1 | 2 | 4 | 3 |
| (D) | 2 | 1 | 4 | 3 |
| (E) | Answer not known | | | |

185. Self purification of eutrophicated water bodies due to

- (A) Oxidation process
- ~~(B)~~ Removal of nitrogen nutrients
- (C) Reduction process
- (D) Adding more nitrogen components
- (E) Answer not known

186. Briggs' model is used to estimate the plume rise under neutral or unstable conditions and the model is: (Where Δh = plume rise m; u = wind speed at stack height, m/s; x_f = distance downwind to point of final plume rise, m; s = stability parameter, S^{-2})

F = buoyancy flux parameter

(A) $\Delta h = 2.4 \left(\frac{F}{uS} \right)^{\frac{1}{3}}$

(B) $\Delta h = \frac{1.6Fx_f^{\frac{2}{3}}}{u}$

(C) $\Delta h = 2.4 \left(\frac{F}{uS} \right)^{\frac{2}{3}}$

~~(D)~~ $\Delta h = \frac{1.6F^{\frac{1}{3}}x_f^{\frac{2}{3}}}{u}$

- (E) Answer not known

187. In the Gaussian plume model, the dispersion coefficients depends on

- (A) Upward distance
- (B) Atmospheric stability
- (C) Surface roughness
- ~~(D)~~ Both atmospheric stability and surface roughness
- (E) Answer not known

188. The prognostic model can predict the development of a flow field in a spatial scale of

- (A) 1 to 2 km
- (B) 3000 to 5000 km
- (C) 7500 to 10000 km
- ~~(D)~~ 2.5 to 2500 km
- (E) Answer not known

189. Choose the incorrect option is the properties of t-distribution
- (A) The variable t-distribution ranges from minus infinity to plus infinity
 - ~~(B)~~ t-distribution is symmetrical and has a non-zero mean
 - (C) Variance of t-distribution is greater than 1
 - (D) From an infinite number of degrees of freedom the t-distribution and normal distribution are exactly equal
 - (E) Answer not known
190. In statistical estimation, if estimator's expected value is identical with the population parameter being estimated, coming under which of the properties of good estimator
- ~~(A)~~ Unbiasedness
 - (B) Consistency
 - (C) Efficiency
 - (D) Sufficiency
 - (E) Answer not known
191. The process is to tune the model to file a data set, called as:
- (A) Identification
 - (B) Validation
 - (C) Confirmation
 - ~~(D)~~ Calibration
 - (E) Answer not known
192. The number which provides a transfer function to propagate the relative error of the parameter into the relative error of the prediction. This number is called as:
- ~~(A)~~ Condition number
 - (B) Eigen values
 - (C) Determinant
 - (D) Inverse
 - (E) Answer not known



193. For light signals, the National Safety Council (1988) recommends certain color/signal combinations. Which of following color denotes extreme caution is required; checking or rechecking or unexpected delay in necessary

- (A) Red
- (B) ~~Yellow~~
- (C) White
- (D) Blue
- (E) Answer not known

194. Assertion [A] : Ergonomic safety policies consists of Hazard prevention and control through worksite analysis, medical management by training and education.

Reason [R] : Occupational Safety Health Act (1991) does not recommend this safety policies.

- (A) Both [A] and [R] true
- (B) Both [A] and [R] false
- ~~(C)~~ [A] is true but [R] is false
- (D) [A] is false but [R] is true
- (E) Answer not known

195. The place of origin of earth quake is

- ~~(A)~~ Fault
- (B) Epicenter
- (C) Focus
- (D) Eye
- (E) Answer not known

196. The benefits of monitoring steps in risk management does not include.

- (A) Identification
- (B) Accumulation
- (C) Cost Reduction
- ~~(D)~~ Health and Hygiene
- (E) Answer not known

197. The purpose of a quantitative risk analysis is
- (A) To create public awareness
 - (B) To assess the cost involved
 - (C) To translate the probability and impact of risk
 - (D) To control the pollution
 - (E) Answer not known
198. Consider following steps in performing environmental risk assessment
- (1) Hazard Identification
 - (2) Hazard Accounting
 - (3) Scenarios of exposure
 - (4) Risk Characterization
 - (5) Risk management
- Choose the correct step sequence
- (A) 1 → 2 → 3 → 4 → 5
 - (B) 2 → 3 → 1 → 4 → 5
 - (C) 3 → 4 → 2 → 1 → 5
 - (D) 4 → 2 → 1 → 3 → 5
 - (E) Answer not known
199. Ambient air quality standards in respect of noise in industrial area zone
- (A) 75 dB (A) Leq in day and 70 dB (A) leq in night
 - (B) 70 dB (A) Leq in day and 75 dB (A) leq in night
 - (C) 75 dB (A) Leq in day and night
 - (D) 70 dB (A) Leq in day and night
 - (E) Answer not known
200. Personal Protective Equipment (PPE) to be used by a worker at a degreasing tank to protect against inhalation of vapours or absorption of solvent that splash on bare skin
- (A) Respirator, Boots and Helmet
 - (B) Gloves, Face shield and Safety glass
 - (C) Gloves, Face shield and Respirator
 - (D) Helmet, Earplug and Gloves
 - (E) Answer not known



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