



**OFFICE OF THE ENGINEER-IN-CHIEF
PUBLIC HEALTH ENGINEERING DEPARTMENT
AIZAWL : MIZORAM**

**WRITTEN EXAMINATION : 2025
FOR THE POST OF**

**ANALYST (LAB)
(Regular)**

PAPER-III

Code No: _____
(For Official Use)

Signature of Invigilator

SUBJECT (Part)	MARKS OBTAINED
Technical/Specialised Subject <i>(100x2=200 marks)</i>	
Total Marks obtained (Full Marks-200)	

Signature of Examiner



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Roll No: _____
(To be filled in by Candidate)

Signature of Candidate

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Instructions:

1. The question paper will also serve as the answer sheet. Candidates are required to answer directly on the question/answer sheet using Tick (✓) Marks.
2. Time : 3 Hours

ANALYST (LAB) : PAPER-III (Technical Papers)

(Each question carry 2(two) marks, the total is 200 marks and all question carry equal mark)

1. When did the Government of India pass the Environment Protection Act ?
(a) 1990 ☐ (b) 1986 ☐
(c) 1989 ☐ (d) 2000 ☐
2. For acids, Normality is _____
(a) Molarity X No. of elections lost by one molecule of substance. ☐
(b) Molarity X Acidity ☐
(c) Molarity X No. of electrons gained by one molecule ☐
(d) Molarity X Basicity ☐
3. Quality control in laboratory is important because
(a) We need to check our result ☐
(b) We can assess other laboratory ☐
(c) We can try to improve our defect ☐
(d) All of the above ☐
4. On what does the harmful effect of pollution depend on ?
(a) The concentration of pollution and the organism ☐
(b) The contration, duration of exposure to pollutants and the organism. ☐
(c) The concentration of pollutants and duration of exposure ☐
(d) The organism only ☐
5. 4L of 0.02M aqueous solution of NaCl was diluted by assing 1L of water. The Molality of the resultant solution is _____
(a) 0.0008 ☐ (b) 0.008 ☐
(c) 0.016 ☐ (d) 0.012 ☐
6. Best autuclaving is achieved at
(a) 121°C for 15 minutes ☐ (b) 120°C for 1 hour ☐
(c) 110°C for 2 hours ☐ (d) 110°C for 3 hours ☐
7. Why is CNG (Compressed Natural Gas) preferred over petrol ?
(a) Burns most efficiently ☐ (b) It is expensive ☐
(c) Burns less efficiently ☐ (d) Can be adulterated ☐
8. The cell constant of a conductivity cell _____
(a) Changes with change of electrolyte ☐
(b) Changes with change of concentration of electrolyte ☐
(c) Changes with temperature of electrolyte ☐
(d) Remains constant for a cell ☐
9. Which of the following bacteria is biological indicator of water pollution?
(a) N. Meningitidis ☐ (b) E. Coli ☐
(c) C. Diptheria ☐ (d) B. Anthracis ☐
10. How much percent of impurities are enough to make domestic sewage unit for humans ?
(a) 0.1 % ☐ (b) 1 % ☐
(c) 5 % ☐ (d) 10% ☐

