



## BRAINWARE UNIVERSITY

### Term End Examination 2019 – 20

Programme – Master of Science in Biotechnology

Course Name – Analytical Technique

Course Code – MBT104

(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) Which of the following is not the function of buffer?
 

a. Prevent cell lysis	b. Chelating the metals
c. Prevent protease action	d. Prevent lipase action
  - (ii) Which of the following techniques uses sound waves for cell disruption?
 

a. Homogenization	b. Sonication
c. Blender	d. Mortar and Pestle
  - (iii) Which of the following is not the product of cell disruption?
 

a. DNA	b. RNA
c. Protein	d. Water
  - (iv) Which of the following is a physical method of cell disruption?
 

a. Using detergents	b. Using solvents
c. Using French press	d. Using osmotic shock
  - (v) Which of the following options is not a stage of product recovery?
 

a. Removal of solids	b. Isolation of organism
c. Purification and concentration	d. Cell disruption
  - (vi) Who employed the term 'Chromatography'?
 

a. Tsvet	b. Archer
c. Richard	d. Erika

- (vii) Which of the following options is used to pack columns in adsorption chromatography?
- |                        |                    |
|------------------------|--------------------|
| a. Carbon              | b. Silica gel      |
| c. Potassium hydroxide | d. Aluminium oxide |
- (viii) Which of the following stationary phases is not used in gel filtration chromatography?
- |             |                |
|-------------|----------------|
| a. Sephadex | b. Sephacryl   |
| c. Bio-Gel  | d. Resin beads |
- (ix) Immunoaffinity chromatography is used for the purification of \_\_\_\_\_
- |                 |                  |
|-----------------|------------------|
| a. Lipoproteins | b. Interferons   |
| c. Antibodies   | d. Carbohydrates |
- (x) The HPLC uses the application of \_\_\_\_\_
- |                     |                    |
|---------------------|--------------------|
| a. High temperature | b. Low temperature |
| c. High pressure    | d. Low pressure    |
- (xi) Mobile phase can be
- |                  |                    |
|------------------|--------------------|
| a. gas or liquid | b. solid or liquid |
| c. only solid    | d. only gas        |
- (xii) Which of the following is used in electron microscope?
- |                   |                                       |
|-------------------|---------------------------------------|
| a. electron beams | b. magnetic fields                    |
| c. light waves    | d. electron beams and magnetic fields |
- (xiii) In  $500 \times g$ , 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 |
- (xiv) 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 |
- (xv) At what speed do you centrifuge blood?
- |                  |                  |
|------------------|------------------|
| a. 2200-2500 RPM | b. 3000-3200 RPM |
| c. 1000-1500 RPM | d. 4000 RPM      |
- (xvi) Gram staining technique was developed by
- |                          |                        |
|--------------------------|------------------------|
| a. Alexander Fleming     | b. Hans Christian Gram |
| c. Joseph Christian Gram | d. Robert Gram         |
- (xvii) The compound microscope consists of two lenses known as -----
- |                         |                           |
|-------------------------|---------------------------|
| a. Objective & Eyepiece | b. Objective & Condenser. |
| c. Eyepiece & Occular   | d. None.                  |

- (xviii) Which of the following cannot be used as adsorbent in Column adsorption chromatography?
- |                      |                           |
|----------------------|---------------------------|
| a. Magnesium oxide   | b. Silica gel             |
| c. Activated alumina | d. Potassium permanganate |
- (xix) In Column chromatography, the stationary phase is made of \_\_\_\_\_ and the mobile phase is made of \_\_\_\_\_
- |                  |                   |
|------------------|-------------------|
| a. Solid, liquid | b. Liquid, liquid |
| c. Liquid, gas   | d. Solid, gas     |
- (xx) In Thin layer chromatography, the stationary phase is made of \_\_\_\_\_ and the mobile phase is made of \_\_\_\_\_
- |                  |                   |
|------------------|-------------------|
| a. Solid, liquid | b. Liquid, liquid |
| c. Liquid, gas   | d. Solid, gas     |
- (xxi) 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 |
- (xxii) The charged molecules can be separated by \_\_\_\_\_
- |                                   |  |
|-----------------------------------|--|
| a. Ascending paper chromatography | b. Descending paper chromatography     |
| c. Radial paper chromatography    | d. Ascending-Descending chromatography |
- (xxiii) Which of the following is used to separate molecules based on affinity?
- |                              |                                |
|------------------------------|--------------------------------|
| a. Column chromatography     | b. Ion exchange chromatography |
| c. Thin layer chromatography | d. Affinity chromatography     |
- (xxiv) 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 |
- (xxv) Pattern on paper in chromatography is called
- |                  |                 |
|------------------|-----------------|
| a. chroming      | b. chroma       |
| c. chromatograph | d. chromatogram |

**Group – B**

(Short Answer Type Questions)

4 x 5 = 20

Answer any *four* from the following

- |    |   |   |
|----|---|---|
| 2. | Write short notes on buffer solution.   | 5 |
| 3. | Write the Basics principle Of Chromatographic Process?                        | 5 |
| 4. | What are the main differences between High Performance Liquid Chromatography? | 5 |
| 5. | Explain the terms Rf Value and their importance.                              | 5 |
| 6. | Briefly explain about the different methods of cell disruption.               | 5 |
| 7. | Briefly explain the different types of non-mechanical enzymatic methods.      | 5 |

**Group – C**

(Long Answer Type Questions)

2 x 10 = 20

Answer any *two* from the following

- |     |   |         |
|-----|---|---------|
| 8.  | (a) Write short notes on French press.  | 5       |
|     | (b) What do you mean by acidic buffer and how can you prepared in laboratory.           | 5       |
| 9.  | (a) Define Buffer.  | 2       |
|     | (b) Write the Basic principle Of Chromatographic Process?                               | 4       |
|     | (c) What is buffer solution? Write the characteristics of buffer solution.              | 4       |
| 10. | (a) What is cell disruption? Enlists the importance of cell disruption.                 | 2+5     |
|     | (b) What do you mean By The Term Rf Value?  | 3       |
| 11. | (a) Explain the concepts of cell disruption? Enlists the importance of cell disruption. | 2.5+2.5 |
|     | (b) Write the Basic principle Of Chromatographic Process?                               | 5       |

-----