

**NORTH MAHARASHTRA UNIVERSITY,  
JALGAON**

**QUESTION BANK FOR  
S.Y.BSc. - BIOTECHNOLOGY**

**PAPER**

**BT 211 & 212**

**CELL BIOLOGY AND BASIC METABOLISM**

**SEMESTER- FIRST**

**(WITH EFFECT FROM JUNE, 2008)**

**NORTH MAHARASHTRA UNIVERSITY, JALGAON**

# QUESTION BANK OF BIOTECHNOLOGY

## CLASS- S.Y.B.Sc SEMESTER-I

### PAPER: BT 211- CELL BIOLOGY AND BASIC METABOLISUM

#### Unit I: Cell Division & Cell Ageing

##### ❖ Q.1 Question for 2 Marks (Objective).

- 1). ----- divide cell cycle into four phases
  - a) Darnell
  - b) Bottino
  - c) Hapler
  - d) Howard
- 2). M phase of cell cycle is also called -----
  - a) Meosis
  - b) Mitotic
  - c). Median
  - d) Post Median
- 3) During G2 phase synthesis of ----- continuous
  - a) RNA
  - b) r RNA
  - c) m RNA
  - d) t RNA
- 4). Interphase of cell division includes following phases-----.
  - a) G1 Phase
  - b) G2 phase
  - c) S phase
  - d) All the above.
- 5). G1 phase of Cell cycle involved -----.
  - a) RNA synthesis
  - b) DNA replication.
  - c) Division of cell
  - d) None of these.
- 6) S phase is carried out by-----.
  - a) RNA synthesis
  - b) DNA replication.
  - c) Protein synthesis
  - d) none of these.
- 7) Mitotic cell division occurred in-----.
  - a) Somatic cell
  - b) Germ cell.
  - c) Both a and b
  - d) None of these.
- 8) Condensation of chromosome is carried in-----.
  - a) Prophase
  - b) Metaphase
  - c) Anaphase
  - d) Telophase
- 9) Equatorial plate formation is a result of-----.

- a) Prophase                      b) Metaphase  
c) Anaphase                      d) Telophase.
- 10) Crossing over is observed in-----.
- a) Pachytene                      b) Leptotene  
c) Zygotene                      d) Diplotene.
- 11) Programmed cell death is called as-----.
- a) Apoptosis                      b) Cell ageing.  
c) Cell lysis                      d) None of these.
- 12) Chiasmata formation takes place in-----.
- a) Mitosis                      b) Meiosis  
c) Interphase                      d) None of these.
- 13) Zygotene is characterized by-----.
- a) Chiasmata formation                      b) Crossing over  
c) Pairing of homologous chromosomes                      d) Tetrad formation

❖ **Question for 2 Marks (Short Answer)**

- 1) Define:
- a) Cell cycle    b) M phase    c) G2 phase
- 2) Explain cell cycle with definition.
- 3) Explain interphase.
- 4) Define meiosis and classify it.
- 5) Describe Pachytene phase.
- 6) Explain significance of meiosis.
- 7) Define apoptosis.
- 8) Define Meiosis.
- 9) Define Ageing of cell.
- 10) Define-Mitotic spindle.
- 11) Comment on morphological changes in apoptosis.
- 12) Describe chiasmata formation.
- 13) Explain cytokinesis.
- 14) Define and explain apoptosis.
- 15) Draw cell cycle and explain it briefly.

❖ **Question for 3 Marks**

- 1) What is concept of cell Apoptosis?
- 2) Give the significance of mitosis.
- 3) Comment on sub- cellular mechanism of ageing.
- 4) Comment on prophase II and metaphase II.
- 5) Write a note on telophase and cytokinesis.
- 6) Discuss about free radical theory of cell ageing.
- 7) Discuss briefly cell apoptosis.

❖ **Question for 4 Marks**

- 1) Comment on Interphase in Cell Division.
- 2) Describe anaphase of mitosis.
- 3) Describe meiotic division II.
- 4) What is Apoptosis? Give its importance.
- 5) Describe briefly, cell ageing.
- 6) Comment on metaphase.
- 7) Comment on prophase.
- 8) Describe 'G1' Phase and 'S' phase
- 9) What is cell cycle? Explain briefly the stages of cell cycle
- 10) Enlist the stages of cell cycle? Comment on longest stage of Cell Cycle?
- 11) What basic activities occurring during mitosis?
- 12) Compare: Mitosis & Meiosis.
- 13) Compare the cytogenic view & chromatin in interphase in Mitosis & Meiosis.