11. Which of the following statements is correct ?
 (a) The rate of reaction decreases with increase in concentration of reactants. ☐
 (b) The rate of reaction decreases with passage of time as the concentration of reactant decreases. ☐
 (c) The rate of reaction is same at any time during the reaction. ☐
 (d) The rate of reaction is independent of temperature change. ☐
12. Which one of the following is a smallest bacteria ?
 (a) N. Gonorrhoea ☐ (b) M. Tuberculosis ☐
 (c) Vibrio cholerae ☐ (d) Mycoplasma ☐
13. Which of the following is categorized as pesticide used in India?
 (a) Atrazine ☐ (b) Simazine ☐
 (c) Benomyle ☐ (d) Cytotoxic drug ☐
14. 1L of 2M CH_3COOH is mixed with 1L of 3M $\text{C}_2\text{H}_5\text{OH}$ to form an ester. The rate of the reaction with respect to the initial rate when each solution is diluted with an equal volume of water will be.
 (a) 2 times ☐ (b) 0.25 times ☐
 (c) 2.5 times ☐ (d) 0.025 times ☐
15. How many types of nucleic acids are present in the living systems ?
 (a) One ☐ (b) Two ☐
 (c) Three ☐ (d) Four ☐
16. Which one is a sulphur containing Amino-acid?
 (a) Cystein ☐ (b) Alanine ☐
 (c) Tyrosin ☐ (d) Valine ☐
17. Which of the following is most acidic ?
 (a) Xyclohexanol ☐ (b) Benzyl alcohol ☐
 (c) M-Chlorophenol ☐ (d) Phenol ☐
18. How many bases are required for coding 20 amino acids ?
 (a) One ☐ (b) Two ☐
 (c) Three ☐ (d) Four ☐
19. Ethanol on warming with conc. H_2SO_4 at 413K give
 (a) Ethane ☐ (b) Diethyl ether ☐
 (c) Dimethyl ether ☐ (d) Ethylhydrogen sulphate ☐
20. Which is flammable hazard?
 (a) Ether ☐ (b) Picric acid ☐
 (c) Hydrochloric acid ☐ (d) Sodium Cyanide ☐
21. Which of the following organisms cannot fix nitrogen ?
 (a) Azobacter ☐ (b) Nostoc ☐
 (c) Volvox ☐ (d) Anabaena ☐
22. The reagent which does not react with both, acetone and benzaldehyde____
 (a) Phenyl hydrazine ☐ (b) Fehling's solution ☐
 (c) Grignard reagent ☐ (d) Sodium hydrogensulphite ☐
23. The buffer solution is prepared by combining
 (a) A weak acid and its salt ☐ (b) A weak base and its salt ☐
 (c) Acidic salt and basic salt ☐ (d) All of the above ☐
24. Which of the following chemical agent is used for fumigation?
 (a) Formaldehyde ☐ (b) Alcohol ☐
 (c) Iodine ☐ (d) Phenol ☐

25. Which of the following acids may be used for decalcification?
 (a) 20% hydrochloric acid ☐ (b) 25 % sulphuric acid ☐
 (c) 5 % nitric acid ☐ (d) 30 % orthophosphoric acid ☐
26. Acid burn in laboratory accident occurs with the following acid, expect
 (a) Sulphuric acid ☐ (b) Nitric acid ☐
 (c) Acetic acid ☐ (d) Hydrochloric acid ☐
27. BOD of waste water is estimated by measuring the amount of _____
 (a) Total organic matter ☐ (b) Biodegradable organic matter ☐
 (c) Oxygen evolution ☐ (d) Oxygen consumption ☐
28. GMO stand for
 (a) Genetically Matured Organisms ☐ (b) Genetically Mental Organs ☐
 (c) Genetically Modified Organisms ☐ (d) Genetically Mutant Organisms ☐
29. At a given temperature, a solution which does not change its pH even on addition of more alkalis or acid is
 (a) Buffer solution ☐ (b) Molar solution ☐
 (c) Hypertonic solution ☐ (d) Hypotonic solution ☐
30. The Bt toxin does not kill the Bacillus because the Bt toxin protein exist as inactive _____.
 (a) lipid ☐ (b) protoxins ☐
 (c) protein ☐ (d) carbohydrate ☐
31. Tag polymerase is obtained from
 (a) S. typhi ☐ (b) E. coli ☐
 (c) Thermusaquaticus ☐ (d) Thermophilus ☐
32. Durham's tube is used to assess
 (a) pH ☐ (b) Colour development ☐
 (c) Gas production ☐ (d) Turbidity development ☐
33. What is the ideal pH for growth of most of the bacteria ?
 (a) 6.8 - 7.2 ☐ (b) 7.2 - 7.6 ☐
 (c) 7.6 - 8.0 ☐ (d) 8.0 - 8.4 ☐
34. The patents granted for biological entities and products derived from them are called ____
 (a) ethics ☐ (b) pathents ☐
 (c) bio-patents ☐ (d) biosafety ☐
35. _____ organism's plasmid was used for the construction of first recombinant DNA.
 (a) Cyanobacteria ☐ (b) Bacillus subtilus ☐
 (c) Saccharomyces cereviasae ☐ (d) Salmonella typhimurium ☐
36. Thermophilic bacteria grow best at
 (a) 5 -10° C ☐ (b) 15 -20° C ☐
 (c) 40 - 50° C ☐ (d) 60 - 70° C ☐
37. Which among the follwing is known as a Secondary Pollutant in the atmosphere ?
 (a) Ozone ☐ (b) Sulfur Dioxide ☐
 (c) Nitrogen Oxides ☐ (d) Carbon Monoxide ☐
38. Which of the following Sustainable Development Goals ensures availability and sustainable management of water and sanitation for all ?
 (a) SDG 4 ☐ (b) SDG 5 ☐
 (c) SDG 6 ☐ (d) SDG 7 ☐
39. The science that deals with the measurement of the capacity of a chemical coloured system to absorb lights is known as
 (a) Nephelomery ☐ (b) Colorimetry ☐
 (c) Turbidimetry ☐ (d) Biometry ☐

