



BRAINWARE UNIVERSITY

Term End Examination 2019 – 20

Programme – Master of Science in Microbiology

Course Name – General Microbiology & Microbial Physiology

Course Code – MMB101

(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) Example of selective media

| | |
|-------------------------|-------------------|
| a. Eosin methylene blue | b. Macconkey agar |
| c. Mannitol salt agar | d. All of these |
 - (ii) Which of the following options is not an indirect method for the measurement of cell mass?

| | |
|-------------------------|--------------------|
| a. Nutrient composition | b. Cell dry weight |
| c. Viscosity | d. Heat evolution. |
 - (iii) Which of the following options is/are the fluorochrome?

| | |
|----------------|--------------------|
| a. Rose Bengal | b. Acridine orange |
| c. Both. | d. None. |
 - (iv) In SEM, the secondary electrons are converted into-----

| | |
|-----------------------|----------------------|
| a. Tertiary electrons | b. Electric current. |
| c. Electric charge. | d. None. |
 - (v) What is the minimum distance for the eye to focus any object?

| | |
|----------|----------|
| a. 11 cm | b. 25 cm |
| c. 32 cm | d. 42 cm |

- (vi) 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 |
- (vii) Kind of electron microscope which is used to study internal structure of cells is
- | | |
|---------------------------------|-------------------------------------|
| a. scanning electron microscope | b. transmission electron microscope |
| c. light microscope | d. compound microscope |
- (viii) Which of the following options is used in electron microscope?
- | | |
|-------------------|---------------------------------------|
| a. electron beams | b. magnetic fields |
| c. light waves | d. electron beams and magnetic fields |
- (ix) 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 |
- (x) Which among the following options 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 |
- (xi) Which of the followings is used to visualize live cells?
- | | |
|------------------------------|-----------------|
| a. SEM | b. TEM |
| c. Phase contrast microscope | d. All of these |
- (xii) The compound microscope consists of two lenses known as-----
- | | |
|-------------------------|---------------------------|
| a. Objective & Eyepiece | b. Objective & Condenser. |
| c. Eyepiece & Occular | d. None. |
- (xiii) Which of the microscopes below is usually good for use on unstained specimens
- | | |
|-------------------|--------------------------|
| a. phase-contrast | b. fluorescence |
| c. bright-field | d. transmission electron |
- (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) Total Magnification is obtained by _____
- Magnifying power of the objective lens
 - Magnifying power of eyepiece
 - Magnifying power of condenser lens
 - Magnifying power of both the objective lens and eyepiece
- (xvi) The phase contrast microscope was developed by
- Hans Janssen.
 - Zacharias.
 - Fredrick Zernike
 - Lippershey.
- (xvii) Which of the following method can be used to determine the number of bacteria quantitatively?
- Streak-plate
 - Spread-plate
 - Pour plate
 - Pour-plate and spread plate
- (xviii) All of the followings are components of compound microscope except
- stage clip
 - fine adjustment
 - electron gun
 - binocular eye piece
- (xix) Which of the following is a function of cryoprotective agents?
- for long-term preservation of cultures
 - prevents cell damage due to ice crystal formation
 - prevents formation of ice
 - to trap the liquid nitrogen
- (xx) Nichrome loop wire is used in which of the following techniques?
- Pour-plate
 - Streak-plate
 - Spread-plate
 - Roll-tube technique
- (xxi) The two bacterial genera that produce endospores are _____
- Bacillus, Clostridium
 - Escherichia coli, Bacillus
 - Actinobacter, Bacillus
 - Staphylococcus, Streptococcus
- (xxii) Example of selective media
- Eosin methylene blue
 - Macconkey agar
 - Mannitol salt agar
 - All of these
- (xxiii) In SEM, the secondary electrons are converted into-----
- Tertiary electrons
 - Electric current.
 - Electric charge.
 - None of these.
- (xxiv) A major difference between the SEM and the TEM is that the SEM _____.
- can resolve objects smaller than 20 nanometer
 - requires less of a vacuum system than the TEM

- c. can create three dimensional images d. does not require the use of any metal coating of the specimen
- (xxv) The portion of the growth curve where a rapid growth of bacteria is observed is known as
- a. Lag phase b. Logarithmic phase
- c. Stationary phase d. Decline phase

Group – B

(Short Answer Type Questions)

4 x 5 = 20

Answer any *four* from the following

2. Differentiate between eukaryotic and prokaryotic cell. 5
3. What is microbial growth? 5
4. Define medium. Explain selective and differential media with example. 5
5. Explain the terms magnification and resolution. 5
6. Why the Bacterial Endospores are Extremely Resistant to Temperature, Radiations and Chemicals? 5
7. Write short notes on bright field microscopy. 5

Group – C

(Long Answer Type Questions)

2 x 10 = 20

Answer any *two* from the following

8. (a) Describe the different types of preservation methods for microbial cultures. 5
- (b) Explain the concepts of magnification, resolution and numerical aperture. 5
9. (a) Define medium. 2
- (b) Difference between sterilization and disinfection. 4
- (c) Explain carbon, nitrogen and energy requirements of Bacteria. 4
10. (a) Write a note on preparation of medium. 3
- (b) Briefly explain about the resolving power of a light microscope. 3
- (c) Explain the use of hot air oven and autoclave to control microorganisms. 4
11. (a) Compare bright field and dark field microscope. Add a note on image formation in compound microscope. 2.5+2.5
- (b) What is growth curve? Explain the different stages of microbial growth. 2+3