❖ **Question for 6 Marks**

- 1) Explain mitosis in detail.
- 2) Describe meiotic division I along with diagramme.
- 3) Enlist the differences between meiosis and mitosis.
- 4) Describe theories of cell ageing.
- 5) Comment on somatic mutation theory.
- 6) Comment on free radical theory.
- 7) Comparison & Significant of mitosis & meiosis.

- 8) What is cell division? Discuss the use & biological significance of each type of cell division.

## Unit II: Cell Membrane and Transport

### ❖ Q.1 Question for 2 Marks (Objective).

- 1) -----provides rigidity to cell membrane.  
a) Glycerol                      b) Sterol  
c) Phospholipids              d) All the above
- 2) Transport is a main function of-----.  
a) Plasma membrane    b) Cell wall  
c) Golgi complex        d) Ribosome
- 3) -----type of lipid present in plasma membrane.  
a) Lecithin                      b) Cephalin  
c) Glycerol                      d) Sphingomyelin
- 4) Molecules get transported out is called as-----.  
a) Exocytosis                      b) Endocytosis  
c) Pinocytosis                      d) Phagocytosis.
- 5) Solid particles engulfed by plasma membrane are called as-----.  
a) Exocytosis                      b) Endocytosis  
c) Pinocytosis                      d) Phagocytosis.
- 6) -----enhances stability of lipid bilayer and reduces their permeability.  
a) Cholesterol                      b) Cephalin  
c) Glycerol                      d) Sphingomyelin.
- 7) Clathrin formation takes place in-----.  
a) Exocytosis                      b) Endocytosis  
c) Pinocytosis                      d) Receptor mediated Endocytosis.
- 8) -----transport required metabolic energy for its transport.  
a) Active transport                      b) Passive transport.  
c) Both a & b                      d) Antiport.
- 9) Na-K ATPase pump is example of-----type of transport.

- a) Active transport      b) Passive transport.  
 c) Symport                d) Antiport.
- 10) Chloride shift is example of-----type of transport.  
 a) Active transport      b) Passive transport.  
 c) Symport                d) Antiport.
- 11) All cell are bounded by a thin membrane -----.  
 a) Lipoprotein            b) Plasma lemma  
 c) Jelly membrane      d) cell membrane
- 12) Membrane contain about ----- protein-----carbohydrate dry weight.  
 a) 30% & 20%            b) 40% & 20%  
 c) 10% & 5%             d) 60% & 40%.
- 13) ----- substance passed easily through cell membrane.  
 a) Lipid                  b) Fat soluble  
 c) Protein                d) Amino acid.
- 14) The Pinocytosis was first observe by-----in amoeba.  
 a) Lewis                 b) Alberts  
 c) Edward                d) Rothman

❖ **Question for 2 Marks (Short Answer)**

- 1) Comment on distribution of lipid.
- 2) Describe structure of cell membrane.
- 3) Explain the mechanism of Exocytosis.
- 4) Describe the structure of flagella with Diagramme.
- 5) Comment on Danielli-Davson model.
- 6) Describe briefly Phagocytosis.
- 7) Explain Na-K pump.
- 8) Comment on membrane models.
- 9) What is active transport?
- 10) What is passive transport?
- 11) Describe role of flagella.
- 12) Explain simple diffusion.
- 13) Define active and passive transport.
- 14) Enlist different lipid present in membrane.

- 15) Comment on cilia.
- 16) Comment on transport system of glucose.
- 17) Describe Phagocytosis briefly.
- 18) Role of micro filament.

❖ **Question for 3 Marks.**

- 1) Explain Cytoskeletal element with help of microtubules.
- 2) Comment on active transport membrane.
- 3) What is membrane lipid?
- 4) Structure of cell membrane.
- 5) Describe organization of cell membrane.
- 6) Comment on receptor mediated Endocytosis.
- 7) Give Antigenic structure account of membrane lipid.
- 8) Explain passive transport briefly.
- 9) Describe the structure of lipid bilayer.
- 10) Organization of cell membrane.
- 11) Comment on Daniell model.
- 12) Give the difference between Phagocytosis and Pinocytosis

❖ **Question for 4 Marks**

- 1) Comment on detail of Microtubule.
- 2) Explain features of active transport.
- 3) Explain phenomenon of osmosis.
- 4) Define and explain Exocytosis.
- 5) Describe microfilament.
- 6) Define and explain endocytosis.
- 7) Explain phagocytosis with its mechanism.
- 8) Describe flagella along with functions.
- 9) Explain Ca-ATPase pump.
- 10) Comment on lipid bilayer model.
- 11) How you will explain the primary active transport.
- 12) Comparison between active and passive transport.
- 13) Comparison between Endocytosis & Exocytosis.
- 14) Structure of micro filament.