40. The upper part of an aquatic ecosystem contains
 (a) Nekton ☐ (b) Plankton ☐
 (c) Benthos ☐ (d) Both (a) and (b) ☐
41. What is the killing of aquatic life due to depletion of oxygen because of the excessive growth of algae due to the over-abundance of phosphorous in the coastal areas called ?
 (a) Leaching ☐ (b) Respiration ☐
 (c) Photosynthesis ☐ (d) Eutrophication ☐
42. Stains that are made up of combination of acid and basic dyes are called
 (a) Romanowsky's stain ☐ (b) Giemsa's stain ☐
 (c) Leishmain's stain ☐ (d) Field's stain ☐
43. Constant boiling point mixtures are called -
 (a) Ideal solution ☐ (b) Azeotropes ☐
 (c) Isotonic solution ☐ (d) Buffers ☐
44. Largest number of oxidation state is shown by -
 (a) Mn ☐ (b) Fe ☐
 (c) Cr ☐ (d) Zn ☐
45. The best way to sterilize test tubes, petri-dished, flaks, pipette is
 (a) Tyndallization ☐ (b) Steam under pressure ☐
 (c) Boiling ☐ (d) Hot air oven ☐
46. The smallest particle that can take part in chemical reaction is _____
 (a) Atom ☐ (b) Molecules ☐
 (c) Both (a) and (b) ☐ (d) None of the above ☐
47. Which of the following is a chemical change ?
 (a) Conversion of water to ice. ☐ (b) Rusting of iron ☐
 (c) Crumpling a sheet of aluminium foil ☐ (d) Casting silver ☐
48. Normal life span of Platelets is about
 (a) 1-2 days ☐ (b) 7 -14 days ☐
 (c) 120 - 140 days ☐ (d) 2 - 3 days ☐
49. According to S.I. system, ____ was used to measure the amount of substance.
 (a) Mole ☐ (b) Weight machine ☐
 (c) Weight ☐ (d) Mass ☐
50. The ideal gases were in _____ group of Mendeleev's periodic table.
 (a) 3rd ☐ (b) 4th ☐
 (c) 1st ☐ (d) 2nd ☐
51. Solvent is
 (a) Any substance that dissolves in a liquid ☐
 (b) Any liquid in which a substance dissolves. ☐
 (c) Any solution which contains undissolves substance ☐
 (d) None of the above ☐
52. The wavelength used in estimating Alkaline phosphate
 (a) 405 nm ☐ (b) 510 nm ☐
 (c) 520 nm ☐ (d) 570 nm ☐
53. What is the oxidation state of Mn in KMnO_4
 (a) 4 ☐ (b) 5 ☐
 (c) 6 ☐ (d) 7 ☐
54. Atomic radii ____ along the periods
 (a) Increases ☐ (b) Decreases ☐
 (c) Remains constant ☐ (d) Irregular ☐

