P.B.S. College, Chiplun
Semester II MKT Examination March, 2025
Class :- FY Biotechnology Subject :- Cell biology & Microbiology-2 Paper no- II
Date :- 10-03-2025 Time :- 2.00pm to 4.30pm Max-Marks :- 75

Time – 2 $^{1/2}$ **hours** **Marks–75**

Note: Attempt **all** questions.
All questions carry **equal** marks.
For **Q.2.Q.3 and Q.4** attempt A and B **OR** C and D
Draw **neat labeled diagrams** wherever necessary.

Q.1 A) Answer the following. (Any fifteen) **(15)**

1. State the function of SER.
2. The 70 s ribosome present in prokaryotes. (State true or false)
3. Give an function of flagella.
4. The F1 particle present in the ----------.
5. What is dictyosomes?
6. State the function of Capsule.
7. The peptidoglycan percentage is high in Gram negative bacteria.(State true or false)
8. Define Growth.
9. Write the role of mineral oil in preservation of pure culture.
10. The rate of increase in bacteria at any particular time is proportional to the number or mass of bacteria present at that time. (State true or false)
11. The synthesis of protoplasm carried out in ----------phase.
12. Define generation time.
13. What is freeze drying.
14. Enlist the cell counting type.
15. Influenza is the enveloped virus .(State true or false)
16. Write example of animal viruses.
17. What is plaque?
18. T4 phage is example of bacteriophage.(State true or false)
19. Define latent period.
20. Write the two examples of virus having complex structure.

Q.2	A)	Describe the ultrastructure of prokaryotic cell.	(08)
Q.2	B)	Explain the endoplasmic reticulum and golgi bodies in eukaryotes.	(07)
		OR	
Q.2	C)	Elaborate the process of endospore formation in bacteria.	(08)
Q.2	D)	Describe the structure of mitochondrion in eukaryotes.	(07)
Q.3	A)	Elaborate the growth curve of bacteria.	(08)
Q.3	B)	Compare between synchronous and continuous culture.	(07)
		OR	
Q.3	C)	Enumerate the bacteria by direct method.	(08)
Q.3	D)	Explain the lyophilization method for preservation of bacteria.	(07)
Q.4	A)	Give an account on transcription process in bacteriophage.	(08)
Q.4	B)	Explain the penetration and uncoating process of animal viruses.	(07)
		OR	
Q.4	C)	Explain the general morphology of virus.	(08)
Q.4	D)	Describe the one step growth curve of virus.	(07)
Q.5		**Write short notes on any three of the following.**	(15)

a. Flagella movement in bacteria

b. Eukaryotic ribosome

c. Turbidimetric method

d. Adsorption process in bacteriophage

e. Icosahedral Symmetry

D.B.J College, Chiplun
Semester II ATKT Examination March 2025
Class:- F) Biotechnology Subject:- Basic chemistry II Paper no:- III
Date:- 11-03-2025 Time:- 2.00pm to 4.30pm Max Marks:- 75

Time – 2 $^{1/2}$ hours **Marks–75**

Note: Attempt **all** questions.
For **Q.2, Q.3 and Q.4** attempt A and B **OR** C and D
Use of **log tables** and **non-programmable** calculator is **allowed**.

Q.1 **Answer the following questions. (Any fifteen)** **(15)**

1. What is meant by entropy?
2. Define open system.
3. Give an example of extensive property.
4. Write SI unit of heat.
5. State first law of thermodynamics.
6. What is exothermic reaction?
7. Define isothermal process.
8. Give an example of first order reaction.
9. What is chemical kinetics?
10. Write the equation for rate constant (K) for second order reaction.
11. Define molecularity of reaction.
12. What is the half time?
13. Define rate of reaction.
14. Give formula to calculate half time for first order reaction.
15. Define reduction.
16. What is oxidation number?
17. Define deelectronation.
18. Give an example of oxidising agent.
19. Define elimination reaction.
20. Balance the following redox reaction.
    $SnO2 + C \longrightarrow Sn + CO$

Q.2 A) Define enthalpy. Obtain the expression for it. **(08)**

Q.2 B) Derive expression for entropy changes for an ideal gas undergoing isochoric process. **(07)**

OR

Q.2 C) Discuss Carnot cycle in detail. **(08)**

Q.2 D) Calculate q, w and ΔU for 2.5 mole of ideal gas at 2 atm expands isothermally to 2.5 times of its initial volume against external pressure of 1atm at 300K. (R= 8.314 J/mol K) **(07)**

Q.3 A) Derive the integrated rate equation for first order reaction. **(08)**

Q.3 B) Discuss the kinetic characteristics of second order reaction. **(07)**

OR

Q.3 C) Explain in detail the hydrolysis of methyl acetate. **(08)**

Q.3 D) A second order reaction with a=b is 60% complete in 2 hrs. Find the time taken for 40% of reaction to be completed. **(07)**

Q.4 A) Elaborate steps involved in the ion electron method to balance the reaction. **(08)**

Q.4 B) Balance the following equation for redox reaction in acidic medium by oxidation number method. **(07)**

