



# BRAINWARE UNIVERSITY

**Term End Examination 2021 - 22**

**Programme – Bachelor of Pharmacy**

**Course Name – Advanced Instrumentation Techniques**

**Course Code - BP811ET**

**( Semester VIII )**

**Time allotted : 1 Hrs.30 Min.**

**Full Marks : 75**

[The figure in the margin indicates full marks.]

## Group-A

(Multiple Choice Type Question)

1 x 75=75

*Choose the correct alternative from the following :*

- (1) NMR Spectroscopy is used for determining structure in which of the following materials?
 

a) Radioactive materials	b) Insoluble chemical compounds
c) Liquid	d) Gases.
- (2) During the limit of stray light which chemical is used?
 

a) Calcium Chloride	b) Sodium Chloride
c) Magnesium Chloride	d) Potassium Chloride
- (3) In Ultraviolet spectrophotometry Lambert law deals with?
 

a) pH of the solution	b) Concentration of solution
c) Appearance of solvent	d) Thickness of cuvette
- (4) During the control of absorbance which chemical is used?
 

a) Calcium dichromate	b) Sodium dichromate
c) Magnesium dichromate	d) Potassium dichromate
- (5) Calibration of High performance liquid chromatography by which chemical?
 

a) Methanol	b) Acetonitrile
c) Theophylline	d) Caffeine
- (6) During Calibration robustness of High performance liquid chromatography which parameter is not used?
 

a) System to system variation	b) Flow rate variation
c) Person to person variation	d) Linearity variation
- (7) During electronic balance calibration the 1st step we check is?

- a) Verified balance weights  
b) last calibration data  
c) last validation data  
d) Bubble balance
- (8) At the lowest level the sample start to detection its concentration called as?  
a) Accuracy  
b) limit of quantification  
c) Precision  
d) limit of detection
- (9) Baseline correction is the primary step after which we run our sample in particular instrument?  
a) Nuclear Magnetic Resonance  
b) Fluorimetry  
c) X-ray diffraction  
d) High Performance Liquid Chromatography
- (10) Ultraviolet spectrophotometer Cuvette are made up of?  
a) steel and carbon  
b) plastic and aluminum  
c) thermocol and fiber  
d) quartz and glass
- (11) Which inert gas is used for gas chromatography?  
a) nitrogen  
b) argon  
c) helium  
d) all the above
- (12) In IR spectrophotometry the solid sample run with the help of?  
a) magnesium bromide  
b) sodium chloride  
c) silver iodide  
d) potassium bromide
- (13) Which is mainly required for solid phase extraction?  
a) filter paper  
b) micron filter  
c) holmium filter  
d) cartridge filter
- (14) liquid liquid extraction occurs with the help of?  
a) glass funnel  
b) buchner funnel  
c) manifold  
d) separating funnel
- (15) NMR is the study of absorption of \_\_\_\_\_ by nuclei in a magnetic field?  
a) Radio frequency radiation  
b) Radioactive radiation  
c) IR radiation  
d) Microwaves.
- (16) NMR Spectrometer provides \_\_\_\_\_ and \_\_\_\_\_ method of determining structure in soluble chemical compounds.  
a) Accurate, destructive  
b) Accurate, non-destructive.  
c) Inaccurate, Destructive  
d) Inaccurate, Nondestructive.
- (17) NMR spectroscopy indicates the chemical nature of the \_\_\_\_\_ and spatial positions of  
a) Nuclei,neighbouring nuclei  
b) Electrons, Protons.  
c) Neutrons, electrons.  
d) Nuclei, electrons.
- (18) In NMR spectroscopy, which of the following must irradiate the spinning nuclei in strong magnetic field ?  
a) Perpendicular and stronger field  
b) Parallel and stronger field  
c) Perpendicular and weaker field  
d) Parallel and weaker field.
- (19) When energy is absorbed by the sample, the absorption can be observed as a change in signal developed by which of the following components?  
a) Radiofrequency detector  
b) Amplifier  
c) GM counter  
d) Photodetector