55. The term trace element refers to
 (a) Inorganic substances ☐ (b) Organic substances ☐
 (c) Both (a) and (b) ☐ (d) None of these ☐
56. The word pathogen refers to -
 (a) cultured micro - organisms ☐ (b) healthy living organism ☐
 (c) disease causing organism ☐ (d) inoculated organism ☐
57. The unit of measurement of wavelength is
 (a) Nanometer ☐ (b) Lambda ☐
 (c) Both (a) and (b) ☐ (d) None of the above ☐
58. How much blood should be added to 8mg EDTA vial for good results ?
 (a) 1-2 ml ☐ (b) 3-4 ml ☐
 (c) 5-6 ml ☐ (d) 6-8 ml ☐
59. E. coli has _____
 (a) 4.6×10^9 pb ☐ (b) 4.6×10^6 pb ☐
 (c) 4.8×10^9 pb ☐ (d) 4.8×10^6 pb ☐
60. All infected materials should ideally be discarded into
 (a) Alcohol ☐ (b) Saline ☐
 (c) Hypochloride solution ☐ (d) Benzoyl solution ☐
61. In the abbreviation SI units, S stands for
 (a) Small ☐ (b) Standard ☐
 (c) Significant ☐ (d) System ☐
62. Thromboplastin is released by damaged
 (a) Platelets ☐ (b) Tissue ☐
 (c) Both (a) and (b) ☐ (d) None of the above ☐
63. ESR is retarded by
 (a) Plasma ☐ (b) Albumin ☐
 (c) Both (a) and (b) ☐ (d) None of the above ☐
64. Which of the following is not an example of redox reaction ?
 (a) $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$ ☐ (b) $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$ ☐
 (c) $2\text{K} + \text{F}_2 \rightarrow 2\text{KF}$ ☐ (d) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$ ☐
65. What is the full form of INR ?
 (a) Indian Normal Ratio ☐ (b) Internal Normal Ratio ☐
 (c) Intrinsic Normalized Ratio ☐ (d) International Normalized Ratio ☐
66. Antibiotics are the most effective on
 (a) Bacteria ☐ (b) Virus ☐
 (c) Fungi ☐ (d) None of the above ☐
67. What is oxidation number of carbonyl carbon in methanol ?
 (a) +3 ☐ (b) +2 ☐
 (c) +4 ☐ (d) 0 ☐
68. Absolute alcohol and acetone are used as fixative for
 (a) Glycogen ☐ (b) Bacteria ☐
 (c) Both (a) and (b) ☐ (d) None of the above ☐
69. Microorganisms are used during which stage of the purification of the sewage water ?
 (a) Primary treatment ☐ (b) Secondary treatment ☐
 (c) Both (a) and (b) ☐ (d) none of the above ☐

70. Which is the most commonly used fixative in clinical practice
 (a) Carnoy's fluid ☐ (b) 10 % neutral buffered formalin ☐
 (c) Bovin's fluid ☐ (d) Zenher's fluid ☐
71. Alcohol iodine and sodium thiosulphate is used to remove
 (a) Melanin pigment ☐ (b) Mercury precipitate ☐
 (c) Iron pigment ☐ (d) Formalin precipitate ☐
72. Which of the following act both as an oxidizing as well as reducing agent ?
 (a) HNO_3 ☐ (b) H_2O_2 ☐
 (c) HNO_2 ☐ (d) H_2S ☐
73. Which of the following is the correct IUPAC name?
 (a) 3-Ethyl-4, 4-dimethylheptane ☐ (b) 4, 4-Dimethyl-3, ethylheptane ☐
 (c) 5-Ethyl-4, 4-dimethylheptane ☐ (d) 4, 4-Bis(methyl)-3-ethylheptane ☐
74. The end product of protein metabolism is _____
 a) Ammonia ☐ b) Uric acid ☐
 c) Creatinine ☐ d) Urea ☐
75. The primary treatment of waste water involved the removal of :
 (a) dissolved impurities ☐ (b) stable substances ☐
 (c) toxic substances ☐ (d) harmful bacteria ☐
76. Which of the following is an example of elimination reaction ?
 (a) Chlorination of methane ☐ (b) Dehydration of alcohol ☐
 (c) Nitration of benzene ☐ (d) Hydroxylation of ethylene ☐
77. Tuberculosis bacilli resist decolourization by
 (a) Alcohol ☐ (b) Acid ☐
 (c) Both (a) and (b) ☐ (d) None of the above ☐
78. The municipal waste water is also known as
 (a) Sewage ☐ (b) Human excreta ☐
 (c) Household waste ☐ (d) Organic matter ☐
79. Which of the following are basic media ?
 (a) Meat extract ☐
 (b) Nutrient broth (liquid) or Nutrient agar (solid) ☐
 (c) Peptone and salt ☐
 (d) All of the above ☐
80. Amylase is secreted by the
 (a) Large intestine ☐ (b) Pancrease and salivary gland ☐
 (c) Kidney ☐ (d) Small intestine ☐
81. The distillation technique most suited for separating glycerol from spent lye in the soap industry is
 (a) Simple distillation ☐ (b) Fractional distillation ☐
 (c) Steam distillation ☐ (d) Siatillation under reduces pressure ☐
82. Which of the following sets of diseases is caused by bacteria ?
 (a) Cholera and tetanus ☐ (b) Typhoid and smallpox ☐
 (c) Tetanus and mumps ☐ (d) Herpes and influenza ☐
83. In which distinct morphological form(s) does fungi exist?
 (a) Mycelium ☐ (b) Yeast form ☐
 (c) Both (a) and (b) ☐ (d) None of the above ☐

