



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

**WRITTEN EXAMINATION
(Advertisement No.3 of 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: (a) The question paper will also serve as the answer sheet. Candidates are required to answer directly on the question/answer sheet using Tick (✓) Marks.

(b) 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. The working temperature of an autoclave is
(a) 110°C ☐ (b) 98°C ☐
(c) 121°C ☐ (d) 37°C ☐
2. What makes a solution?
(a) Solute and solvent ☐ (b) Solute and solute ☐
(c) Solvent and solvent ☐ (d) None of the above ☐
3. Plotting a graph between temperature and reaction rates can reveal the temperature dependence of reaction rates.
(a) Concentration of reactants and temperature ☐
(b) Concentration of products and temperature ☐
(c) Rate constant and temperature ☐
(d) Rate of catalysis and temperature ☐
4. What is the full form of STPs?
(a) Sexually transmitted problems ☐ (b) Sewage treatment plants ☐
(c) Serum tissue plasminogen ☐ (d) Sebaceous tissue plasminogen ☐
5. The normal pH of CSF is
(a) 6.0-6.5 ☐ (b) 7.3-7.4 ☐
(c) 7.0- 7.5 ☐ (d) 7.2- 7.5 ☐
6. Which is a universal solvent?
(a) Alcohol ☐ (b) Ether ☐
(c) Water ☐ (d) Benzene ☐
7. The IUPAC name of the compound:
 $\text{CH}_3\text{—C(=O)—CH}_2\text{—CH}_2\text{OH}$ is
(a) 3-oxobutan-1-ol ☐ (b) 1-Hydroxybutan-3-one ☐
(c) 4-Hydroxybutan-2-one ☐ (d) 2-oxobutan-4-ol ☐
8. The Science that deals with the study of fungi is called
(a) Virology ☐ (b) Parasitology ☐
(c) Mycology ☐ (d) Bacteriology ☐
9. Which is the most suitable carrier gas in gas chromatography?
(a) Helium ☐ (b) Nitrogen ☐
(c) Oxygen ☐ (d) Carbon dioxide ☐
10. How much percent of impurities are enough to make domestic sewage unfit for humans?
(a) 0.1 percent ☐ (b) 1 percent ☐
(c) 5 percent ☐ (d) 10 percent ☐
11. The backbone of nucleic acid structure is constructed by
(a) Phosphodiester bond ☐ (b) Peptide bond ☐
(c) Glycosidic bond ☐ (d) Hydrogen bond ☐
12. When two perfect solutions with volume V each are combined, What is the volume of the solution as a result?
(a) V ☐ (b) 2V ☐
(c) Greater than 2V ☐ (d) Less than 2V ☐
13. Health is not defined by _____
(a) physical well being ☐ (b) mental well being ☐
(c) social well being ☐ (d) Genetic Disorders ☐
14. The pH of a solution is a measure of its:
(a) Solubility ☐ (b) Ionization energy ☐
(c) Hydrogen ion concentration ☐ (d) density ☐

