R7691

Sub. Code
530101

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

First Semester

Microbiology

GENERAL MICROBIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. What did Edward Jenner discover

   (a) Streptomycin (b) Vaccination for cholera

   (c) Penicillin (d) Vaccination for smallpox.

2. Who proposed the three-domain system of classification?

   (a) R.H. Whittaker (b) Carl Woese

   (c) Haeckel (d) John ray

3. The motile bacteria are able to move by

   (a) Fimbriae (b) Flagella

   (c) Cilia (d) Pili

4. Name the bacteria lacking cell wall

   (a) *Bacillus* (b) *Streptomyces*

   (c) *Mycoplasmas* (d) *Bdellovibrios*

5. Cyanobacterial pigments are located in

(a) Chloroplast (b) Phycobilisomes

(c) Thylakoids (d) None of the above

6. Which is not the characteristic of phylum protozoa

(a) Pseudopodia

(b) Binary fission

(c) Contractile vacuole

(d) Cell membrane as body covering

7. *Agaricus* belongs to

(a) Ascomycetes (b) Basidiomycetes

(c) Deuteromycetes (d) Zygomycetes

8. Bacteriophages that can enter into stable, long-term relationships with their hosts are called

(a) Lytic phages (b) Defective phages

(c) Virulent phages (d) Lysogenic phages

9. Which media used to grow the anaerobic bacteria?

(a) Thioglycollate medium

(b) Robertson cooked meat medium

(c) Both (a) and (b)

(d) None of the above

10. What is the example for enriched media for *Streptococcus*?

(a) Blood agar

(b) Mac Conkey agar

(c) Alkaline peptone water

(d) All the above

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Illustrate the contributions of Louis Pasteur.

Or

(b) Interpret the genetic characteristics used in Microbial taxonomy.

12. (a) Summarize the composition and functions of bacterial capsule.

Or

(b) Discuss the structure and general characteristics *Streptomyces* sp.

13. (a) Outline the characteristics and classification of algae.

Or

(b) Describe the general characteristics and classification of Protozoa.

14. (a) Illustrate the morphology and classification of viruses.

Or

(b) Describe the lysogenic cycle of bacteriophage.

15. (a) How do you culture the anaerobic bacteria?

Or

(b) Illustrate the cultivation methods of viruses.

Part C

$(5 \times 8 = 40)$

Answer any **five** questions.

16. Outline the Bergey's manual of systemic bacterial classification.

17. Illustrate the structure and functions of cell membrane in eubacteria and archaebacteria.

18. Discuss the reserve food materials in bacteria.

19. Explain the structure and reproduction of green algae.

20. Discuss the structure of life cycle of *Aspergillus*.

21. Describe the morphology and life cycle of T4 bacteriophage.

22. Outline the types of bacterial media used to culture the bacteria.

23. Explain the bacterial culture preservation methods.

———————

R7692	Sub. Code
	530102

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

First Semester

Microbiology

MICROBIAL BIOCHEMISTRY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

All questions carry equal marks.

