

NORTH MAHARASHTRA UNIVERSITY, JALGAON

QUESTION BANK OF BIOTECHNOLOGY

PAPER-I (BASIC BIOLOGY)

CLASS : F.Y.B.Sc.

Unit-I : Introduction to Biotechnology

1 **Question for 12 Marks.**

Explain the historical development of Biotechnology in Genetic Engineering?

OR

Explain the historical Development of Biotechnology in agriculture?

OR

Explain the historical development of Biotechnology in fermentation?

OR

1. Explain the historical development in Biotechnology.
2. Describe the Whittaker's five kingdom system with two e.g. each.
3. Give the general structure and characters of viruses.
4. Define Biotechnology? And explain the scope of Biotechnology?
5. Explain Interdisciplinary Relevance of Biotechnology

Question for Six marks

1. Explain history and Scope of Biotechnology.
2. Differentiate between class Monera and Anemalia.

OR

Differentiate Between Class Plantae & Fungi.

Or

Differentiate between class Anemalia and Protista.

3. Explain general characters of Virus?

Question for Four marks.

1. Describe the class Monera with suitable e.g.
2. Describe the class Plantae with suitable e.g.
3. Describe the class Anemalia with suitable e.g.
4. Describe the class Protista with suitable e.g.
5. Describe the class Fungi with suitable e.g.

6. Give application of Biotechnology?
7. Explain characters of Viruses ?
8. Discuss agricultural and plant Biotechnology ?

Question for 2 marks.

1. Define Biotechnology.
2. Sketch and label the structure of virus.
3. Fermentation
4. Define/explain Genetic engineering.

Question for 1 Mark (Objectives)

1. Complete assembly of infectious particle is known as
 - a) virus
 - b) bacteria
 - c) virion
 - d) none of these
2. Term biotechnology was coined by
 - a) Karl Ereley
 - b) Robert Koach
 - c) Louis Pasture
 - d) Whittaker
3. Science deals with criminal investigation is
 - a) Criminal science
 - b) Forensic Science
 - c) Gene Science
 - d) none of these
4. is the best example of class Monera in Whittaker's five Kingdom system.
 - a) Virus
 - b) bacteria
 - c) Fungi
 - d) Plant
5. scientist give two Kingdom system before Whittaker's system of five Kingdom.
 - a) Steiner
 - b) Koach
 - c) Linnaeus
 - d) Louis

UNIT – II : CYTOLOGY

Question for 12 Marks.

1. Sketch and explain the structure of Eukaryotic cell.

OR

Sketch and explain the structure of Prokaryotic Cell.

2. Explain the detail structure of gram +ve and gram –ve cell wall.

3. Explain ultra structure of Bacteria.
4. Give the general account of plant cell with suitable diagram ?

OR

Give the general account of Animal cell with suitable diagram.

Question for 6 Months.

1. Explain structure of Peptidoglycon.
2. Describe the structure and functions of cell wall.
3. Describe the structure and functions of flagella.
4. Describe the structure and functions of Endospore.
5. Explain the chemical structure of ribosome.
6. Describe cytoskeleton.
7. Sketch and explain mitochondria.
8. Differentiate between Prokaryotic and Eukaryotic cell.

Question for 4 Marks.

1. Concept of cell ?
2. Structure and function of Capsule.
3. Give general account of Golgi apparatus.
4. Structure and function of Microtubules.
5. Structure and function of Chloroplast.
6. Functions of cell wall.
7. Describe types, Morphology and Functions of endoplasmic Reticulum.
8. Differentiate between gram +ve and gram –ve cell wall.
9. Explain peptidoglycan.
10. Explain Neucloid.
11. Draw label diagram of plant and animal cell.
12. Differentiate between plant and animal cell.
13. Give general account of 70s ribosome.
14. Explain lysomomes.

Question for 2 Marks.

1. Define cell.
2. Define Prokaryotic OR Eukaryotic cell

3. Define Endospore
4. Explain flagella
5. Explain Ribosome
6. Shapes of Bacteria

Questions for Multiple Choice

1. Cell wall less bacteria
 a) *Bacillus* b) *E-Coli*
 c) *Staphylococcus* d) *Mycoplasma*
2. Which of the following part is responsible for locomotion of bacteria.
 a) Flagella b) Pili
 c) cilia d) Fimbrae
3. Cell wall of bacteria is composed of
 a) Protein b) Lipids
 c) Carbohydrate d) Vitamin

UNIT-III : GROWTH

Question for 12 marks.

