BRAINWARE UNIVERSITY

Term End Examination 2021 - 22
Programme – Bachelor of Science (Honours) in Biotechnology
Course Name – Bio Analytical Tools
Course Code - BBTC601
(Semester VI)

Time allotted : 1 Hrs.15 Min. **Full Marks : 60**

[The figure in the margin indicates full marks.]

Group-A

(Multiple Choice Type Question) 1 x 60=60

Choose the correct alternative from the following :

(1) Which part of the compound microscope helps in gathering and focusing light rays on the specimen to be viewed?

a) Eyepiece lens
b) Objective lens
c) Condenser lens
d) Magnifying lens

(2) What is the minimum distance for the eye to focus any object?

a) 11 cm
b) 25 cm
c) 45cm
d) 15 cm

(3) Resolving power of a microscope is a function of _____

a) Wavelength of light used
b) Numerical aperture of lens system
c) Refractive index
d) Wavelength of light used and numerical aperture of lens system

(4) The greatest resolution in light microscopy can be obtained with __

a) Longest wavelength of visible light used
b) An objective with minimum numerical aperture
c) Shortest wavelength of visible light used
d) Shortest wavelength of visible light used and an objective with the maximum numerical aperture

(5) Oil immersion objective lens has an NA value of

a) 0.65
b) 0.85
c) 1.33
d) 1

(6) In fluorescence microscopy, which of the following performs the function of removing all light except the blue light?

a) Exciter filter
b) Barrier filter
c) Dichroic mirror
d) Mercury arc lamp

(7) Total Magnification is obtained by

a) Magnifying power of the objective lens
b) Magnifying power of eyepiece
c) Magnifying power of condenser lens
d) Magnifying power of both the objective lens and eyepiece

(8) In light microscopy, which of the following is used as fixatives prior to staining technique?

a) Osmic acid
b) Glutaraldehyde
c) Heat
d) Osmic acid, glutaraldehyde, heat

(9) In Phase contrast microscopy, the rate at which light enters through objects is

a) Constant
b) Inversely proportional to their refractive indices
c) Directly proportional to their refractive indices
d) Exponentially related to their refractive indices

(10) Which part of the light microscope controls the intensity of light entering the viewing area?

a) Coarse adjustment screw
b) Fine adjustment screw
c) Diaphragm
d) Condenser lens

(11) Which of the following is used in electron microscope?

a) electron beams
b) magnetic fields
c) light waves
d) electron beams and magnetic fields

(12) Electron Microscope can give a magnification up to

a) 400,000X
b) 100,000X
c) 15000X
d) 100X

(13) Which of the following are true for electron microscopy?

a) specimen should be thin and dry
b) image is obtained on a phosphorescent screen
c) electron beam must pass through evacuated chamber
d) specimen should be thin and dry, image is obtained on a phosphorescent screen and electron beam must pass through evacuated chamber

(14) Degree of scattering in transmission electron microscope is a function of

a) wavelength of electron beam used
b) number of atoms that lie in the electron path
c) number and mass of atoms that lie in the electron path
d) mass of atoms that lie in the electron path

(15) Negative Staining is used for examining

a) virus particles
b) protein molecules
c) bacterial flagella
d) virus particles, protein molecules and bacterial flagella

(16) Which among the following helps us in getting a three-dimensional picture of the specimen?

a) Transmission Electron Microscope
b) Scanning Electron Microscope
c) Compound Microscope
d) Simple Microscope

(17) The secondary electrons radiated back in scanning microscope is collected by?

a) specimen
b) anode
c) vacuum chamber
d) cathode

(18) On what factors do the intensity of secondary electrons depend upon?

a) shape of the irradiated object
b) chemical composition of the irradiated object
c) number of electrons ejected
d) size and chemical composition of the irradiated object, number of electrons ejected and on the number of electrons reabsorbed by surrounding

(19) Where do we obtain the magnified image of the specimen in SEM?

a) cathode ray tube
b) phosphorescent screen
c) anode
d) scanning generator

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

a) Negative-Staining
b) Shadow Casting
c) Ultrathin Sectioning
d) Negative-Staining, Shadow Casting, Ultrathin Sectioning, Freeze-Etching

(21) pH meters can be considered as voltage sources with which of the following internal resistances?

a) Very low resistance
b) Moderate resistance
c) Very high resistance
d) No resistance

(22) The electrodes used in pH measurement have which of the following internal resistances?

a) Very low resistance
b) Moderate resistance
c) Very high resistance
d) No resistance

(23) Which of the following is not a failure in pH meters?

a) Defective electrodes
b) Defective input circuitry
c) Defective electronic circuitry
d) Defective calibration

(24) Which of the following is the simplest of pH meters?

a) Null-detector type pH meter
b) Direct reading type pH meter
c) Digital pH meter
d) Modern pH meter

(25) Which of the following is not the characteristic of null-detector type pH meter?

a) It can be battery operated
b) It has less accuracy
c) It is easy to maintain
d) Its electronic circuits are simple

(26) Which of the following is not a type of Spectroscopy?

a) Gamma ray
b) X ray
c) Nuclear magnetic resonance
d) Sound

(27) Which of the following is false about the wavelengths of electromagnetic radiation?

a) Radiation with short wavelengths have high energies
b) Energy does not depend on wavelength
c) Radiation with long wavelengths have low energies
d) Energy depends on wavelength

