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Paper Code		
6	2	8

(To be filled in the OMR Sheet)

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

O.M.R. Serial No. | | | | | | | | |

प्रश्नपुस्तिका सीरीज
Question Booklet Series
C

M.Sc (Biotechnology) First Semester, Examination, February/March-2022
MBT-1003
Biophysical Chemistry and Techniques

Time : 1:30 Hours **Maximum Marks-100**

जब तक कहा न जाय, इस प्रश्नपुस्तिका को न खोलें

निर्देश : –

1. परीक्षार्थी अपने अनुक्रमांक, विषय एवं प्रश्नपुस्तिका की सीरीज का विवरण यथास्थान सही– सही भरें, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।
2. **इस प्रश्नपुस्तिका में 100 प्रश्न हैं, जिनमे से केवल 75 प्रश्नों के उत्तर परीक्षार्थियों द्वारा दिये जाने है। प्रत्येक प्रश्न के चार वैकल्पिक उत्तर प्रश्न के नीचे दिये गये हैं। इन चारों में से केवल एक ही उत्तर सही है। जिस उत्तर को आप सही या सबसे उचित समझते हैं, अपने उत्तर पत्रक (O.M.R. ANSWER SHEET)में उसके अक्षर वाले वृत्त को काले या नीले बाल प्वांइट पेन से पूरा भर दें। यदि किसी परीक्षार्थी द्वारा निर्धारित प्रश्नों से अधिक प्रश्नों के उत्तर दिये जाते हैं तो उसके द्वारा हल किये गये प्रथमतः यथा निर्दिष्ट प्रश्नोत्तरों का ही मूल्यांकन किया जायेगा।**
3. प्रत्येक प्रश्न के अंक समान हैं। आप के जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
4. सभी उत्तर केवल ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर ही दिये जाने हैं। उत्तर पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
5. ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाय।
6. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी प्रश्नपुस्तिका बुकलेट एवं ओ०एम०आर० शीट पृथक–पृथक उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें।
7. निगेटिव मार्किंग नहीं है।

महत्वपूर्ण : – **प्रश्नपुस्तिका खोलने पर प्रथमतः जॉच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभॉति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्ष निरीक्षक को दिखाकर उसी सीरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।**

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1. Detector used in UV-Visible spectrophotometer?
   (A) Photo emissive tube
   (B) Gas detector
   (C) pH detector
   (D) Chemical detectors
2. How is emitted energy converted to light in autoradiography?
   (A) X-ray
   (B) UV
   (C) Spectroscopy
   (D) Scintillation
3. The radioactive emission produce which color on the developed autoradiograph?
   (A) White
   (B) Transparent
   (C) Black
   (D) Opaque
4. Which of the following detection methods is not commonly used to detect isotopic ally labelled drug metabolites?
   (A) Infrared spectroscopy
   (B) Nuclear Magnetic Resonance spectroscopy
   (C) Scintillation counting (detection of radioactivity)
   (D) Mass spectrometry
5. Which of the following isotopes is not a radioisotope?
   (A) Carbon-13
   (B) Carbon -14
   (C) Tritium
   (D) Sulphur-35

6. Mass spectrometer requires:

(A) High temperature

(B) High cooling

(C) High vacuum

(D) High pressure

7. Bragg equation is:

(A) $n\lambda=2$

(B) $n=2d$

(C) $n\lambda=2d$

(D) $n\lambda=2f$

8. Which is reference standard in ESR?

(A) KBr

(B) DPPH

(C) NaOH

(D) Cu

9. Electron spin resonance is also known as which of the following?

(A) Electron diamagnetic reoccurrence

(B) Electron paramagnetic reoccurrence

(C) Electron diamagnetic resonance

(D) Electron paramagnetic resonance

10. Microwaves are generated by _____.

(A) Klystron tube

(B) Trode tube

(C) Doide tube

(D) Cathode ray tube

11. Nuclei have either the number of protons or neutron as odd have_____ spin.
    (A) Integral spin
    (B) Half integral spin
    (C) Zero spin
    (D) Positive spin
12. NMR is the study of absorption of _____ by nuclei in a magnetic field.
    (A) Radioactive radiation
    (B) IR radiation
    (C) Radiofrequency radiation
    (D) Microwaves
13. Which spectroscopy is measure intensity of the FLUORESCENCE of molecule?
    (A) IR
    (B) NMR
    (C) Flurometry
    (D) All of the above
14. When molecule absorbed incident electromagnetic radiation it is electron goes excited state. But in excited state it is unstable so. Electron is goes ground state. When it is goes ground state it is emitted radiation. this phenomena called?
    (A) Fluorescence
    (B) Phosphorescence
    (C) (A)&(B)
    (D) None
15. The main advantage of fluorescence over UV-Vis spectroscopy is:
    (A) Its sensitivity
    (B) Its compatibility with separation technique
    (C) Its compatibility with most analytes
    (D) None of the above