1. Explain the mathematical expressions of bacterial growth.
2. Explain the growth phases of bacteria.
3. Explain influence of physical factors on Microbial growth ?
4. Describe various mode of cell division.

Question for 6 Marks.

1. Explain growth curve ?
2. Describe effect of temperature on microbial growth.
3. Describe the effect of pH on microbial growth.
4. Give general account on Budding.
5. Explain Mitosis.

Question for 4 Marks.

1. Explain multiple fission.
2. Explain Binary fission.
3. Explain the physical factor oxygen concentration on Microbial growth?
4. Which pH level do bacteria prefers?
5. What is Cordial temperature.

Question for 2 Marks.

1. Define growth.
2. Mitosis
3. Generation time
4. Explain C period and D period.
5. Discuss water activity on micro organism.
6. Explain Mesophiles OR Psychrophiles OR Thermophiles.

Multiple Choice Questions

1. Generation of E-coli is
a) 0.20 b) 6
c) 1.7 d) 0.43
2. Which of the following organism is Mesophiles
a) E-coli b) Salmonella sp.
c) Pseudomonas d) Both 'a' and 'c'
3. Diauxic growth means
a) Increase in cell number due to cell division
b) Growth due to accumulation of extra cellular products.
c) An increase in cell mass
d) all above
4. Pure water has aW =.....
a) 1 b) 0.86
c) 0.75 d) 0.60
5. In Phase the cells are constantly reproducing and the cell number increases as a function of exponent.
a) Lag phase b) Log phase
c) Stationary phase d) Death phase

UNIT IV : NUTRITION

Questions for 12 marks.

1. Give brief account on essential media components of animal tissue culture.

OR

Give brief account on essential media components of plant tissue culture.

2. Define a balance diet and add a note on fuel value of carbohydrate.
3. Define media? And add a note on media ingredients and types of Media?
4. How organisms are classified on basis of Nutritional requirement?
5. Explain term micronutrients.

Questions for 6 Marks

1. Discuss the essential amino acid and add a note on fuel value of proteins.
2. Give note on balance diet.
3. Write a note on essential fatty acids.
4. Media components of plant tissue culture.
5. Write a note on growth factor.

Question for 4 marks.

1. Write a note on auxotrophy and prototrophy.
2. Explain basic food group.
3. Explain types of media.
4. Functions of essential fatty acids.

Questions for 2 marks.

1. Define Chemotrops
2. Autotrophs
3. Media
4. Solidifying agent
5. Nutrition

Multiple Choice Question

1. One of the following is the most important essential fatty acid in the diet.

a) Hinokic acid	b) Oleic acid
c) Arachidonic acid	d) Palmific acid
2. is a essential amino acid.

a) Alanine	b) Serine
c) Arginine	d) Aspartate

3. Agar Agar powder is obtained from
 - a) Marine BGA
 - b) Fungus
 - c) Red Algal
 - d) Agrobacterium
4. Which of the following is animal tissue culture media
 - a) MEM
 - b) RPMI 1640
 - c) CMRL 1066
 - d) All the above
5. None digestable carbohydrate is
 - a) Cellulose
 - b) Lactose
 - c) Starch
 - d) Sucrose
6. is considered as energy currency.
 - a) Glucose
 - b) Proteini
 - c) Food
 - d) ATP
7. Yeast extract is extracted from yeast like
 - a) *Sacchromyces cerevisae*
 - b) *Aspergillus niger*
 - c) *E-Coli*
 - d) *Pseudomonas*
8. Find out basic amino acids
 - a) Lysine
 - b) Arginine
 - c) Histidine
 - d) All of the above
9. Find out Essential amino acids
 - a) Lysine
 - b) Alonine
 - c) Serine
 - d) Proline

UNIT-V : CARBOHYDRATES

Question for 12 Marks.

1. Define carbohydrate? And Give brief account on its classification.
2. Give an account of the structural configuration of Monosaccharides, with special reference to glucose.
3. Discuss the structure of properties of two biochemically important disaccharides.
4. Define polysaccharides and describe the structure of starch.
5. Define carbohydrate and give its biological significance and add a note on Mutarotation.
6. Define Polysaccharides and explain its types.

Questions for 6 marks.

1. Explain structure and properties of lactose.
2. Explain structure and properties of sucrose.
3. Differentiate between reducing and non reducing sugar.
4. Give a brief account on functions of carbohydrates.
5. Explain biological significance of carbohydrate.

Question for 4 marks.

