

- 1 What do you mean by potentiometry ?
 - (A) Measurement of electrical conductivity
 - (B) Measurement of electrochemical potential
 - (C) Measurement of reduction potential
 - (D) Measurement of pH
- 2 What are the requirements for the satisfactory reference electrode ?
 - (A) Reproducibility
 - (B) Reversibility
 - (C) All of these
 - (D) Stability
- 3 Which types of reference electrodes are known ?
 - (A) Non aqueous
 - (B) Pseudo reference electrode
 - (C) All
 - (D) Aqueous
- 4 Which of the following are the components of reference electrode ?
 - (A) Filling solution
 - (B) A contact frit
 - (C) All
 - (D) An internal element
- 5 Which solution is filled in calomel electrode ?

(A) NaCl solution	(B) Hg_2Cl_2 solution
(C) Liquid mercury	(D) KCl solution
- 6 Choose correct option with respect of calomel electrode.
 - (A) $\text{HgCl}_2 + 2e^- \rightarrow \text{Hg} + 2\text{Cl}^-$
 - (B) $\text{Hg} + 2\text{Cl}^- \rightarrow \text{HgCl}_2 + 2e^-$
 - (C) $2\text{Hg} + 2\text{Cl}^- \rightarrow \text{HgCl}_2 + 2e^-$
 - (D) $\text{Hg}_2\text{Cl}_2 + 2e^- \rightarrow 2\text{Hg} + 2\text{Cl}^-$
- 7 Why Silver-Silver electrode is widely used ?
 - (A) It is stable
 - (B) It is non-toxic
 - (C) Because of all of these
 - (D) It is simple to construct
- 8 How much potential is developed by Silver-Silver electrode, when saturated KCl solution is filled ?

(A) 0.299 Volt	(B) 0.000 Volt
(C) 1.000 Volt	(D) 0.199 Volt
- 9 Which of the following are the components of pH meter ?
 - (A) pH measuring electrode
 - (B) None
 - (C) Reference electrode and pH measuring electrode
 - (D) Reference electrode
- 10 What is the pH range for the use of fluoride selective electrode ?

(A) 0.0 to 7.0	(B) 7.0 to 14.0
(C) 0.0 to 14.0	(D) 3.5 to 8.0

- 11 What is meant by tendency of particles in suspension to settle out of the fluid in which they are entrained ?
- (A) Electrophoresis
 - (B) Sedimentation
 - (C) Rotation
 - (D) Centrifugation
- 12 Which force is experienced by biological particles moving through a viscous medium ?
- (A) Frictional force
 - (B) Electrical force
 - (C) None
 - (D) Centrifugal force
- 13 Give the relationship between applied centrifugal field (G) and angular velocity ω .
- (A) $G = \omega r$
 - (B) $G = \omega^2 r^2$
 - (C) $G = \omega r^2$
 - (D) $G = \omega^2 r$
- 14 What is the tube angle in near vertical rotors ?
- (A) 10° to 15°
 - (B) 7° to 10°
 - (C) 0° to 10°
 - (D) 14° to 40°
- 15 What are the criteria for successful isopycnic separation ?
- (A) Any gradient length is acceptable.
 - (B) The run time must be sufficient for the particles to band at their isopycnic point.
 - (C) All
 - (D) Density of the sample particle must fall within the limits of the gradient densities.
- 16 What is the applied centrifugal field at a point equivalent to 5 cm from the centre rotation and an angular velocity of 3000 rad s^{-1} ?
- (A) $4.5 \times 10^7 \text{ m s}^{-2}$
 - (B) $4.5 \times 10^7 \text{ cm min}^{-2}$
 - (C) $1.5 \times 10^7 \text{ cm s}^{-2}$
 - (D) $4.5 \times 10^7 \text{ cm s}^{-2}$

- 17 Microscopy is refers to the use of _____ or _____ to magnify objects.
(A) Light, electron
(B) Neutron, light
(C) Proton, light
(D) Electron, proton
- 18 General principles involved in light and electron microscopy include
(A) Magnification of an image
(B) Resolving power and the instrument
(C) All
(D) Wavelength of radiation
- 19 Contrast refers to_____
(A) Differences in intensity between incident light and transmitted light.
(B) Differences in intensity between two objects, incident light and transmitted light
(C) None of given
(D) Differences in intensity between two objects
- 20 Which of the following is not the component of microscope ?
(A) Specimen stage
(B) Objective lens system
(C) Detector
(D) Condenser system
- 21 When it can be said that light rays are in phase ?
(A) When their crests and troughs are not aligned
(B) When all rays are parallel
(C) When rays are perpendicular
(D) When their crests and troughs are aligned
- 22 What is used to decrease the numerical aperture ?
(A) Dark field stop
(B) Aperture stop
(C) Phase ring
(D) Iris diaphragm
- 23 One curie = ?
(A) 3.7×10^{10} disintegrations per second
(B) 2.22×10^{12} disintegrations per second
(C) 3.7×10^{15} disintegrations per minute
(D) 3.7×10^{10} disintegrations per minute