15. Oral thrush is caused by
 (a) *Streptococcus aureus* ☐ (b) *Candida albicans* ☐
 (c) *Streptococcus pyogens* ☐ (d) *Escherichia coli* ☐
16. What is the full form of DNA?
 (a) Degenerative acid ☐ (b) Deoxyribonucleic acid ☐
 (c) Deadly nucleic acid ☐ (d) Disoriented acid ☐
17. Which of the following terms are unit less?
 (a) Molality ☐ (b) Molarity ☐
 (c) Mole fraction ☐ (d) Normality ☐
18. What are the basic constituents of matter?
 (a) Atoms & Molecules ☐ (b) Atoms & Moles ☐
 (c) Molecules & Ions ☐ (d) Nuclei & Ions ☐
19. Which energy was approved as a non-polluting way for generating electricity?
 (a) Water energy ☐ (b) Nuclear energy ☐
 (c) Solar energy ☐ (d) Soil energy ☐
20. When a tissue is removed from the body, it begins to
 (a) Dehydrate ☐ (b) Compose ☐
 (c) Decompose ☐ (d) Hydrate ☐
21. The most common method employed for tissue processing is by using
 (a) Xylene ☐ (b) Paraffin wax ☐
 (c) Alcohol ☐ (d) Phenol ☐
22. What is a population?
 (a) Species of a community ☐ (b) Individuals in the same species ☐
 (c) Individuals in a family ☐ (d) Communities in an ecosystem ☐
23. This capacity to generate a whole plant from any cell/explant is called
 (a) Pluripotency ☐ (b) Totipotency ☐
 (c) Both a and b ☐ (d) None of these ☐
24. Why does the colourless solution of silver nitrate slowly turn blue on adding copper chips to it?
 (a) Dissolution of Copper ☐ (b) Oxidation of $\text{Ag}^+ \rightarrow \text{Ag}$ ☐
 (c) Reduction of Cu^{2+} ions ☐ (d) Oxidation of Cu atoms. ☐
25. The chlorination of methane is an example of
 (a) Elimination reaction ☐ (b) Substitution reaction ☐
 (c) Addition reaction ☐ (d) Oxidation reaction ☐
26. The melting point of amino acids is above
 (a) 100°C ☐ (b) 150°C ☐
 (c) 200°C ☐ (d) 250°C ☐
27. Replacement of clearing agent with the embedding medium is called
 (a) Dehydration ☐ (b) Embedding ☐
 (c) Impregnation ☐ (d) Clearing ☐
28. Which staining technique is used to visualize the capsule of *Cryptococcus Neoformans*?
 (a) Gram stain ☐ (b) Acid-fast stain ☐
 (c) India-ink ☐ (d) Giemsa stain ☐
29. Which of the following is not a Degenerative disease?
 (a) Hypertension ☐ (b) Atherosclerosis ☐
 (c) Obesity ☐ (d) Alzheimer's disease ☐
30. Wastewater treatment generates a large quantity of sludge, which can be treated by
 (a) Anaerobic digesters ☐ (b) Floe ☐
 (c) Chemicals ☐ (d) Oxidation pond ☐
31. Biochemical oxygen demand is an indicator of pollution of
 (a) Air ☐ (b) Water ☐
 (c) Noise ☐ (d) Soil ☐

32. Which of the following does not belong in the category of electrochemical cells?
- | | | | |
|-----------------------|--------------------------|-----------------------|--------------------------|
| (a) Voltaic cell | ☐ | (b) Photovoltaic cell | ☐ |
| (c) Electrolytic cell | ☐ | (d) Fuel Cell | ☐ |
33. What is the oxidation state of chlorine in NaClO_3 ?
- | | | | |
|--------|--------------------------|--------|--------------------------|
| (a) -1 | ☐ | (b) +1 | ☐ |
| (c) +5 | ☐ | (d) +7 | ☐ |
34. Uric acid is the end product of
- | | | | |
|-------------|--------------------------|--------------|--------------------------|
| (a) Protein | ☐ | (b) Purine | ☐ |
| (c) Sodium | ☐ | (d) Hydrogen | ☐ |
35. Rabies virus is
- | | | | |
|-------------------|--------------------------|-------------------|--------------------------|
| (a) Brick shaped | ☐ | (b) Viricular | ☐ |
| (c) Rocket shaped | ☐ | (d) Bullet shaped | ☐ |
36. During dewaxing, the sections on the slide are treated first with
- | | | | |
|-------------------|--------------------------|--------------------|--------------------------|
| (a) Ethyl alcohol | ☐ | (b) Propyl alcohol | ☐ |
| (c) Chloroform | ☐ | (d) Xylene | ☐ |
37. What is activated sludge?
- | | | | |
|------------------------------|--------------------------|------------------------|--------------------------|
| (a) Distilled bacteria | ☐ | (b) Fermented bacteria | ☐ |
| (c) Sediment bacterial flocs | ☐ | (d) Fungi | ☐ |
38. Who are the major sufferers of bio-patents?
- | | | | |
|---|--------------------------|---------------------------|--------------------------|
| (a) Traditional users | ☐ | (b) Traditional knowledge | ☐ |
| (c) Bioresources of the country of origin | ☐ | (d) Farmers | ☐ |
39. Which of the following pairs can form a buffer solution?
- | | | | |
|-------------------------------------|--------------------------|---|--------------------------|
| (a) HCl and NaCl | ☐ | (b) NH_3 and NH_4Cl | ☐ |
| (c) NaOH and NaCl | ☐ | (d) H_2SO_4 and KHSO_4 | ☐ |
40. Which of the following has the smallest radius?
- | | | | |
|----------------------|--------------------------|----------------------|--------------------------|
| (a) Sn^{+4} | ☐ | (b) Li^+ | ☐ |
| (c) Ca^{+2} | ☐ | (d) Al^{+3} | ☐ |
41. The principle involved in paper chromatography is
- | | | | |
|----------------|--------------------------|----------------|--------------------------|
| (a) Adsorption | ☐ | (b) Partition | ☐ |
| (c) Solubility | ☐ | (d) Volatility | ☐ |
42. The only plasma enzyme normally found in urine is
- | | | | |
|-------------|--------------------------|--------------------------|--------------------------|
| (a) Lipase | ☐ | (b) Alkaline phosphatase | ☐ |
| (c) Amylase | ☐ | (d) Acid phosphatase | ☐ |
43. Important buffer in extracellular fluid is
- | | | | |
|-----------------|--------------------------|-----------------|--------------------------|
| (a) Haemoglobin | ☐ | (b) Bicarbonate | ☐ |
| (c) Phosphate | ☐ | (d) Protein | ☐ |
44. Which of the following are the suspended solids in the domestic sewage?
- | | | | |
|-------------|--------------------------|--------------|--------------------------|
| (a) Ammonia | ☐ | (b) Sand | ☐ |
| (c) Calcium | ☐ | (d) Bacteria | ☐ |
45. The amounts of water can be detected by the increase in the mass of _____ during quantitative analysis of hydrogen.
- | | | | |
|-------------------------|--------------------------|----------------------|--------------------------|
| (a) potassium hydroxide | ☐ | (b) sodium hydroxide | ☐ |
| (c) sodium chloride | ☐ | (d) calcium chloride | ☐ |
46. Activated sludge should have the ability to settle quickly so that it can
- | | |
|--|--------------------------|
| (a) Be rapidly pumped back from sedimentation tank to aeration tank | ☐ |
| (b) Absorb pathogenic bacteria present in waste water while sinking to the bottom of the settling tank | ☐ |
| (c) Be discarded and anaerobically digested | ☐ |
| (d) Absorb colloidal organic matter | ☐ |
47. The order of screening effect of electrons of s, p, d and f orbitals of a given shell of an atom on its outer shell electrons is
- | | | | |
|---------------------|--------------------------|---------------------|--------------------------|
| (a) $s > p > d > f$ | ☐ | (b) $f > d > p > s$ | ☐ |
| (c) $p < d < s > f$ | ☐ | (d) $f > p$ | ☐ |

