BRAINWARE UNIVERSITY

Term End Examination 2019 – 20

Programme – Master of Science in Microbiology

Course Name – Research Methodology & Techniques

Course Code – MMB103

(Semester – 1)

Time allotted: 2 Hours 30 Minutes **Full Marks: 60**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Question) 20 x 1 = 20

1. Answer any *twenty* from the following

(i) Molar absorbtivity is the measure of the

a. amount of light absorbed per unit length
b. amount of light absorbed per unit concentration
c. amount of light reflected and absorbed per unit concentration
d. None of the above

(ii) Which of the following options is not an IR vibrational mode?

a. Stretching
b. Scissoring
c. Rocking
d. Rolling

(iii) A simple harmonic oscillator may absorb energy

a. at anytime
b. when the frequencies match exactly
c. when the amplitudes are the same
d. at no time

(iv) Vibrational spectroscopy is

a. a large mass on a weak spring
b. a flashlight through a prism and shake it
c. a class of spectroscopic techniques which analyzes molecular motions
d. an Infrared spectroscopy

(v) In new spectrometers each ion hits ais

a. Detector
b. ionizer
c. collector
d. graph

(vi) The most common type of gel used for DNA separation is

a. Agar
b. Polyacrylamide
c. Agarose
d. All of the above

(vii) Which is the technique suited for the separation of large DNA fragments

a. AGE
b. PAGE
c. PFGE
d. SDS-PAGE

(viii) What is the role of SDS in SDS-PAGE?

a. protein denaturing and imparting net negative charge
b. imparting overall negative charge to the protein
c. imparting equal mass to all proteins
d. protein unfolding and imparting net positive charge

(ix) Chromatography is a physical method that is used to separate and analyse

a. Simple mixtures
b. Complex mixtures
c. Viscous mixtures
d. Metals

(x) In which type of chromatography, the stationary phase held in a narrow tube and the mobile phase is forced through it under pressure?

a. Column chromatography
b. Planar chromatography
c. Liquid chromatography
d. Gas chromatography

(xi) Gas 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

(xii) A numerical value used as a summary measure for a sample, such as sample mean, is known as a

a. population parameter
b. sample parameter
c. sample statistic
d. population mean

(xiii) Which of the following types of chromatography involves the process, where 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

(xiv) The mean of a sample is

a. always equal to the mean of the population
b. always smaller than the mean of the population
c. computed by summing the data values and dividing the sum by (n - 1)
d. computed by summing all the data values and dividing the sum by the number of items

(xv) Since the mode is the most frequently occurring data value, it

a. can never be larger than the mean
b. is always larger than the median
c. is always larger than the mean
d. None of the above answers is correct

(xvi) In diffusion, the particles flow from a region of _____ to region of _____

a. High, low
b. Low , high
c. High , medium
d. Low, medium

(xvii) DNA extraction from plant tissues are difficult due to

a. presence of large amount of DNA
b. presence of large amount of RNA along with DNA
c. both a and b
d. presence of secondary metabolites and polysaccharides

(xviii) Which of the following reagents are used for precipitating DNA

a. isopropanol
b. ethanol
c. both a and b
d. none of these

(xix) What is the maximum wavelength that Tryptophan and tyrosine absorb?

a. 260nm
b. 257nm
c. 280nm
d. 230nm

(xx) In cell extracts with high protein content, before phenol treatment

a. chloroform is used to break polypeptides to small fragments
b. SDS is used to break polypeptides to small fragments
c. Proteases are used to break polypeptides to small fragments
d. d)all of these

(xxi) After centrifugation, sublimate _____

a. dissolves completely
b. remain suspended in a liquid
c. settles at bottom
d. depends upon pH of sublimatee

(xxii) Differential centrifugation relies on the differences in _____ of biological particles of different _____

a. Size, density
b. Sedimentation rate, sizes and density
c. Size, structure
d. Mass, size

(xxiii) What is the name of the machine that spins in order to separate out components making up a mixture?

a. Centrifuge
b. Blood plasma
c. Centrifugation
d. Centrifugation tube

(xxiv) Which would be best to separate a protein that binds strongly to its substrate?

a. Gel filtration
b. Cation exchange
c. Affinity chromatography
d. Anion exchange

(xxv) Thin layer chromatography is

a. partition chromatography
b. electrical mobility of ionic species
c. adsorption chromatography
d. none of the above

Group – B

(Short Answer Type Questions) 4 x 5 = 20

Answer any *four* from the following

2. Write a short note on cation exchange Chromatography with diagram 5

3. How to purify protein with -GST tag? Briefly highlight the steps involved 5

4. How would dialysis be used to remove salts after proteins precipitation? 5

5. What is the working principle of the UV VIS spectrophotometer? 5

6. What are the applications of gel electrophoresis? Why is SDS PAGE used for proteins? 3+2

7. How do you prepare a manuscript? 5

Group – C

(Long Answer Type Questions) 2 x 10 = 20

Answer any *two* from the following

8. Describe the different methods of cell disruption? 10

9. (a) What is the basic principle of Ion exchange chromatography? 3
   (b) Describe different methods of Ion exchange chromatography. 7

10. (a) What is diffusion in biology? What is facilitated diffusion? 2 +2
    (b) What is the difference between passive and facilitated diffusion? Is facilitated diffusion active or passive? 4 +2

11. Describe different methods of HPLC 10