$MnO_4^-{}_{(aq)} + SO_3^{2-}{}_{(aq)} \longrightarrow MnO_4^{2-}{}_{(aq)} + SO_4^{2-}{}_{(aq)}$

OR

Q.4 C) Calculate the oxidation number of- **(08)**

1) P in Na_3PO_4 2) C in CH_2Cl_2 3) Cr in $(Cr_2O_7)^{2-}$ 4) Sn in $(SnO_3)^{-2}$

Q.4 D) Explain the addition reaction with suitable example. **(07)**

Q.5 **Write short notes on any three of the following.** **(15)**

a. Limitations of thermodynamics
b. Concept of work in thermodynamics
c. Equi-fraction method of determining order of reaction
d. Decomposition of H_2O_2
e. Redox reaction

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Time – 2 $^{1/2}$ hours Marks–75

Note: Attempt **all** questions.
All questions carry **equal** marks.
Under **Q.2, Q.3 and Q.4** attempt A and B **OR** C and D
Draw **neat labeled diagrams** wherever necessary.

Q.1 **A) Attempt any fifteen of the following.** (15)

1. Amino acids are organic compounds containing amino and ---------- functional groups
2. Draw the structure of lysine.
3. Define enzyme specificity.
4. Each turn of α helix contains 4.6 amino acids (state true/false).
5. Define zwitterion.
6. In bovine chymotrypsinogen 245 amino acids are present (state true/false).
7. Define lipoprotein.
8. Define extracellular enzyme.
9. Give an example of oxidoreductase enzyme.
10. Define Km.
11. What is holoenzyme?
12. The most frequently found amino acid in active site of enzyme is serine (state true/ false).
13. Define allosteric site.
14. In competitive inhibition Km value increases whereas Vmax is--------.
15. What is the formula of Rf value?
16. Give the full form of TLC.
17. Enlist types of electrophoresis.
18. Polymerization of acrylamide is an example of free radical catalysis (State true/false).
19. Give an application of filtration.
20. ---------- dye is used for the visualization of proteins in electrophoretic gel.

Q.2 **A)** Define secondary structure of protein. Diagramatically represent the α helical structure of protein. **(08)**

Q.2 **B)** Describe derived proteins with suitable examples. **(07)**

OR

Q.2 **C)** Define quaternary structure. Diagramatically represent the structure of human insulin. **(08)**

Q.2 **D)** Enlist the physical properties of amino acids. **(07)**

Q.3 **A)** Describe the mechanism of enzyme action. **(08)**

Q.3 **B)** Define isoenzymes. Describe the isoenzymes of lactate dehydrogenase. **(07)**

OR

Q.3 C) Describe the effect of substrate concentration on enzyme activity. (08)

Q.3 D) What is enzyme inhibition? Describe the non competitive inhibition of enzyme. (07)

Q.4 A) Describe the principle and working of column chromatography. (08)

Q.4 B) Elaborate on distillation process. (07)

OR

Q.4 C) Elaborate on agarose gel electrophoresis. (08)

Q.4 D) Explain the principle and working of paper chromatography. (07)

Q.5 **Write short notes on any three of the following.** (15)

a. Titration curve of amino acids.
b. Anti parallel β sheets.
c. Zymogens.
d. Irreversible inhibition of enzyme.
e. Application of colorimeter.

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Time – 2 1/2 hours Marks–75

Note: Attempt **all** questions.
All questions carry **equal** marks.
Under **Q.2, Q.3 and Q.4** attempt A and B **OR** C and D
Draw **neat labeled diagrams** wherever necessary.

Q.1 **A) Attempt any fifteen of the following.** (15)

1. Define photosystem.
2. What is the function of antenna molecules?
3. Define dark reaction.
4. What is the full form of Rubisco?
5. Stroma is the site of light reaction (state true/false).
6. Define parthenocarpy.
7. Ethylene stimulates the fruit ripening process (state true/false).
8. The pH of blood is ----------.
9. Give the role of thrombin.
10. What is the normal value of albumin in blood?
11. Define homeostasis.
12. Tubular secretion makes the urine acidic by adding free hydrogen ions (state true/false).
13. Define expiration.
14. The normal range of platelet count is----------.
15. What is inflammation?
16. Define herd immunity.
17. Thymus is the site of T cell maturation (state true/false).
18. What is the full form of APC?
19. Antigen binding fragment of antibody is known as Fab fragment (state true/false).
20. ----------antibody mediate the immediate hypersensitivity reactions

Q.2 **A)** Describe non cyclic photophosphorylation. **(08)**

Q.2 **B)** What is carbon fixation reaction? Describe the stages of carbon fixation reaction. **(07)**

OR

Q.2 **C)** Describe C_4 pathway. **(08)**

Q.2 **D)** Define secondary metabolites. Describe the applications of secondary metabolites. **(07)**

Q.3 **A)** Describe the composition of plasma. **(08)**

Q.3 **B)** Define blood coagulation. Describe the theories of blood coagulation. **(07)**

OR

Q.3 **C)** Diagramatically represent the structure and functions of nephron. **(08)**

Q.3 D) Describe the types of excretory products. (07)

Q.4 A) Define immunogenecity. Enumerate the factors that influence immunogenecity. (08)

Q.4 B) Describe the mechanism of cell mediated immunity. (07)

OR

Q.4 C) Diagramatically represent the structure of IgA antibody. (08)

Q.4 D) Describe antibody mediated effector functions (07)

Q.5 **Write short notes on any three of the following.** (15)

a. Gibberellin.
b. CAM pathway.
c. Properties of blood.
d. Principle of gases exchange in respiratory system.
e. Opsonization.

