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B. Sc. (Biotechnology) (Sem. - III) Examination

March - 2023

BT-05 : Instrumentations and Techniques

સૂચના : / Instructions

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ **B. Sc. (Biotechnology) (Sem. - III)**

Name of the Subject :

☛ **BT-05 : Instrumentations and Techniques**

Subject Code No.: **1903001103020001**

Seat No.:

Student's Signature

(2) All questions are compulsory.

***O.M.R. Sheet* ભરવા અંગેની અગત્યની સૂચનાઓ આપેલ *O.M.R. Sheet*ની પાછળ છાપેલ છે.**
Important instructions to fillup O.M.R. Sheet are given on back side of the provided O.M.R. Sheet.

Q. 1. Which of the following is an effective way of purifying liquids containing suspensions?

A. Crystallization
B. Decanting
C. Centrifuging
D. Separating funnel

Q. 2. Which type of rotors are useful for gradient centrifugation of biological elements that do not properly participate in conventional gradient?

A. Fixed angle
B. Vertical
C. Swinging bucket
D. Near vertical

Q. 3. Which of the following can be used to establish gradient for the separation of whole cells and sub-cellular particles?

A. Percoll
B. Ficoll
C. Dextran
D. All

Q. 4. Give the mathematical equation to describe Stock's law.

A. $v = 2/9\ r^2\ (\rho_p - \rho_m) / \eta \times g$
B. $v = 9/2\ r^2\ (\rho_p - \rho_m) / \eta \times g$
C. $v = 2/9\ \eta \times g / r^2\ (\rho_p - \rho_m)$
D. None

Q. 5. Which type of centrifugation is based upon the differences in the sedimentation rate of biological particles of different size and shape?

A. Differential
B. Density gradient
C. Analytical
D. Both A & B

Q. 6. Low speed rotors are usually made of _____.

A. Steel
B. Titanium
C. Aluminium
D. All of above

Q. 7. For the pelleting of the microsomal fraction from a liver homogenate, an ultracentrifuge is operated at a speed of 40,000 rpm. Calculate the angular velocity, ω, in radians per second.

A. 4189
B. 4999
C. 6149
D. 5189

Q. 8. Analytical ultracentrifugation is employed for

A. Determination of Purity

B. Determination of average molecular mass

C. Ligand binding studies

D. All of above

Q. 9. The process of settling down particles with the help of gravity is known as

A. Sublimation

B. Centrifugation

C. Decantation

D. Sedimentation

Q. 10. In 500 × g, what does g represent in accordance to centrifugation?

A. Gravitational force

B. Centrifugal force is 500 times greater than earthly gravitational force

C. Centrifugal force is 500 times less than earthly gravitational force

D. Centrifugal force is 500 times same as that of earthly gravitational force

Q. 11. Differential centrifugation relies on the differences in _____ of biological particles of different _____.

A. Size, density

B. Mass, size

C. Sedimentation rate, sizes and density

D. Size, structure

Q. 12. After centrifugation, sublimate _____.

A. Dissolves completely

B. Settles at bottom

C. Depends upon pH of sublimate

D. Remain suspended in a liquid

Q. 13. A grating consists of ruled lines, as many as _____ line per mm, on a transparent or reflecting base.

A. 20

B. 200

C. 500

D. 2000

Q. 14. Which of the below lamp can be used as light source for U.V. light?

A. The Deuterium Lamp

B. Hydrogen Discharge Lamp

C. Tungsten Halogen Lamp

D. All of the given

Q. 15. Which of the given option correctly represent the dimensions of the cuvette?

A. 1.00 cm by 1.00 cm cross section and are several centimeters in height

B. 0.10 cm by 1.00 cm cross section and are 1.00 centimeters in height

C. 10.0 cm by 10.0 cm cross section and are 1.0 centimeters in height

D. 1.00 cm by 10.0 cm cross section and are several centimeters in height

Q. 16. Function of reference beam is to _____.

A. Provide the final light intensity after passing through the sample

B. Provide the initial light intensity before passing through the sample

C. Both of the given

D. None of the given

Q. 17. The colorimeter is generally allowed to warm up for 15 minutes in order to _____.

A. Perform auto-cleaning

B. Generate Vacuum

C. Stabilize the light source and the detector

D. None of the given

Q. 18. The useful range of absorbance scale is from 0-2 but it is desirable to keep within the range 0-1 because, above 1, the results become unreliable due _____.

A. To scattering of light.

B. To refection of light from the edge of solution

C. To difficulty in calculation results

D. All of the given

Q. 19. In colorimeter, process of recording "zero absorbance" is called as _____.

A. Celebration

B. Calibration

C. Zeroing

D. Auto-tunning

Q. 20. Beer-Lambert's law is only applicable to _____.

A. A beam of monochromatic light passes through a homogeneous transparent medium

B. A beam of dichromatic light passes through a homogeneous transparent medium

C. A beam of multichromatic light passes through a homogeneous transparent medium

D. All of the given are correct

Q. 21. In U.V./VIS spectrometry, _____ acts as the silent component of the sample.

A. Water B. Proteins

C. Nucleic Acids D. Organic Solvents

Q. 22. The absorption of UV light by nucleic acids depends upon _____.

A. n-π^* transition of purine

B. π-π^* transition of purine and pyrimidine

C. n-π^* and π-π^* transition of purine and pyrimidine

D. n-n*, n-π^* and π-π^* transition of purine and pyrimidine

Q. 23. Molecular sub-structures responsible for interaction with electromagnetic radiation are called _____.

A. Chromophores B. Fluorophores

C. Chromogens D. Fluorogens

Q. 24. In spectrophotometer, _____ is light received at the detector but not anticipated in the spectral band isolated by monochromator.