- 24 Which of the following has least penetrating power ?
(A) Beta particles
(B) Gamma rays
(C) X-rays
(D) Alpha particles
- 25 What can be used to stop alpha particles ?
(A) 1 cm thick aluminium sheet
(B) 25 mm thick lead plate
(C) Thick concrete block
(D) 0.01 mm thick aluminium foil
- 26 What are gamma rays ?
(A) Fast moving electron
(B) Fast moving Helium nucleus
(C) Fast moving proton
(D) Electromagnetic radiation with shorter wavelength
- 27 Choose the correct order of the ability to induce ionization in decreasing manner.
(A) $\beta > \gamma > \alpha$
(B) $\gamma > \beta > \alpha$
(C) All
(D) $\alpha > \beta > \gamma$
- 28 Which gas is generally filled in Geiger counter ?
(A) Oxygen
(B) Water Vapour
(C) Helium
(D) Nitrogen
- 29 Autoradiography can be used _____.
(A) To know the relative distribution of ^{32}P
(B) To demonstrate localization of ^3H -labelled thymidine
(C) All given
(D) To determine the sites of ^{45}Ca concentrations in growing bone tissue
- 30 In which fields radioisotopes are used ?
(A) In various research laboratories
(B) In industrial microbiology
(C) In all given fields
(D) In clinical field

- 31 What is the velocity of electromagnetic radiation in space ?
- (A) $3 \times 10^8 \text{ cms}^{-1}$
 - (B) $3 \times 10^8 \text{ m minutes}^{-1}$
 - (C) $3 \times 10^8 \text{ cm minutes}^{-1}$
 - (D) $3 \times 10^8 \text{ ms}^{-1}$
- 32 What do you meant by frequency ?
- (A) The distance between two successive wave crests
 - (B) The number of waves per unit length
 - (C) None of these
 - (D) The number of waves that passing through a given point per second
- 33 Which of the following factors can influence the absorption of light ?
- (A) The amount of absorbing substance in the light path
 - (B) Path-length
 - (C) All
 - (D) The basic ability of the absorbing substance to absorb
- 34 Which of the following is the correct statement for Lambert's law ?
- (A) Light absorbed by a solution is directly proportional to the length of the light path
 - (B) Light absorbed by a solution is inversely proportional to the length of the light path
 - (C) Light absorbed is inversely proportional to concentration of absorbing solute in the solution
 - (D) Light absorbed is directly proportional to concentration of absorbing solute in the solution
- 35 Which of the following solution will obey Beer's Law ?
- (A) 1.0 M CuSO_4 solution
 - (B) 0.001 M CuSO_4 solution
 - (C) All
 - (D) 0.1 M CuSO_4 solution

- 36 Which of the following law cannot be verified by colorimeter ?
- (A) Combined law
 - (B) Lambert's law
 - (C) None of these
 - (D) Beer's law
- 37 Which of the following is correct ?
- (A) $v = \frac{c}{\lambda}$
 - (B) $\lambda = v \times c$
 - (C) $\lambda = hc$
 - (D) $v = \frac{\lambda}{c}$
- 38 Which of following is correct with respect to Beer's Law ?
- (A) Applicable to highly concentrated solution
 - (B) Not applicable for diluted solution
 - (C) Not applicable to coloured solution
 - (D) Not applicable for highly concentrated solution
- 39 When the source of radiation extends into the ultraviolet region of the spectrum; the instrument is known as _____.
- (A) Colorimeter
 - (B) Chromatograph
 - (C) Galvanometer
 - (D) Spectrophotometer
- 40 Which of the following can be used as the source of spectrophotometer ?
- (A) Deuterium lamp
 - (B) Hydrogen discharge lamp
 - (C) Tungsten halogen lamp
 - (D) All

- 41 Why is it generally preferable to use absorbance as a measure of absorption rather than % transmittance ?
 (A) Because %T is dependent on the power of the incident radiation
 (B) Because absorbance is proportional to the concentration of the analyte, whereas %T is not
 (C) None
 (D) Because %T cannot be measured as accurately as absorbance
- 42 Cuvettes are made from _____ glass.
 (A) Borosilicate glass (B) Safety glass
 (C) Toughened glass (D) Simple glass
- 43 The effect of interference of CO₂ and H₂O on absorbance can be removed much more by using _____.
 (A) Colorimeter
 (B) Single beam spectrophotometer
 (C) Conductometer
 (D) Double beam spectrophotometer
- 44 Which of the following are the characteristics of fluorescence ?
 (A) Emission occurs within a nanosecond
 (B) Fluorescence depends upon nature of solvent
 (C) All
 (D) Fluorescence is instantaneous
- 45 Re-emission of excess radiation in fluorescence takes place within _____.
 (A) 10⁻⁸ to 10⁻⁴ second absorption
 (B) 10⁻⁴ to 20 seconds of absorption
 (C) 1 to 2 minutes
 (D) 10⁻⁴ to 10⁻⁸ second of absorption
- 46 Identify correct statement from following :
 (A) The life time of phosphorescence is much shorter than fluorescence
 (B) The excited states are stable
 (C) Fluorescence is delayed luminescence
 (D) The life time of phosphorescence is much longer than fluorescence
- 47 In triplet state of excitation spin of electrons _____.
 (A) Opposite (B) Cannot be said
 (C) Paired (D) Parallel
- 48 What will be the net spin in singlet excited state ?
 (A) Nonzero (B) Negative
 (C) Zero (D) None of these
- 49 What is the value of absorbance for the 0.25 molar solution having path length 0.01 m ? (Molar absorptivity = 0.4)
 (A) 0.2 (B) 0.15
 (C) 0.22 (D) 0.1
- 50 One given coloured solution has absorbance 0.06, molar extinction coefficient of 6×10^3 at 270 nm and it is taken in 0.1 cm cell. What will be the concentration of this solution ?
 (A) 1.0×10^{-2} M (B) 1.0×10^{-3} M
 (C) 1.0×10^{-4} M (D) 1.0×10^{-1} M