16. The correct equation of Beer-lambert's law?

(A) A=Io/ I

(B) A= T/T0

(C) A= € cl

(D) A=I/T

17. Select the wavelength range corresponding to UV-visible region?

(A) 400-800nm

(B) 200-800nm

(C) 25um-2.5um

(D) 2.5um-1mm

18. The phenomenon of polarization shows that light has _____ nature.

(A) Particle

(B) Transverse

(C) Longitudinal

(D) Dual

19. Which of the following colour light has the lowest frequency?

(A) Green

(B) Blue

(C) Red

(D) Violet

20. Which of the following rays have maximum frequency?

(A) UV rays

(B) Microwaves

(C) Infrared rays

(D) X-rays

21. In a visible spectrum of light, which of the following colour has the longest wavelength?

(A) Violet

(B) Orange

(C) Yellow

(D) Black

22. Electrophoretic mobility μ is represented by:

(A) V/E

(B) q/E

(C) M/E

(D) E/M

23. Samples do not run in a straight line in?

(A) 2D electrophoresis

(B) Western Blotting

(C) PFGE

(D) PAGE

24. Technique used for the separation of large plant DNA:

(A) Gel electrophoresis

(B) Pulse Field gel electrophoresis (PFGE)

(C) PAGE

(D) Isoelectric focusing

25. _____are the acrylamide gel matrix co-polymerized with the pH gradient.

(A) IEF (isoelectric focusing)

(B) IPG (immobilized pH gradient)

(C) IEP (isoelectric point)

(D) Amphoteric

26. pH at which a protein has a neutral charge;loss or gain of protons in a pH gradient is _____.

(A) Isoelectric focusing

(B) Electrophoresis

(C) Isoelectric point

(D) SDS-PAGE

27. Application of 2D gel electrophoresis is:

(A) Analysis of cell differentiation

(B) Detection of disease markers

(C) Cancer research

(D) All of the above

28. Proteins can be visualized directly in gels by:

(A) Measuring their molecular weight

(B) Using electron microscope only

(C) Staining them with the dye

(D) None of these

29. In isoelectric focusing, proteins are separated on the basis of their:

(A) Size

(B) Relative content of positively charged residue only

(C) Relative content of negatively charged residue only

(D) Relative content of positively and negatively charged residue

30. When is electrophoresis not used?

(A) Separation of lipid

(B) Separation of protein

(C) Separation of amino acids

(D) Separation of nucleic acids

31. The electrophoresis technique that used isoelectricfocusing is:

(A) AGE

(B) FGE

(C) PFGE

(D) 2D-Gel electro focusing

32. The processes of polymerization of PAGE in presence of sunlight is called?

(A) Photopolymerization

(B) Gel formation

(C) Crystallization

(D) Evaporation

33. Covalent disulfide (--S-S-) bond can be breaked by using?

(A) Heating

(B) SDS

(C) Beta-merkeptoethanol

(D) Blue dye

34. In western blotting secondary antibody is tagged with the enzyme called?

(A) Proteases

(B) Alkaline phosphatase

(C) Gluconeoaldolase

(D) Transferase

35. Gel electrophoresis is used for _____of cutting and joining of DNA.

(A) Completing

(B) Hindering

(C) Monitoring

(D) Aiding

36. Which membrane is used in blotting?

(A) Agarose

(B) Sucrose

(C) Polyethene

(D) Nylon

37. Which is the most common ligand in western blotting?

(A) Lactose

(B) Toxins

(C) Genes

(D) Antibodies

38. Probes are used in:

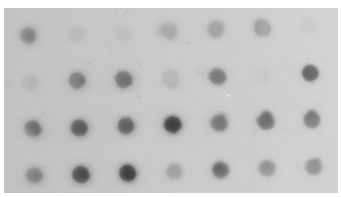
(A) Western blotting

(B) 2D gel electrophoresis

(C) Southern blotting

(D) PAGE

39. What is the name of the technique for the following figure?



(A) Southern blotting

(B) Dot blotting

(C) Western blotting

(D) Northern blotting

40. Western blotting is a technique for detection of:

(A) Specific DNA in a sample

(B) Specific RNA in a sample

(C) Specific protein in a sample

(D) Specific glycolipid in a sample

41. The fluorescent dye such as ethidium bromide is used for visualizing DNA. How do ethidium bromide binds to DNA?

(A) Stacked between histone molecules

(B) Binds to the nucleotide base

(C) Intercalated between the stacked bases

(D) Binds to the phosphodiester backbone

42. Agarose can be extracted from which of the following?

(A) Lycazusican esculentum

(B) Ficum benghalensis

(C) Gracilaria esculentus

(D) Agrostis Stolonifera

43. Sodium dodecyl sulfate (SDS)used in SDS PAGE is _____.

(A) Anionic detergent

(B) Cationic detergent

(C) Nonionic detergent

(D) Neutral agent

44. For the separation of DNA by electrophoresis, which of the following method is commonly used?

(A) Agarose-vertical

(B) Agarose-horizontal

(C) PAGE-Vertical

(D) PAGE- Horizontal

45. What is agarose gel?

(A) Cross linkage molecules

(B) Purified unchange poly saccharide

(C) It is prepared by dissolving 0.5% agarose in boiling water and allowing it to cool to 40°C