84. The hepatitis delta virus (HDV) is a
 (a) RNA effective virus ☐ (b) RNA defectice virus ☐
 (c) DNA defectice virus ☐ (d) DNA effectice virus ☐
85. The number of water molecules present in a drop of water weighing 0.018g is :
 (a) 6.02×10^{26} ☐ (b) 6.02×10^{23} ☐
 (c) 6.02×10^{20} ☐ (d) 6.02×10^{19} ☐
86. Hookworm infection is also khawn as 10^{19}
 (a) Ascariasis ☐ (b) Anchylostomiasis ☐
 (c) Trichuriasis ☐ (d) Enterobiasis ☐
87. Site of enzyme synthesis in a cell is _____
 (a) Golgi bodies ☐ (b) Rough endoplasmic ☐
 (c) Mitochondria ☐ (d) All of the above ☐
88. DNA chemically is less reactive and structurally more stable than RNA.therefore,
 (a) DNA has evolved from RNA ☐
 (b) RNA can directly code for proteins ☐
 (c) DNA is the better genetic material than RNA ☐
 (d) The protein synthesizing machinery has evolved around RNA ☐
89. Dextrose means
 (a) Dextrin ☐ (b) Ribose ☐
 (c) D-Glucose ☐ (d) D - Fructose ☐
90. The number of water molecules is maximum :
 (a) 18 grams of water ☐ (b) 18 moles of water ☐
 (c) 18 molecules of water ☐ (d) 1.8 gram of water ☐
91. Fluoride inhibits the following enzymes to prevent glycolysis
 (a) Succinate dehydrogenase ☐
 (b) Enolase ☐
 (c) Aconitase ☐
 (d) Glyceraldehyde3-phosphate dehydrogenase ☐
92. Extensive branch, filamentous body of a fungus is called
 (a) Mold ☐ (b) Hyphae ☐
 (c) Mycelium ☐ (d) Mushroom ☐
93. The element having greatest difference between its first and second ionization enthalpies is:
 (a) Ca ☐ (b) K ☐
 (c) Ba ☐ (d) Sc ☐
94. Iron is absorbed in
 (a) Ferrous form ☐ (b) Ferric form ☐
 (c) Ferritin form ☐ (d) Haemosideun form ☐
95. The equivalent of structural gene is
 (a) muton ☐ (b) cistron ☐
 (c) operon ☐ (d) recon ☐

96. For dehydration of delicate tissue, it is recommended to start processing with
 (a) 20% Ethanol ☐ (b) 30% Ethanol ☐
 (c) 40 % Ethanol ☐ (d) None of the above ☐
97. The IUPAC symbol for the element with atomic number 119 would be :
 (a) unh ☐ (b) uun ☐
 (c) une ☐ (d) uue ☐
98. In H & E stain, what percentage of yellow eosin is used ?
 (a) 1 % ☐ (b) 1.5 % ☐
 (c) 2 % ☐ (d) None of the above ☐
99. Burying the radioactive waste is not acceptable to many peoples as :
 (a) There is a risk of groundwater contamination ☐
 (b) It may explode ☐
 (c) It will harm the buried dead bodies ☐
 (d) It may get accumulated in vegetation ☐
100. Electrode potential of hydrogen electrode is _____ volt
 (a) 0 ☐ (b) +1 ☐
 (c) -1 ☐ (d) None of the above ☐

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