48. Which salt, when dissolved in water, will produce a basic solution?
 (a) NaCl ☐ (b) KNO₃ ☐
 (c) Na₂CO₃ ☐ (d) NH₄C ☐
49. The strop is usually made of
 (a) Fiber ☐ (b) Leather ☐
 (c) Rubber ☐ (d) Nylon ☐
50. Metals generally react with dilute acids to produce hydrogen gas. Which one of the following metals does not react with dilute hydrochloric acid?
 (a) Copper ☐ (b) Magnesium ☐
 (c) Iron ☐ (d) Silver ☐
51. In a dry cell, which of the following is the electrolyte?
 (a) Potassium hydroxide ☐ (b) Sulphuric acid ☐
 (c) Ammonium chloride ☐ (d) Manganese dioxide ☐
52. For a chemical reaction A→B, it is found that the rate of reaction doubles when the concentration of A is increased four times. The order of reaction is
 (a) Two ☐ (b) One ☐
 (c) Half ☐ (d) Zero ☐
53. Eutrophication of water bodies leading to killing of fishes is mainly due to non-availability of
 (a) Light ☐ (b) Essential minerals ☐
 (c) Oxygen ☐ (d) Food ☐
54. Which of the following is the characteristic feature of an organism?
 (a) Number of RNA ☐ (b) Number of protein molecules ☐
 (c) Length of chromosomes ☐ (d) Length of DNA ☐
55. Hydrolysis of fats by alkali is called
 (a) Saponification ☐ (b) Rancidity ☐
 (c) Halogenation ☐ (d) Esterification ☐
56. The optimum temperature for most of the pathogenic bacteria is
 (a) 25°C ☐ (b) 37°C ☐
 (c) 27°C ☐ (d) 40°C ☐
57. Which of the following is not a good conductor?
 (a) Cu ☐ (b) NaCl (aq) ☐
 (c) NaCl (molten) ☐ (d) NaCl(s) ☐
58. What is the valency of carbon?
 (a) Pentavalent ☐ (b) Divalent ☐
 (c) Trivalent ☐ (d) Tetravalent ☐
59. A common indicator organism of water pollution is
 (a) Lemna paucicostata ☐ (b) Escherichia coli ☐
 (c) Entamoeba histolytica ☐ (d) Eichhornia crassipes ☐
60. Which one of the following alcoholic drinks is produced without distillation?
 (a) Wine ☐ (b) Whisky ☐
 (c) Rum ☐ (d) Brandy ☐
61. The word tissue is derived from
 (a) Latin word ☐ (b) Greek word ☐
 (c) French word ☐ (d) Spanish word ☐
62. The science that deals with the formation, structure and functions of cells is called
 (a) Cytology ☐ (b) Histopathology ☐
 (c) Mycology ☐ (d) Pathology ☐
63. The addition of NaCl to a saturated solution of AgCl will:
 (a) Increase the solubility of AgCl ☐ (b) Decrease the solubility of AgCl ☐
 (c) Have no effect on the solubility of AgCl ☐ (d) Increase the ionization of AgCl ☐
64. Solubility of gas in liquid decreases with increase in...
 (a) Pressure ☐ (b) Temperature ☐
 (c) Volume ☐ (d) Number of solute ☐