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Time-2 $^{1/2}$hours Marks-75

Note: Attempt **all** questions.
All questions carry **equal** marks.
For **Q.2.Q.3 and Q.4** attempt A and B **OR** C and D
Draw **neat labeled diagrams** wherever necessary.

Q.1 **A)** **Answer the following. (Any fifteen)** (15)

1. Define the term Internet.
2. What is the role of Telnet?
3. What is office button in MS-Excel?
4. _____key is used to open new blank document in word processor.
5. What is computer network?
6. Give the role of header in word processing.
7. Define variable.
8. Range is based on two extreme observations of a series. (State true or false)
9. Give an example of wide area network.
10. Enlist the types of statistics.
11. What are the main formatting options in presentation?
12. Enlist components of computer network.
13. Give one advantage of range.
14. A pie chart is also known as circular chart. (State true or false)
15. Define the term Standard deviation.
16. Give the role of internet relay chat in email.
17. Enlist types of storage devices used for computer system.
18. Write full form of HTTP.
19. Define the term median.
20. Write full form of LAN.

Q.2 **A)** Give an account on types of operating system. (08)

Q.2 **B)** Elaborate on the mathematical function used in spread sheet program. (07)

OR

Q.2 **C)** Give an account on design and layout tools used in word processing. (08)

Q.2 **D)** Describe the process to start new presentation. (07)

Q.3 **A)** Discuss email architecture along with its components. (08)

Q.3 **B)** Give an account on gadgets used for computer networking. (07)

OR

Q.3 **C)** Explain DSL and ISDN as internet connections. (08)

Q.3 **D)** Describe general precautions taken from transmission of viruses in computer system. (07)

Q.4 A) Explain importance of statistics in biology. (08)

Q.4 B) Find the mode for following data: (07)

Height of plant	1-5	6-10	11-15	16-20	21-25
Number of plants	7	10	16	32	24

OR

Q.4 C) Give an account of measures of central tendency. (08)

Q.4 D) Find standard deviation of 68 students of the following data (07)

IQ	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of students	5	12	15	20	10	4	2

Q.5 **Write short notes on any three of the following.** (15)

a. Formatting documents
b. Advanced presentation graphics
c. Types of data.
d. Router.
e. Hybrid topology.

Time-$2^{1/2}$hours Marks–75

Note: Attempt **all** questions.
All questions carry **equal** marks.
For **Q.2.Q.3 and Q.4** attempt A and B **OR** C and D
Draw **neat labeled diagrams** wherever necessary.

Q.1 **A)** **Answer the following. (Any fifteen)** **(15)**

1. Define biodiversity.
2. The major constituent of biogas is _____.
3. What do you mean by producers?
4. What is desertification?
5. Define the term pollutant.
6. What is insitu conservation?
7. Give the use of geothermal energy.
8. What is meant by natural resources?
9. Mention some natural sources of air pollution.
10. Define species.
11. What do you mean by ecology?
12. Define the term recycling.
13. Name the most rich biodiversity zones of India.
14. Write a role of decomposers in ecosystem.
15. Define the term habitat.
16. Enlist biotic components of ecosystem.
17. The instrument through which magnitude of earthquake waves are recorded is called as _____.
18. Give application of solar energy.
19. Define the term acid rain
20. Write any two sources of hydrogenase enzymes.

Q.2 **A)** Elaborate on aquatic ecosystem. **(08)**

Q.2 **B)** Discuss the different types of energy flow models in ecosystem . **(07)**

OR

Q.2 **C)** Discuss salient features of hotspots of biodiversity. **(08)**

Q.2 **D)** Explain grassland ecosystem. **(07)**

Q.3 **A)** Explain the concept of sustainable development. **(08)**

Q.3 **B)** Elaborate on manmade causes of global warming. **(07)**

OR

Q.3 **C)** Give an account of nuclear accidents and nuclear holocaust. **(08)**

Q.3 **D)** Discuss the role of an individual in prevention of pollution **(07)**

Q.4 A) Explain renewable energy sources with examples. (08)

Q.4 B) Describe the process of ethanol production. (07)

OR

Q.4 C) Discuss the factors affecting biogas production. (08)

Q.4 D) Explain in detail non renewable energy sources and their environmental impact. (07)

Q.5 **Write short notes on any three of the following.** (15)

a. Food web.
b. Geothermal energy
c. Petrocrops
d. Noise pollution.
e. Sources of solid waste pollution.