- (20) The amount of energy available in radio frequency radiation is sufficient for which of the following?
- a) Excite an atom
  - b) Vibrate an atom
  - c) Affect the nuclear spin of an atom
  - d) Vibrate a molecule
- (21) The amount of energy available in radio frequency radiation is sufficient for which of the following?
- a) Excite an atom
  - b) Vibrate an atom
  - c) Affect the nuclear spin of an atom
  - d) Vibrate a molecule
- (22) If the number of proton or neutrons is even the spin of the nucleus will be which of the following?
- a) Integral Spin
  - b) Zero spin.
  - c) Half integral spin
  - d) Positive spin.
- (23) Signal splitting in NMR arises from
- a) Spin-spin coupling
  - b) Shielding effect
  - c) Deshielding effect
  - d) Spin-Spin decoupling
- (24) In proton NMR spectroscopy, hydrogen bonding results in,
- a) Shielding effect
  - b) Peak splitting
  - c) Deshielding effect
  - d) All of these
- (25) Which of the following environmental effect is influenced by magnetic field strength
- a) Spin Splitting
  - b) electronegativity
  - c) Shielding
  - d) Chemical shift
- (26) Compound A has greater shielding constant than compound B. Which of them will have more chemical shift?
- a) Compound B
  - b) Compound A
  - c) Both will have equal chemical shift
  - d) Chemical shift has no relation with shielding constants.
- (27) Which of the following statement is false for mass spectroscopy?
- a) Mass spectroscopy is used to identify unknown compounds within a sample, and to elucidate the structure and chemical properties of different molecules
  - b) Particle are characterized by their mass to charge ratios ( $m/z$ ) and relative abundances
  - c) This technique basically studies the effect of ionizing energy on molecules
  - d) This technique can be used on all state of matter
- (28) What are the main criteria on which mass spectrometer used for?
- a) Composition in sample
  - b) Relative mass of atoms
  - c) Concentration of elements in the sample
  - d) Properties of sample
- (29) Which species of the following is used to bombard with the sample for which mass spectroscopy has been performed?
- a) Alpha particles
  - b) Neutrons
  - c) Electrons
  - d) Protons
- (30) Separation of ions in mass spectrometer take place on the basis of which of the following?
- a) Mass
  - b) Charge
  - c) Molecular weight
  - d) Mass to charge ratio

- (31) What is the use of Mass spectroscopy
- a) Determination of molecular weight                      b) Elucidating the chemical structures of molecules
- c) Both a & b                                                              d) None of the above
- (32) The highest  $m/z$  peak in mass spectrum is called as
- a) Parent Peak                                                              b) Fragment peak
- c) Isotopic peak                                                              d) Base peak
- (33) The procedure for mass spectroscopy starts with which of the following processes?
- a) The sample is bombarded by electron beam                      b) The ions are separated by passing them into electric and magnetic field
- c) The sample is converted into gaseous state                      d) The ions are detected
- (34) Which of the following ions pass through the slit and reach the collecting plate?
- a) Negative ions of all masses                                              b) Positive ions of all masses
- c) Negative ions of specific mass                                              d) Positive ions of specific mass
- (35) Thermal analysis is defined as \_\_\_\_\_
- a) Measurement of concentration of materials as a function of temperature                      b) Measurement of solubility of materials as a function of temperature
- c) Measurement of physical properties as a function of temperature                      d) Measurement of line positions of crystals as a function of temperature
- (36) What are the two main techniques for thermal analysis?
- a) FTG AND DGG                                                              b) MSP AND FCT
- c) TGA AND DTA                                                              d) TSA AND DGF
- (37) Which of the following statements given below is false?
- a) TGA, DTA and DSC are measured using same instrument                      b) TGA and DTA can be carried out simultaneously.
- c) TGA, DTA and DSC are measured using different instruments.                      d) TMA is a recent name of Dilatometry
- (38) The  $T_i$  and  $T_f$  temperature depends on which of the following factor?
- a) Cooling rate                                                              b) Mechanical property of the material
- c) Thermal expansion coefficient                                              d) Atmosphere above the sample
- (39) The  $T_i$  and  $T_f$  temperature depends on which of the following factor?
- a) Cooling rate                                                              b) Mechanical property of the material
- c) Thermal expansion coefficient                                              d) Atmosphere above the sample
- (40) What is the temperature required for the decomposition of  $\text{CaCO}_3$  in degree Celsius?
- a) 200                                                                              b) 500
- c) 900                                                                              d) 1200
- (41) On studying the reversible process during DTA, which of the following is observed on both heating and cooling?
- a) Esterification                                                              b) Hysteresis
- c) Methylation                                                                      d) Carboxylation
- (42) In the application of DTA and DSC which of the following parameters is measured for the glasses?

- a) Concentration of the glass  
b) Solubility of the glass  
c) Cooling temperature  
d) Transition temperature
- (43) For the decomposition of the anhydrous calcium oxalate, which of the following steps occur?  
a) Intermediates, transition state, product  
b) Intermediates, anhydrous oxalate, calcium oxysalts  
c) Intermediates, aqueous hydrates, calcium hydroxides  
d) Intermediates, anhydrous calcium oxalate, calcium carbonate
- (44) Which of the following parameters can be used, using the DSC and DTA cells?  
a) Catalytic properties of enzyme  
b) Elasticity of crystals  
c) Enthalpy of substances  
d) Line positions of phases
- (45) Collimators used in XRD are made up of  
a) Thin quartz tube  
b) Thin Glass plates  
c) Thin metal plates  
d) All of these
- (46) As the applied voltage increases, the minimum wavelength of X-radiation from a metal  
a) Increases  
b) Decreases  
c) Remains same  
d) Variable with metal
- (47) As the atomic number increases, the frequency of X-radiation from a target material  
a) Increases  
b) Decreases  
c) Remains same  
d) Variable with metal
- (48) The detector in X-ray diffraction that detects the visible radiation is  
a) Proportional Counter  
b) Silicon diode  
c) Golay detector  
d) Scintillation counter
- (49) Which of the following detector in X-ray diffraction has more resolution  
a) Proportional Counter  
b) Silicon diode  
c) Goniometer  
d) Scintillation counter
- (50) Which of the following techniques can be considered as finger spectra  
a) NMR  
b) X-ray diffraction  
c) Mass  
d) Fluorimetry
- (51) The useful range of x-ray region for Pharmaceutical analysis is  
a) 0.01 to 0.05nm  
b) 0.05-0.07nm  
c) 0.01-0.1nm  
d) 0.2-0.3nm
- (52) In x-ray Powder camera technique, the detector used is  
a) Photographic film  
b) PMT  
c) Bolometer  
d) Thermistor
- (53) One of the widely used target material for generation of X-ray spectral line is  
a) Zinc  
b) Molybdenum  
c) Xenon  
d) Manganese
- (54) X-ray diffractometers provide \_\_\_\_\_ information about the compounds present in a solid sample.  
a) Quantitative  
b) Qualitative  
c) Quantitative and qualitative  
d) Either quantitative or qualitative