15) Why Daniell's model called sandwich model explain.

❖ **Question for 6 Marks**

- 1) Explain facilitated diffusion with example.
- 2) Explain Endocytosis with its type.
- 3) Describe active transport with example.
- 4) Describe the models of membrane.

### Unit III: Biocatalysts

❖ **Q.1 Question for 2 Marks (Objective).**

- 1) Enzymes are -----in nature.  
a) Acidic                      c) Proteinous  
b) Basic                        d) Neutral
- 2) Enzymes are categorized in to -----type.  
a) 1                              c) 3  
b) 2                              d) 4
- 3) The enzymes are classified into----- major groups.  
a) 5                              c) 6  
b) 10                             d) 12
- 4) Enzyme shows maximum activity at temperature-----  
a) 37<sup>0</sup>-45<sup>0</sup>C                  c) 60<sup>0</sup>-75<sup>0</sup>C  
b) 10<sup>0</sup>-20<sup>0</sup>C                  d) 85<sup>0</sup>-95<sup>0</sup>C
- 5) Ligases enzyme are also called as-----  
a) Lysases                      c) Cellulase  
b) Proteases                    d) Synthetase
- 6) ----- is the Unit of enzyme activity  
a) Gm                              c) Farady  
b) ketal                            d) S
- 7) Lock and key model was proposed by-----.  
a) Koshland                      b) Emil Fishcer  
c) Parlor                            d) Arora
- 8) As pH of an Enzyme is increases, rate of reaction is-----.



- a) Decrease                      b) Increase  
 c) Steady state                  d) All of the above
- 9) The protein part of a conjugated enzyme is called as-----  
 a) Apo enzyme                  b) Isozyme  
 c) Coenzyme                      d) b & d
- 10) Enzymes are also called as-----  
 a) Biocatalyst                  b) activators  
 c) Key of life                      d) all the above
- 11) In 1833 the word enzyme was used by -----.  
 a) Buchner                        b) Kihne  
 c) James Sumner                d) Duclax
- 12) ----- is a good example of Oxidoreductase class.  
 a) Fumarase                      b) Chemotrypsin  
 c) L & D amino acid            d) Succinate thiokinase
- 13) Enzymes from fungi & plants are active in-----condition.  
 a) Basic                            b) Acidic  
 c) Neutral                         d) Alkaline
- 14) ----- is a good example of Metalloenzymes.  
 a) Copper                         b) Silver  
 c) Iron                              d) Aluminum
- 15) A substance which binds with an enzyme and brings a decrease in catalytic activity is called-----.  
 a) Activator                      b) Inhibitor  
 c) Allosteric                      d) None of these
- 16) Optimum temperature for most of the enzymes is between -----.  
 a) 40°- 42°c                      b) 30°- 35°c  
 c) 40°-45°c                        d) 50°-52°c
- 17) The Lock & Key model was proposed by-----.  
 a) Karl Fischer                  b) Emil Fischer  
 c) Sweden Fischer                d) Koshland
- 18) Induced fit theory was proposed in-----year.  
 a) 1950                              b) 1953  
 c) 1958                              d) 1957
- 19) Koshland's model also explains the action of-----.

- a) Reversible Inhibition      b) Competitive inhibition  
c) Non competitive inhibition      d) Allosteric inhibition

20)  $K_m$  stands for-----constant.

- a) Koshland Menten      b) Michealis Menten  
c) Khune Menten      d) None of these

❖ **Question for 2 Marks (Short Answer)**

- 1) Give the industrial significance of Protease.
- 2) Give the industrial significance of Amylase.
- 3) What are Apoenzymes & coenzymes?
- 4) Enlist the functions of the enzymes?
- 5) What is Lineweaver Burk equation?
- 6) Give the graphical presentation of the enzyme concentration.
- 7) Importance of temperature in enzymology.
- 8) What are the Isoenzymes?
- 9) Give the functions of the enzyme in any biochemical reaction.
- 10) Graphically represent effect of the pH, Temperature.
- 12) What is Activator? Explain with suitable example.
- 13) What is Inhibitor? Explain with suitable example
- 14) Define  $\beta$ -oxidation.
- 15) Comment on Decarboxylation process.
- 16) What is Transmethylation.
- 17) Enlist essential and non essential amino acid.