A. Stray Light B. Day Light

C. Additional Light D. Gray Light

Q. 25. Select the correct statement.

A. According to Lambert's law, amount of light absorbed is directly proportional to concentration of absorbing solute in the solution

B. The Beer's law states that light absorbed by a solution is directly proportional to the length of the light path through the solution.

C. Molar absorbance co-efficient or molar extinction co-efficient is absorption of light by one molar solution of solute using standard cuvette of one cm. light path.

D. Absorption of light by a solution is not dependent on the molar absorption co-efficient and molar concentration of the solute in solution.

Q. 26. Combination electrodes containing the electrolyte in gel format have which of the following advantages over normal ones?

A. Simple to use
B. Low maintenance
C. Low cost
D. More accurate

Q. 27. The biocatalytic membrane is attached to the glass electrode using which of the following materials?

A. Nylon mesh
B. Teflon
C. Silicon rubber
D. Polythene

Q. 28. Which types of reference electrodes are known?

A. Aqueous
B. Nonaqueous
C. Pseudo reference electrode
D. All above

Q. 29. What will be the concentration of hydroxide ion in solution having pH 7.0?

A. 7.0 M
B. 1.0×10^{7} M
C. 1.0×10^{-7} M
D. 0.0 M

Q. 30. Lanthanum fluoride is used in _____ electrode.

A. Lanthanum selective electrode
B. Fluoride selective electrode
C. Enzyme electrode
D. Calcium selective electrode

Q. 31. pH meter is a _____ which measures the voltage between two electrodes placed in a solution.

A. Potentiometer
B. Voltmeter
C. Conductometer
D. Thermometer

Q. 32. In liquid membrane electrode, the liquid ion exchanger is held in a porous disc of _____.

A. Solid material
B. Semi-permeable membrane
C. Hydrophobic material
D. Water absorbing material

Q. 33. A slice of rabbit liver was used to construct _____ electrode?

A. Guanine selective
B. Calcium selective
C. Fluoride selective
D. None of given

Q. 34. Why does hydroxide ion interfere with the measurement of fluoride ion?

A. Large size
B. Small size
C. Same size
D. Unknown reason

Q. 35. Which solution is filled in calomel electrode?

A. Saturated solution of potassium chloride
B. Saturated solution of potassium iodide
C. Saturated solution Sodium chloride
D. Saturated solution of aluminium chloride

Q. 36. Which of the following is not the characteristic of ion selective electrodes?

A. It is fragile
B. Easy to use
C. Available in different sizes and shapes
D. It is insensitive to many ions

Q. 37. In recent liquid membrane electrodes, the porous liquid membrane is replaced with which of the following?

A. Polyvinyl chloride
B. Polyacryl chloride
C. Polyester membrane
D. Polyacryl amide

Q. 38. Identify the radioactive version of carbon.

A. ^{12}C
B. ^{15}C
C. ^{13}C
D. ^{14}C

Q. 39. What does act as an anode in Geiger Muller counter?

A. Argon gas
B. Platinum rod
C. Copper cylinder
D. Steel plate

Q. 40. Chromatography technique is invented by _____.

A. M. Tswett
B. CremerC.
C. William Harris
D. Duboscq

Q. 41. Which of the Factors affects the efficiency of autoradiography?

A. Thickness of the sample
B. All of Given
C. Thickness of emulsion
D. Exposure time

Q. 42. Identify SI unit of radioactivity.

A. Curie
B. Rutherford
C. Becquerel
D. Milicurie

Q. 43. Alkalinity of a solution _____ as the pH _____.

A. Decreases, increases
B. Increases, increases
C. Increases, decreases
D. None of the above

Q. 44. Which one is not included in planer chromatography?

A. TLC
B. Paper Chromatography
C. HPLC
D. HPTLC

Q. 45. One electron volt (eV) is equal to _____.

A. $1.6 \times 10\text{^}{-16}$ J
B. 1.9×10^{-19} J
C. 1.6×10^{-19} J
D. 1.9×10^{-16} J

Q. 46. Cocktails used in scintillation fluids does not contain _____.

A. 2,5-diphenyloxazole
B. 1,4 bis(5phenyloxazol-2-yl) benzene
C. 2-(4'-t-butylphenyl)-5-(4"-biphenyl)-1,3,4,-oxydiazole
D. 1,4 bis(5benzenoxazol-2-yl) phenyl

Q. 47. Intensifying screen sheet is used in _____.

A. Direct autoradiography

B. Indirect autoradiography

C. Converged autoradiography

D. Conservational autoradiography

Q. 48. _____ is defined as the total amount, as distinct from the concentration, of analyte present in one phase divided by the total amount present in the other phase.

A. Distribution coefficient

B. Partition coefficient

C. Effective distribution coefficient

D. Concentration

Q. 49. Choose the correct statement for chromatography.

A. Higher the adsorption to the stationary phase, the faster the molecule will move through the column.

B. Higher the solubility in the mobile phase, the faster the molecule will move through the column

C. Higher the absorption to the stationary phase, the faster the molecule will move through the column

D. None of the above are correct.

Q. 50. Pre-activation of chromatographic plate can be carried out at which temperature in Hot air oven?

A. 101 °C

B. 301 °C

C. 401 °C

D. 201 °C

SPACE FOR ROUGH WORK