1. Glyoxylate cycle takes place in

   (a) Mitochondria (b) Peroxisomes

   (c) Golgi complex (d) Cytoplasm

2. Lactose is formed from

   (a) Glucose and Glucose

   (b) Glucose and Sucrose

   (c) Galactose and Starch

   (d) Glucose and Galactose

3. Side group of optically inactive glycine is bonded to

   (a) Hydrogen (b) Hydroxyl

   (c) Carboxyl (d) Alkyl

4. Dihedral angle ϕ in Ramachandran plot represents

(a) N – C α (b) $C\alpha - C\alpha$

(c) $C\alpha$-C (d) N – N

5. Which enzyme is precursor in Purine Salvage Pathway?

(a) PRPP amidotransferase

(b) PRPP amyl isomerase

(c) PRPP hydroxyl transferase

(d) PRPP amid isomerase

6. Cerebrosides are categorised into

(a) Cholesterols (b) Sphingolipids

(c) Amino lipids (d) Fatty acids

7. In allosteric mode of enzyme inhibition Vmax is

(a) Increases (b) Decreases

(c) Unaffected (d) Cannot be predicted

8. Antibodies with autocatalytic activity is called as

(a) Co- factors (b) Allosteric enzymes

(c) Ribozymes (d) Abzymes

9. Metal ion present in chlorophyll ring structure is

(a) Ni^{+} (b) Fe^{3+}

(c) Mg^{2+} (d) Zn^{2+}

10. A flatoxin is produced by

(a) *Mucor* (b) *Rhizopus*

(c) *Salmonella* (d) *Aspergillus*

Part B ($5 \times 5 = 25$)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write in detail about classifications of Carbohydrates.

Or

(b) Write short note on peptidoglycan structure in microbial cell wall.

12. (a) Briefly explain about chemical and physical properties of amino acids.

Or

(b) Explain about various forms of secondary structure of proteins.

13. (a) Write a short note on cholesterol synthesis in *E.coli*.

Or

(b) Give an account on α and β oxidation of fatty acids.

14. (a) Write short note on factors effecting enzyme activity.

Or

(b) Briefly explain vitamins and their role in metabolism.

15. (a) Explain about antibiotics and mode of action with example.

Or

(b) Write a short note on botulism toxin and its toxicity effects.

Part C $(5 \times 8 = 40)$

Answer any **five** questions.

16. Elaborate on the mechanism of converting non-carbohydrates into glucose.

17. Write essay on various structure of protein, with Haemoglobin as example.

18. Elaborate on mechanism of *de novo* synthesis of pyrimidines in a microbial cell.

19. Compare various theories of enzyme action.

20. Discuss about

(a) Lock and key model

(b) Induced fit theory.

21. Write an essay on "Bacterial toxins and the need of production by bacterial cells".

22. Describe phospholipids and bacterial cell wall with detailed structures.

23. Elaborate on the topic β-lactam antibiotics, with example.

———————

R7693	Sub. Code
	530103

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

First Semester

Microbiology

MICROBIAL PHYSIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. Generation time of Escherichia coli is

   (a) 20 minutes (b) 20 hours

   (c) 20 days (d) 200 hours

2. Absorptive heterotrophic nutrition is exhibited by

   (a) Fungi (b) algae

   (c) pteridophytes (d) bryophytes

3. Which of the following acts as a chemical reductant in bacterial photosynthesis?

   (a) oxygen

   (b) water

   (c) hydrogen sulphide

   (d) ammonia

4. Respiration and photosynthesis are the central process of

   (a) Carbon cycle (b) Nitrogen cycle

   (c) Sulfur cycle (d) Phosphorus cycle

5. Cyclic photophosphorylation results in the formation of

(a) ATP (b) NADPH

(c) ATP and NADPH (d) ATP, NADPH and O_2

6. Which enzyme quantification is performed using acetylene reduction assay?

(a) Nitrogenase (b) Carboxylase

(c) Keratinase (d) Lipase

7. Name the symbiotic nitrogen fixing bacteria?

(a) *Azotobacter* (b) *Azospirillum*

(c) *Rhizobium* (d) *Pseudomonas*

8. Bacteria displaying optimal growth at a pressure of more than 40 MPa?

(a) Halophiles (b) Psychrophiles

(c) Mesophiles (d) Piezophiles

9. Hetrolactic acid bacteria produce

(a) Lactic acid only

(b) Lactic acid + H_2O + CO_2

(c) Lactic acid + CO_2

(d) Lactic acid + alchohol + CO_2

10. The process of coupled sugar uptake with sugar phosphorylation, involving substrate modification

(a) group translocation

(b) simple diffusion

(c) facilitated diffusion

(d) All of the above

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Differentiate the batch and continuous culture.

Or

(b) Determine the bacterial growth kinetics and generation time.