(28) 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
d) Centrifugal force is 500 times same as that of

gravitational force earthly gravitational force

(29) Which of the following is not a type of centrifugation?

a) Hydro cyclone b) Tubular centrifuge

c) Microfiltration d) Disk stack separator

(30) Which of the following centrifugation is used to separate certain organelles from whole cell?

a) Rate-zonal centrifugation b) Normal centrifugation

c) Differential centrifugation d) Isopycnic centrifugation

(31) Which of the following is used as a media for density gradient?

a) Agarose b) Ficoll

c) Luria broth d) Propylene glycol

(32) From the following which is the type of filtration centrifuge?

a) Screen/scroll centrifuge b) Tubular centrifuge

c) Decanter centrifuge d) Separator centrifuge

(33) What is rate-zonal centrifugation?

a) Based on separation of particles by mass b) Based on separation of particles by density

c) Based on separation of particles on solubility d) Based on separation of particles on size

(34) Which of the following is used in PAGE to prevent the mixing of the sample with running buffer?

a) ethanol b) methanol

c) chloroform d) sucrose

(35) When was the technique of two-dimensional gel electrophoresis developed?

a) 1955 b) 1965

c) 1975 d) 1985

(36) Which of the following amino acid absorbs the light of 280 nm?

a) tyrosine b) cysteine

c) leucine d) valine

(37) In mass-spectrometry, proteins are separated base on their

a) i-value b) c-value

c) m/z ratio d) e/m ratio

(38) Which is the main ingredient in the sample preparation of mass spectrometry?

a) papain b) pepsin

c) vinculin d) trypsin

(39) MALDI is a technique of _____

a) ionization b) fractionation

c) proteolysis d) cell counting

(40) Which of the following techniques delivers the amino-acid sequence of a peptide?

a) Tandem MS b) GC-MS

c) LC-MS d) SDS-PAGE

(41) In X-ray diffraction, the protein crystals are bombarded with ____

a) UV rays b) X rays

c) Gamma rays d) Infrared rays

(42) Which was the first protein to have its structure determined using X-ray crystallography?

a) keratin
b) myoglobin
c) immunoglobulin
d) globulin

(43) Synchrotrons generate _

a) Peptides
b) X rays
c) Infrared rays
d) Carcinogens

(44) Purification of a protein can be measured as an increase in ___

a) temperature
b) pH value
c) specific activity
d) polarity

(45) Total nitrogen measurement can be used to measure _____

a) pH drift
b) total protein
c) specific enzyme
d) viscosity

(46) In which of the following type of paper, chromatography does the mobile phase move horizontally over a circular sheet of paper?

a) Ascending paper chromatography
b) Descending paper chromatography
c) Radial paper chromatography
d) Ascending – descending chromatography

(47) Liquid chromatography can be performed in which of the following ways?

a) Only in columns
b) Only on plane surfaces
c) Either in columns or on plane surfaces
d) Neither in columns nor on plane surfaces

(48) In Gas-liquid phase chromatography, the stationary phase is composed of _____ and the mobile phase is made of _____

a) Solid, liquid
b) Liquid, liquid
c) Liquid, gas
d) Solid, gas

(49) Which of the following types of chromatography involves the process, where the mobile phase moves through the stationary phase by the influence of gravity or capillary action?

a) Column Chromatography
b) High Pressure Liquid Chromatography
c) Gas Chromatography
d) Planar Chromatography

(50) Which force is responsible for the separation of the components in descending paper chromatography?

a) Partition
b) Adsorption
c) Gravity
d) All of the above

(51) Which is not development technique of paper Chromatography ?

a) Two dimensional
b) Ascending
c) Descending
d) HPLC

(52) Rf value is

a) Distance travelled by the compound at it's point of maximum.
b) Distance travelled by the standard.
c) Solvent travelled
d) None of the above

(53) In ion-exchange chromatography

a) proteins are separated on the basis of their net charge
b) Seperated on the basis of mass
c) proteins are separated on the basis of their shape
d) either (b) or (c)

(54) Which technique separates charged particles using electric field?

a) Hydrolysis
b) Electrophoresis
c) Protein synthesis
d) Protein denaturing

(55) Gel-filtration chromatography separates on the basis of

a) size and shape using porous beads packed in a column
b) size using porous beads packed in a column
c) shape using porous beads packed in a column
d) none of these

(56) The Affinity chromatography deals with the

a) specific binding of a protein constituents for another molecule
b) protein - protein interaction
c) protein - carbohydrate interaction
d) None of these

(57) A purified protein sample contains 10 µg of protein and has an enzyme activity of 1 m mole of ATP synthesized/sec (1 unit). What is the specific activity of the final purified sample?

a) 1,000 units/mg
b) 10,000 units/mg.
c) 100,000 units/mg
d) 1,000,000 units/mg

(58) The best way to determine the location of protein in the purification scheme is to measure the

a) rate of ATP synthesis
b) UV absorption
c) changes in the refractive index
d) mass spectroscopy of the protein

(59) In antibiotic manufacturing processes, the fermentation time ranges from

a) 2-3 weeks
b) 1-2 weeks
c) 4-5 weeks
d) 2-4 weeks

(60) The conventional filtration involves the separation of large particles generally

a) dp > 5µm
b) dp > 10µm
c) dp > 15µm
d) dp > 20µm