(D) All of the above

46. What does the electrophoresis apparatus consist of?

(A) Gel, buffer chamber and fire pack

(B) Buffer chamber and electrophoresis unit

(C) Electrophoresis unit and gel separator

(D) Power pack and electrophoresis unit

47. Which technique separates charged particles using electric field?

(A) Hydrolysis

(B) Electrophoresis

(C) Protein synthesis

(D) Protein denaturing

48. Sandwich ELISA which is detected in sample?

(A) Antigen

(B) Anti body

(C) (A) and (B)

(D) None of the above

49. Which is working principle of ELISA?

(A) Ag-Ab neutralization

(B) Ag-Ab complex

(C) (A) and (B)

(D) None of the above

50. Which of the following is immune diffusion test?

(A) Double diffusion

(B) Radial immunodiffusion

(C) Ouchterlony diffusion

(D) All of the above

51. Which bacteria appears purple-violet colour after staining?

(A) Gram-positive

(B) Gram-negative

(C) Both gram positive & gram negative

(D) Neither gram positive nor gram negative

52. Which of the following techniques are used in Transmission Electron Microscopy (TEM) for examining cellular structure?

(A) Negative staining

(B) Shadow casting

(C) Ultra-thin Sectioning

(D) Negative staining, shadow casting, Ultra-thin sectioning, Freeze Etching

53. The secondary electrons radiated back in scanning microscope is collected by?

(A) Specimen

(B) Anode

(C) Vacuum Chamber

(D) Cathode

54. Osimum tetra oxide is used in electron microscopy as a:

(A) Precipitator

(B) Mordant

(C) Staining agent

(D) Fixing agent

55. Why are thin section specimens necessary in Transmission Electron Microscope?

(A) Electrons are negatively charged

(B) Electrons have a wave nature

(C) Electrons have no mass

(D) Electrons have a poor penetrating power

56. Which of the following is used to visualize the live cell?

(A) SEM

(B) TEM

(C) Phase contrast microscope

(D) All of the above

57. The resolving power of unaided human eye:

(A) 1um

(B) 100um

(C) 10um

(D) 0.1um

58. Which of the following is best suited to get the surface view of the object?

(A) SEM

(B) TEM

(C) Both of the above

(D) Compound microscope

59. All of the components are of compound microscope except?

(A) Stage clip

(B) Fine adjustment

(C) Electron gun

(D) Binocular eye piece

60. Which of the following light is suitable for getting maximum resolution?

(A) Red

(B) Blue

(C) Green

(D) Orange

61. When the power of ocular lense is 10X and objective lense is 20X, the magnification is:

(A) 30 times

(B) 20 times

(C) 200 times

(D) 2000 times

62. Three dimensional structure of any protein can be detected by:

(A) Western Blotting

(B) X-ray diffraction

(C) Radioactivity

(D) ELISA

63. Fluorescent substance is used in:

(A) Viscometer

(B) Centrifugation

(C) Flow cytometry

(D) Spectrophotometer

64. In Laminar air flow _____type of filter is located.

(A) Membrane filter

(B) Seitz Filter

(C) HEPA

(D) All of the above

65. Basic unit of bacterial measurement is:

(A) Micrometer

(B) Nanometer

(C) Milimeter

(D) All of the above

66. In Gram Staining, Gram's iodine is act as_____.

(A) Counter stain

(B) Primary stain

(C) Secondary stain

(D) Mordant

67. Use of single stain to color the bacteria is commonly called as_____.

(A) Monochrome staining

(B) Gram staining

(C) Differential Staining

(D) All of the above

68. _____ is the ability to reveal closely adjacent points as separate & distinct.

(A) Magnification

(B) Resolution

(C) Numerical aperture

(D) None of the above

69. In _____ type of microscope, the field surrounding a specimen appears black, while the object itself is brightly illuminated.