1. Write a note a mutarotations.
2. Write a note on D and L isomers.
3. Draw a structure of glucose and write its properties.
4. Write a note on reducing sugar.
5. Write a note glycogen OR heparin OR Cellulose.
6. Explain reactions (a) Felhing Test, (b) Esterfiction, (c) Hydrogenation.

Question for 2 marks.

1. The following polysaccharide is complete of β -glycosidic bonds.
 - a) Starch
 - b) Glycogen
 - c) Dextrine
 - d) Cellulose
2. Lactose is
 - a) Monosaccharide
 - b) Disaccharide
 - c) Polysaccharide
 - d) None of these
3. If D and L isomer are present in equal concentration it is known as
 - a) D-isomer
 - b) Racemic mixture
 - c) Epimer
 - d) L-isomer
4. Lactose is disaccharide which is combination of
 - a) Glucose + glucose
 - b) Galactose + glucose
 - c) Glucose + Fructose
 - d) Fructose + Maltose
5. A disaccharide sucrose is combination of.....
 - a) Glucose + fructose
 - b) Galactose + Glucose
 - c) Glucose+ Glucose
 - d) Fructose + Maltose
6. is a reducing sugar.
 - a) Maltose
 - b) Lactose
 - c) Sucrose
 - d) Both 'a' & 'c'

7. Glucose is
 - a) monosaccharide
 - b) disaccharide
 - c) Oligosaccharide
 - d) Polysaccharide
8. Lactose having glycosidic bond.
 - a) α -1, 4
 - b) β -1, 4
 - c) α -1, 6
 - d) α -1, 3
9. Cellulose is
 - a) homopolysaccharide
 - b) Heteropolysaccharides
 - c) oligosaccharide
 - d) None of the above
10. Is non reducing sugar.
 - a) Maltose
 - b) Sucrose
 - c) Glucose
 - d) both 'a' and 'b'
11. is storage material in animals
 - a) Glycogen
 - b) Starch
 - c) heparine
 - d) Cellulose
12. Glucose is called as
 - a) aldohexore
 - b) Ketohexore
 - c) Dextrose
 - d) Both 'a' and 'c'
13. Which of the following is non homopolysaccharides ?
 - a) Cellulose
 - b) Glycogen
 - c) Starch
 - d) Heparin
14. Which of the following does not show osazone test ?
 - a) Glucose
 - b) Cellobiore
 - c) Lactose
 - d) oxidation

UNIT-VI : LIPIDS

Question for 12 Marks

1. What is lipids ? Write an account of Classification of lipids with suitable example.
2. Explain biological significance, structure and properties of important lipids.
3. Discuss the saturated and unsaturated fatty acids of biological importance, along with their structure.

4. Give the physical and chemical properties of Lecithine.
5. Describe the structure of functions of phospholipids.

Question for 6 months.

1. What is lipid ? Explain in brief compound lipid.

OR

What is lipid ? Explain in brief simple lipid.

OR

What is lipid ? Explain in brief derived lipid ?

2. Explain saturated and non non-saturated lipid.

Question for 4 Marks.

1. Explain structure and properties of glycerol.
2. Explain structure and properties of cholesterol.
3. Give differentiate between saturated and non saturated fatty acids.

Question for 2 Marks.

- | | |
|-----------------------|--------------------|
| 1. Lipids | 2. Palmetic acid |
| 3. Glycerol | 4. Stearic acid |
| 5. Saturated lipids | 6. Oleic acid |
| 7. Unsaturated lipids | 8. Lenolenic acid |
| 9. PUFA | 10. Woxres |
| 11. Compound Lipids | 12. Derived lipids |

Multiple choice question.

1. The nitrogenous base present in lecithin.

a) Choline	b) ethanolamine
c) Inositol	d) Serine
2. Esterification of cholesterol occur at E-position.

a) 1	b) 2
c) 3	d) 4
3. Which of the following is used to represent the deterioration of fats and oils resulting in an unpleasant taste.

a) Hydrolysis	b) Sapanification
c) Rancidity	d) Antioxidant

4. Lecithin is type of lipids.
 - a) Simple lipid
 - b) Complex lipid
 - c) Derived lipid
 - d) Miscellaneous lipid
5. Cholesterol synthesis
 - a) Bile salt
 - b) Adrenocorticoids
 - c) Vitamin D
 - d) All the above

Fill in the blanks :

1. The lipids that function as fuel reserve in animals
2. The hydrolysis of triacylglycerol by alkali to produce glycerol and soaps is known as
3. The isomerism associated with unsaturated fatty acids
4. The prefix associated with unsaturated fatty acids
5. The number of mg of KOH required to hydrolyse 1gm fat or oil is called
6. Name the glycolipids containing N-acetyl muramic acid
7. The steroids contain a cyclic ring known as

UNIT VIII : AMINO ACID AND PROTEINS

Question for 12 Marks

1. Define amino acids and Give chemical structure of 20 standard amino acids.
2. Define amino acids and classify the amino acids on the basis of structure.
3. What is amino acids? And Classified them on basis of polarity with suitable e.g.
4. Explain the physical and chemical properties of amino acid.
5. Explain the physical and chemical properties of proteins.
6. What are proteins? Give classification of proteins.
7. Explain the structural level of proteins.
8. Explain the amino acids and classify then on basis of nutritional requirement.