- (55) Separating funnel separates out?  
 a) solid and liquid  
 b) semisolid and liquids  
 c) liquid and gases  
 d) low and high density liquids
- (56) Limitation of Radio-Immuno Assay?  
 a) disposal of radioactive waste  
 b) Short shelf-life of radiolabeled compounds  
 c) all the these  
 d) none of these
- (57) which principle involve in Radio-Immuno Assay?  
 a) An immune reaction  
 b) A competitive binding  
 c) Measurement of radio emission  
 d) all the above
- (58) Which sentence is not true about RIA?  
 a) Centrifugation rpm is 1200-2500.  
 b) very sensitivity it can detected 0.001 µg/ml  
 c) Radiolabels in RIA are tritium and iodine.  
 d) very sensitivity it can detected 0.01 µg/ml
- (59) Solvent extraction is basically known as?  
 a) gas liquid extraction  
 b) solid solid extraction  
 c) liquid liquid extraction  
 d) none of these
- (60) Who developed Radio-immuno assay?  
 a) Chals & Wastone  
 b) Lewis & Bronstand  
 c) Watson and Crick  
 d) Berson & Yalow
- (61) The ions are passed into the high vacuum analyser through which of the following?  
 a) Orifice  
 b) Nozzle  
 c) Nebulizer  
 d) Venturi tube
- (62) Which of the following is the disadvantage of gas chromatography?  
 a) It is not a good method  
 b) It cannot be used for qualitative analysis  
 c) It cannot be used for the separation of volatile components  
 d) It does not provide direct identification
- (63) GC- MS has been developed for which of the following systems?  
 a) Packed column  
 b) Open tubular column  
 c) Capillary column  
 d) Porous layer column
- (64) The system for measurement of ion intensity in GS-MS system consists of which of the following?  
 a) Band pass amplifier  
 b) Narrow band amplifier  
 c) Wide band amplifier  
 d) Low pass amplifier
- (65) The ions focussed and de-clustered through which of the following regions?  
 a) Dry helium  
 b) Wet Oxygen  
 c) Dry nitrogen  
 d) Wet chlorine
- (66) Gas burden from conventional flow rates is which of the following?  
 a) 1ml/min of water produces 1.2l/mm of gas  
 b) 1ml/ min of water produces 2.4l/mm of gas  
 c) 2ml/min of water produces 3.2l/mm of gas  
 d) 1ml/min of water produces 4.2l/mm of gas
- (67) The GC trace obtained after experiment is called a  
 a) Chromatograph  
 b) Chromatophore  
 c) Chromatogram  
 d) Graph
- (68) Resolution proportional to the

- a) A number of theoretical Plates in a column      b) Square root of the number of theoretical plates in a column
- c) Square of the number of theoretical plates in a column      d) Cube root of the number of theoretical plates in column
- (69) In LC-MS technology the individual components in a mixture are first separated followed by ionization and separation of the ions on the basis of their \_\_\_\_\_ ratio?
- a) electron/charge      b) mol/charge
- c) ion/charge      d) mass/charge
- (70) HPTLC working principle?
- a) absorption      b) redistribution
- c) distribution      d) adsorption
- (71) In flame photometer principle based on the measurement of the emitted light intensity when a \_\_\_\_\_ introduced into the flame?
- a) oil      b) paper
- c) wood      d) metal
- (72) In UV Spectrophotometer the monochromator is used for?
- a) To pass more than one wavelength at a time      b) To pass no wavelength
- c) To pass all light      d) To pass single wavelength
- (73) In the UV Spectrophotometer before running any sample we do?
- a) base-line correction      b) priming
- c) picking      d) auto-zero
- (74) During calibration of electronic balance the weights we put?
- a) from lower to higher      b) randomly taken
- c) overweight      d) from higher to lower
- (75) In Mull method of IR Spectroscopy sample are mixed with?
- a) paraffin oil      b) silicon oil
- c) vegetable oil      d) nujol