65. Fungi produce a chemical called
 (a) Pheromone ☐ (b) Insulin ☐
 (c) Testosterone ☐ (d) Growth hormone ☐
66. The most immunogenic antigen in typhoid is
 (a) O antigen ☐ (b) H antigen ☐
 (c) Somatic antigen ☐ (d) Vi antigen ☐
67. Primary treatment involves filtration and distillation.
 (a) False ☐ (b) True ☐
68. Which of the following is the carrier of Plague bacteria?
 (a) Anopheles mosquito ☐ (b) Aedes aegypti ☐
 (c) Xenopsylla ☐ (d) Rhinovirus ☐
69. Which of the following is the genome of polio virus
 (a) ds RNA ☐ (b) ds DNA ☐
 (c) ssDNA ☐ (d) ssRNA ☐
70. The carbohydrate reserve in human body is
 (a) Starch ☐ (b) Cellulose ☐
 (c) Glycogen ☐ (d) Insulin ☐
71. The most common culture media used for fungi is
 (a) Sabourand dextrose agar ☐ (b) Blood agar ☐
 (c) Tellurite medium ☐ (d) Fungus ☐
72. In a reaction, what is the driving force?
 (a) Energy given ☐ (b) Energy released ☐
 (c) Free energy ☐ (d) None of the mentioned ☐
73. The process of transmitting electric current through an electrolyte's solution to decompose it is known as _____
 (a) Electrolyte ☐ (b) Electrode ☐
 (c) Electrolysis ☐ (d) Electrochemical cell ☐
74. Liquid hydrocarbons can be converted to a mixture of gaseous hydrocarbons by:
 (a) Distillation under reduced pressure ☐ (b) Hydrolysis ☐
 (c) Oxidation ☐ (d) Cracking ☐
75. How many lines of defence are present in our body?
 (a) One ☐ (b) Two ☐
 (c) Three ☐ (d) Four ☐
76. The most common fixative used for histochemical purposes is
 (a) Formaldehyde ☐ (b) Buffered formalin ☐
 (c) Acetaldehyde ☐ (d) Acrolein ☐
77. The term used for programmed cell death is
 (a) Necrosis ☐ (b) Pyroptosis ☐
 (c) Apoptosis ☐ (d) Necroptosis ☐
78. Which of the following is given to a fuel cell's cathode?
 (a) Hydrogen ☐ (b) Nitrogen ☐
 (c) Oxygen ☐ (d) Chlorine ☐
79. What happens when a solute crystal is added to a supersaturated solution?
 (a) It becomes a colloidal solution ☐ (b) The solute dissolves in the solution ☐
 (c) The solution desaturates ☐ (d) The solute precipitates out of the solution ☐
80. Which of the following is an aerobic nitrogen-fixing bacterium?
 (a) Azotobacter ☐ (b) Clostridium ☐
 (c) Rhodospirillum ☐ (d) Rhodopseudomonas ☐
81. Exfoliative cytology is concerned with the early detection of
 (a) Tuberculosis ☐ (b) Cancer ☐
 (c) Syphilis ☐ (d) HIV ☐