(A) Compound microscope

(B) Phase contrast microscope

(C) Dark field microscope

(D) Fluorescence microscope

70. The ratio of diameter of lenses to its focal length is referred as:

(A) Magnification

(B) Resolution

(C) Numerical aperture

(D) None of the above

71. Word “chrome” in chromatography is used for:

(A) Particle

(B) Technique

(C) Colour

(D) Process

72. The first step in preparation of affinity chromatography column is:

(A) Ligand attachment to matrix

(B) Coupling of aromatic amines to matrix

(C) Activation process

(D) Precipitation

73. Chromatography is a physical method that is used to separate:

(A) Simple mixtures

(B) Complex mixtures

(C) Viscous mixtures

(D) Metals

74. What is Eluent?

(A) Is a liquid solution

(B) Is a liquid solution that is a result from Elution.

(C) It is a solvent used for separation of absorbed material from stationary phase.

(D) None of the above

75. Which of the following cannot be used as adsorbent in Column adsorption chromatography?

(A) Magnesium oxide

(B) Silica gel

(C) Activated alumina

(D) Potassium permanganate

76. Which of the following is not a gel filtration chromatography?

(A) Molecular sieve

(B) Gel permeation

(C) Size exclusion

(D) Gel residue

77. HPLC is an abbreviation for:

(A) High Profit Liquid Chromatography

(B) High Pressure Liquid Chromatography

(C) Higher Performance Low Chromatography

(D) Higher Profit Low Chromatography

78. Which of the following is not true about (HPLC)?

(A) It requires high pressure for the separation of the specious

(B) There is no need to vaporise the samples

(C) It is performed in columns

(D) It has high sensitivity

79. The chromaplate or thin layer chromatography plate is made up of:

(A) Glass

(B) Wood

(C) Fibre

(D) Metal

80. Amino acids detected by spraying the plate with ninhydrin solution is an example of

(A) Column chromatography

(B) Thin layer chromatography

(C) Paper chromatography

(D) Liquid chromatography

81. Salting out process involves:

(A) Precipitation of proteins using ammonium sulphate

(B) Precipitation of proteins using copper sulphate

(C) Precipitation of proteins using sodium chloride

(D) None of these

82. The use of insulin hormone to purify its receptor is an example of:

(A) Ion exchange chromatography

(B) Affinity chromatography

(C) Gel filtration chromatography

(D) Ligand mediated chromatography

83. Protein purification refers to the:

(A) Purification of proteins

(B) Separation of proteins from other biomolecules

(C) Separation of a particular protein from other contaminating proteins

(D) All of these

84. Ion exchange chromatography is based on the:

(A) Electrostatic attraction

(B) Electrical mobility of ionic species

(C) Adsorption chromatography

(D) Partition chromatography

85. Which of the following is not used for detection in GC?

(A) Infrared spectroscopy

(B) NMR

(C) Flame ionisation

(D) Electrical conductivity

86. Which carrier gas is preferred as mobile phase in gas chromatography?

(A) Oxygen

(B) Fluorine

(C) Helium

(D) Aluminium

87. The pattern on the paper in Paper chromatography is called?

(A) Chroming

(B) Chroma

(C) Chromatograph

(D) Chromatogram

88. Which type of filter paper are mostly used in paper chromatography?

(A) Butter paper

(B) Sample paper

(C) Whatmann filter paper

(D) Filter paper

89. Thin Layer chromatography is:

(A) Partition chromatography

(B) Electrical mobility of ionic species

(C) Adsorption chromatography

(D) None of the above

90. Which pH is considered neutral?

(A) 10

(B) 7

(C) 4

(D) 2

91. What is the purpose of a titration?

(A) To find pH of acid

(B) To find pH of base

(C) To find concentration of unknown acid and base

(D) To find volume of unknown acid and base

92. What is the number of neutrons in this isotope of uranium? $_{92}U^{238}$

(A) 92

(B) 119

(C) 146

(D) 238

93. Pure water is known to be which of the following?

(A) Weak electrolyte

(B) Strong electrolyte

(C) Neither weak nor strong

(D) Not an electrolyte

94. Reference electrode in pH meter is also called:

(A) Standard electrode

(B) Calomel electrode

(C) Metal electrode

(D) Zero electrode

95. pH stands for the power of:

(A) H^+ ion concentration

(B) OH^- ion concentration

(C) He ± ion concentration

(D) Power of hydration

96. Which of the following is an accurate method to determine the pH of an aqueous solution?

(A) Litmus paper

(B) Phenopthelein

(C) pH meter

(D) None of the above

97. Is centrifugation used in wine processing?

(A) True

(B) False

(C) Both

(D) None of the above

98. Which of the following used for sedimentation of red blood cells?

(A) High speed centrifuge

(B) Low speed centrifuge

(C) Ultra centrifuge

(D) Vacuum centrifuge

99. What is the principle of centrifugation?

(A) Size reduction principle

(B) Filtration principle

(C) Evaporation principle

(D) Sedimentation principle

100. Differential centrifugation is based on the differences in _____ of biological particles of different density.

(A) Size

(B) Sedimentation rate

(C) Structure

(D) Mass

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Rough Work / रफ कार्य

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