12. (a) Summarize the characteristics of green and purple sulfur bacteria.

Or

(b) Discuss the cyclic and non cyclic photophosphorylation.

13. (a) Outline the structure and functions of nitrogenase.

Or

(b) Describe the physiology of nitrogen fixation in free living bacteria.

14. (a) Illustrate the osmotic stress and osmoregulation in bacteria.

Or

(b) Describe the mixed acid fermentation pathway.

15. (a) Describe the principles of first thermodynamics law.

Or

(b) Illustrate the chemisosmotic theory of mitchell.

Part C

$(5 \times 8 = 40)$

Answer any **five** questions.

16. Explain the factors affecting the bacterial growth.

17. Elaborate the structure and importance of microbial photosynthetic pigments.

18. Discuss the reverse citric acid cycle.

19. Explain the Nitrogen cycle.

20. Compare the nitrogen fixation in symbiotic and free living bacteria.

21. Describe the anaerobic respiration.

22. Outline the electron transport chain.

23. Explain the active transport mechanisms in bacteria.

———————

R7694	Sub. Code
	530501

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

First Semester

Microbiology

BIOLOGICAL TECHNIQUES

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. 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

2. 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

3. Beer's law states that the intensity of light decreases with respect to ————————.

(a) Concentration (b) Distance

(c) Composition (d) Volume

4. The main advantage of fluorescence over UV-Vis spectroscopy is

(a) Its sensitivity

(b) Its compatibility with separation techniques

(c) Its compatibility with most analytes

(d) None of the above

5. Which of the following is used as a media for density gradient?

(a) Agarose (b) Ficoll

(c) Luria broth (d) Propylene glycol

6. Amino acids detected by spraying the plate with ninhydrin solution is an example of ————————

(a) Column chromatography

(b) Thin layer chromatography

(c) Paper chromatography

(d) Liquid chromatography

7. Which technique is also known as colour writing?

(a) NMR (b) Mass spectroscopy

(c) Chromatography (d) All of the above

8. In a native PAGE, proteins are separated on the basis of

(a) net negative charge

(b) net charge and size

(c) net positive charges size

(d) net positive charge

9. Research ethics committees are

(a) Committees of researchers

(b) Convened by organisations to monitor and police the ethical standards of research projects carried out under their auspices, under their name

(c) Committees of researchers concerned with ethics

(d) Concerned only with research conducted in the medical sciences

10. What protects the intellectual property created by inventors?

(a) Copyright (b) Geographical indications

(c) Patent (d) Trademarks

Part B ($5 \times 5 = 25$)

Answer **all** questions, choosing either (a) or (b).

11. (a) Illustrate the principle and uses of phase contrast Microscope.

Or

(b) Write the principle and applications of Scanning Electron Microscopy.

12. (a) Illustrate the working principle and application of ICP- Mass spectroscopy.

Or

(b) Outline the working mechanism of Electron Spin Resonance spectroscopy.

13. (a) How to determine the molecular weight of biomolecules by centrifugation?

Or

(b) What are the factors affecting the sedimentation rate?

14. (a) Write the requirement and protocol of Iron exchange chromatography.

Or

(b) Summarize the principle of Capillary electrophoresis.

15. (a) How do get the ethical committee approval for use of genetically engineered microorganisms?

Or

(b) Illustrate the national and international agencies involved in IPR and patenting.

Part C $(5 \times 8 = 40)$

Answer any **five** questions.

16. Elaborate the Principle and uses of Confocal laser scanning microscopy.

17. Write the principle, procedure and applications of Transmission Electron Microscopy.

18. Discuss basic principle and applications of NMR Spectroscopy.

19. Explain the principle of density gradient centrifugation with neat sketch.

20. How do you separate the proteins by SDS-PAGE?

21. Describe the principle and applications of HP-TLC.

22. Outline the requirement, protocol for agarose gel electrophoresis.

23. Explain the ethical guideline for the research involving experimental animals.

———————