❖ **Question for 3 Marks**

- 1) Definition of enzymes and add a note on its types.
- 2) What is the optimum temperature and the optimum pH of an enzyme?
- 3) What are coenzymes? Explain their characteristics.
- 4) What are the activators?
- 5) What is non-competitive inhibition?
- 6) How enzyme activity affect by PH?
- 7) Enlist the Importance of lipase.
- 8) Explain Koshland's model.

- 9) Comparison between competitive & non competitive inhibitors.
- 10) How Substrate concentration affect on enzyme?

❖ **Question for 4 Marks**

- 1) Give the Michelis- Menten equation.
- 2) What is enzyme? Add a note on its nomenclature? Explain I.U.B.?
- 3) Explain the classification of the enzymes with examples?
- 4) Explain the mechanism of enzyme catalysis?
- 5) What are the significance of the enzyme concentration?
- 6) What is enzyme inhibition? State its types.
- 7) What are activators and inhibitors? Explain with suitable example.
- 8) Enlist the factors affecting enzyme activity.
- 9) State the applications of the proteases and the lipases.
- 10) What is Enzymology? Explain the concept of biocatalysts
- 11) What do you mean by essential amino acid? Add a note on biosynthesis of any one amino acid.
- 12) Explain biosynthesis of Proline?
- 13) Give the regulatory role of enzyme in Gluconeogenesis.
- 14) Explain transamination reaction on protein.

❖ **Question for 6 Marks**

- 1) Give the classification of the enzymes with suitable examples
- 2) Explain the enzyme-substrate complex reaction.
- 3) What is optical specificity and the substrate specificity?
- 4) Explain feed back inhibition?
- 5) Discuss in detail  $\beta$ -oxidation of fatty acid .
- 6) Give the reaction in which oxaloacetic acid is converted in to citric acid
- 7) Discuss in detail Gluconeogenesis.
- 8) Explain protein degradation in details.

## Unit IV: Metabolic Pathway

❖ **Q.1 Question for 2 Marks (Objective).**

- 1) Glycolysis, Glycogenolysis is the example of-----.  
a) Catabolism                      c) Anabolism  
b)  $\beta$ -oxidation                      d) Deamination
- 2) Embeden-Mayerhoff pathway means-----.  
a) Glycogenolysis                      c) TCA cycle  
b) Glycolysis                      d) Gluconeogenesis
- 3) Transamination is the process of combination of -----&-----.  
a) Transmethylation and Methylation  
b) Deamination and Amination  
c) Decarboxylation and Carboxylation  
d)  $\beta$ -oxidation and alpha-oxidation
- 4) Mallic acid is converted to oxaloacetic acid, in this step-----number of ATP molecules are formed.  
a) 5                                      c) 12  
b) 3                                      d) 4
- 5) TCA cycle involve-----no of enzymes.  
a) 11                                      c) 7  
b) 8                                      d) 15
- 6) Glutamate Pyruvate transaminase is used in-----  
a) Decarboxylation                      c) Transmethylation  
b) Transamination                      d) Deamination
- 7) In Decarboxylation reaction, CO<sub>2</sub> is removed from-----group.  
a) -COOH                                      c) -CH<sub>3</sub>  
b) -SH                                      d) -NH<sub>2</sub>
- 8) Valine is present in-----amino acid.  
a) essential                                      c) vitamins  
b) non-essential                                      d) both a&b
- 9) Glycolysis is a----- process.  
a) Anabolic                                      c) Metabolic  
b) Catabolic                                      d) Both b & d
- 10) Alpha ketoglutaric D hydrogenase complex is formed in-----.  
a) Glycolysis                                      c) Decarboxylation

- b) Transmethylation      d) Krebs Cycle
- 11) -----of the ATP is synthesized in Krebs cycle
- a) 80-90%                      b) 65-70%
- c) 40-55%                      d) 50-60%
- 12) Homocystein condenses with serine to form-----.
- a) glutamate- 5-semialdehyde.      b) pyrroline-5-carboxylate
- c) Cystathionine                      d) none of these

❖ **Question for 2 Marks (Short Answer)**

- 1) Give an Importance of Essential amino acids.
- 2) Mention the function of S-Adenosyl methionine.
- 3) Give the pathway of Gluconeogenesis.
- 4) Explain the role of Glucokinase
- 5) Explain-Cori Cycle.
- 6) Give the importance of Glycolysis cycle.
- 7) What is Transamination?
- 8) Diagrammatically represent the TCA Cycle.
- 9) Enlist the stages where ATP formation takes place in TCA Cycle.
- 10) What is Oxidative Deamination?