Question for 6 marks.

1. Explain the formation of peptide bond.
2. Write a note on titration of amino acids.
3. Biological significance of protein.
4. Explain α -helix with suitable diagram.
5. Explain β -sheet with suitable diagram.
6. Explain tertiary structure of protein.

Question for 4 Marks.

1. Draw flow chart of classification of proteins.
2. Differentiate between essential and non-essential Amino acids.
3. Define Imino acid and explain it with e.g.

Question for 2 marks :

Define

1. Amino acid
2. Protein
3. Peptide bond
4. Zwitter ion
5. Isoelectric pH
6. Semi essential amino acids.

Question for 2 marks (Multiple Choice)

1. Basicity of amino group is greatly increase by
a) Acidification b) Alkanisation
c) Esterification d) Methylation
2. Amino acid when react with Ninhydrin it gives colour
a) Red b) Green
c) Brown d) Purple
3. Heamoglobin is a type of protein
a) Hipoprotein b) Phosphoprotein
c) Chromoprotein d) Methalloprotein
4. Histones is strongly Protein
a) Basic b) Acidic
c) Neutral d) none of these

Fill in the blanks :

1. is the abundant protein in mammals.
2. is a derivative of amino acids involved in a blood clotting.
3. is e.g. of amino acid.
4. does undergo transamination.

UNIT VIII : NUCLIC ACID

Question for 12 Marks

1. Explain Watson and Crick Model of DNA.
2. What is RNA ? Explain types of RNA with significance.
3. Write an account of structure, function and nomenclature of nucleotides.
4. Explain in brief A, B and Z type of DNA.
5. Describe the Central Dogma of Molecular biology.

Question for 6 Marks.

1. Explain m-RNA with its significance.
2. Explain t-RNT with its significance.
3. What is DNA and Explain A form of DNA.
4. What is DNA and Explain B form of DNA.
5. What is DNA and Explain Z form of DNA.

Questions for 4 marks.

1. Chargaffs rule.
2. Distinguish between Ribose and Deoxyribose.
3. Distinguish between nucleoside and Nucleotide.
4. Distinguish between Purine and Pyrimidine.
5. Explain S-adenosylmethionine and cGMP.

Questions for 2 marks. (Multiple Choice)

1. RNA is made up of sugar

a) Ribose	b) Deoxyribose
c) Ribulose	d) Glucose

2. Base pairs per turn of helix of β forms of DNA are

a) 11	b) 12
c) 10	d) 9

3. Which one is left handed DNA form
 - a) A-DNA
 - b) B-DNA
 - c) D-DNA
 - d) Z-DNA
4. IUPAC name of adenine is
 - a) 6-aminopurine
 - b) 6-oxypurine
 - c) 2-amino-6-oxypurine
 - d) 2, 6-dioxypurine
5. Width of double helix is
 - a) 34Å
 - b) 20Å
 - c) 10Å
 - d) 3.4Å
6. 3' Terminal end of m-RNA contains a polymer of adenylate which is known as
 - a) Capping
 - b) Polyadenylate
 - c) Poly (a) tail
 - d) Name of these
7. T_m is greater for DNA with
 - a) Higher GC content
 - b) Higher temperature
 - c) Higher AT content
 - d) Long DNA strand
8. RNA contains bases
 - a) ATGC
 - b) AUGC
 - c) Xanthine
 - d) All the above

Fill in the blanks :

1. The fundamental unit of genetic information is known as
2. Nucleic acids are the polymers of
3. The pyrimidine present in DNA but absent in RNA
4. Ribose and deoxyribose differ in their structure around carbon atom
5. Nucleotide is composed of
6. The scientist who observed that there exists a relationship between the content of purines and pyrimidines in DNA structure (A=T, G=C)
7. The base pair G-C is more stable and stronger than A-T due to
8. Under physiological conditions the DNA structure is predominantly in the form
9. The acceptor arm of RNA contains a capped nucleotide sequence

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