82. Putrefaction means the breakdown of tissues by
 (a) Bacterial action ☐ (b) Fungal action ☐
 (c) Protozoal action ☐ (d) Parasitic action ☐
83. Water blooms are formed by
 (a) lemna ☐ (b) hydrilla ☐
 (c) water hyacinth ☐ (d) planktonic algae ☐
84. Which of the following is not a part of the nucleotide?
 (a) Phosphate group ☐ (b) Nitrogenous base ☐
 (c) Pentose sugar ☐ (d) Guanosine ☐
85. The thickness of section cutting by microtome is usually
 (a) 15 mm ☐ (b) 10 mm ☐
 (c) 20 mm ☐ (d) 25 mm ☐
86. Glycosuria occurs when the venous blood sugar exceeds
 (a) 50-70 mg/dl ☐ (b) 100-150 mg/dl ☐
 (c) 80-100 mg/dl ☐ (d) 160-180 mg/dl ☐
87. An electrochemical cell can behave like an electrolytic cell when
 (a) $E_{\text{cell}} = 0$ ☐ (b) $E_{\text{cell}} > E_{\text{ext}}$ ☐
 (c) $E_{\text{ext}} > E_{\text{cell}}$ ☐ (d) $E_{\text{cell}} = E_{\text{ext}}$ ☐
88. Which one is the correct order of acidity?
 (a) $\text{CH}\equiv\text{CH} > \text{CH}_3-\text{C}\equiv\text{CH} > \text{CH}_2=\text{CH}_2 > \text{CH}_3-\text{CH}_3$ ☐
 (b) $\text{CH}\equiv\text{CH} > \text{CH}_2=\text{CH}_2 > \text{CH}_3-\text{C}\equiv\text{CH} > \text{CH}_3-\text{CH}_3$ ☐
 (c) $\text{CH}_3-\text{CH}_3 > \text{CH}_2=\text{CH}_2 > \text{CH}_3-\text{C}\equiv\text{CH} > \text{CH}\equiv\text{CH}$ ☐
 (d) $\text{CH}_2=\text{CH}_2 > \text{CH}_3-\text{CH}_3 > \text{CH}_3-\text{C}\equiv\text{CH} > \text{CH}\equiv\text{CH}$ ☐
89. How many basic laws are required to govern the combination of elements to form compounds?
 (a) 6 ☐ (b) 5 ☐
 (c) 4 ☐ (d) 1 ☐
90. Dark brown colour of faeces in jaundice is due to high content of
 (a) Pus cells ☐ (b) Stercobilinogen ☐
 (c) Urobilinogen ☐ (d) Red blood cells ☐
91. The most useful stain for demonstrating the cytoplasmic inclusion in ocular and vaginal smear is
 (a) H and E stain ☐ (b) Gram stain ☐
 (c) PAS ☐ (d) Giemsa stain ☐
92. Which one among the following was the first genetic material?
 (a) DNA ☐ (b) RNA ☐
 (c) Protein ☐ (d) Nuclein ☐
93. The process of copying genetic information from one strand of DNA to RNA is termed as-
 (a) replication ☐ (b) transcription ☐
 (c) translation ☐ (d) reverse transcription ☐
94. The microtome used to prepare very thin section (upto 1 μm) thickness is
 (a) Rotary microtome ☐ (b) Ultra microtome ☐
 (c) Sliding microtome ☐ (d) Freezing microtome ☐
95. Angle formed between knife edge and paraffin block is the angle of
 (a) Clearance ☐ (b) Maintenance ☐
 (c) Adjustment ☐ (d) Convergence ☐
96. The prefix 10^{18} is -
 (a) giga ☐ (b) exa ☐
 (c) kilo ☐ (d) mega ☐
97. A weak electrolyte is characterized by:
 (a) Complete ionization in solution ☐ (b) Partial ionization in solution ☐
 (c) No ionization in solution ☐ (d) High electrical conductivity ☐

98. Which of the following is a typical characteristic of redox reactions?
- (a) Only one reactant undergoes a change in oxidation state ☐
 - (b) They involve transfer of neutrons ☐
 - (c) They do not involve electron transfer ☐
 - (d) They involve changes in oxidation states of reactants ☐
99. Which of the following statements is incorrect?
- (a) Primary sludge does not have flocs of decomposer microbes. ☐
 - (b) Biogas generation involves aerobic digestion of organic wastes. ☐
 - (c) Bioherbicides are used for inhibiting the growth of weeds. ☐
 - (d) Second stage of biogas formation is the formation of organic acids from monomers. ☐
100. Who discovered blood circulation in the human body?
- | | | | |
|----------------------|--------------------------|------------------|--------------------------|
| (a) William Harvey | ☐ | (b) Robert Hooke | ☐ |
| (c) Karl Landsteiner | ☐ | (d) Robert Brown | ☐ |

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