❖ **Question for 3Marks.**

- 1) Give the features of Transamination.
- 2) Give the role of Glutamate dehydrogenase.
- 3) Give the list of enzymes involved in TCA Cycle.
- 4) What are Essential & Non essential amino acids?
- 5) Give the importance of catabolic pathway.

❖ **Question for 4 Marks.**

- 1) Give the biosynthesis of Glycine.
- 2.) What is Decarboxylation?
- 3) Give the features of Transmethylation.
- 4) Importance of ED Pathway.
- 5) Give the biosynthesis of Proline.

- 6) Give the mechanism of Transamination.
- 7) What is the Non Oxidative Deamination?
- 8) Give the significance of Transmethylation.
- 9) Give the importance of Gluconeogenesis.
- 10) In which location Gluconeogenesis occurs and give the importance of Gluconeogenesis.

❖ **Question for 6 Marks.**

- 1) Give the Energetics of TCA Cycle.
  - 2) Give the Energetics of Glycolysis Cycle.
  - 3) Explain the sequence of  $\beta$ -Oxidation.
  - 4) Explain the synthesis of S-Adenosyl methionine.
  - 5) What is Catabolism? Explain an account of Glycolysis.
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# NORTH MAHARASHTRA UNIVERSITY, JALGAON

## QUESTION BANK OF BIOTECHNOLOGY

### CLASS- S.Y.B.Sc SEMESTER-I

### PAPER: BT 212- MOLECULAR BIOLOGY

#### Unit I: Genome Organization

❖ Q.1 Question for 2 Marks (Objective).

- 1) The most conserved histones are.....
  - a) H1 & H2A
  - b) H2A & H2B
  - c) H3 & H4
  - c) H1 & H4.
- 2) The *E-coli* circular DNA packaged into region of cell called.....
  - a) Nucleus
  - b) Cytoplasm
  - c) Nucleolus
  - d) Nucleoid.
- 3) The prokaryotic translation start with..... initiation codon.
  - a) UAG
  - b) AUC
  - C) AUG
  - d) GUA.
- 4) The triplet of bases present on specific t-RNA molecules are.....
  - a) anticodon
  - b) Synonyms
  - c) codon
  - d) Stop codon.
- 5) The chromatin is more dispersed during.....
  - a) Meiosis
  - b) Interphase
  - c) Mitosis
  - d) M-Phase
- 6) The nuclear DNA-protein complex is called.....
  - a) Chromosome
  - b) Nucleoprotein
  - c) Chromatin
  - d) None.
- 7) ..... are non coding sequence present in m-RNA molecules.
  - a) Introns
  - b) Stop sequence
  - c) Exon
  - d) None.
- 8) .....is due to less stringent pairing of third base of codon with anticodon.
  - a) Degeneracy
  - b) Mutation
  - c) Wobbling
  - d) Universality.

- 9) The sequence of m-RNA transcribed & translated is known as.....
- a) Non coding sequence      b) Exon  
c) Mid sequence                d) Intron
- 10) ..... is the distinct sequence of a DNA molecule forming part of chromosome.
- a) Gene                              b) Chromatin.  
c) Nucleotide                      d) Genome.
- 11) Nucleosome core particle contains a double stranded DNA fragment of .....base pairs.
- a) 148                                b) 144  
c) 156                                d) 146.

❖ **Q.2 Question for 2 Marks (Short answer).**

- 1) Define Nucleosomes.
- 2) Explain Histones protein?
- 3) Comment on concept of Gene.
- 4) Define Intron.
- 5) Comment on Exon as an important part of m-RNA.
- 6) Explain role of Non Histone proteins.
- 7) Define – a) Chromatin b) Chromosome
- 8) Define Genetic code & Codon.
- 9) Explain degeneracy of genetic code.

❖ **Q.3 Question for 3 Marks**

- 1) Explain how Histine protein is important in DNA packaging?
- 2) What is Intron? Explain its types.
- 3) Comment on propeties of genetic code.
- 4) Discuss nucleosomes as fundamentele unit of DNA organization.
- 5) Comment on organization of Chromatin.

❖ **Q.4 Question for 4 Marks**

- 1) Distinguish between Histone & Non histone proteins.
- 2) Explain Degeneracy & wobbling of genetic code.



- 3) Explain detail structure of Nucleosome.
- 4) Discuss the importance of chromatin organization.
- 5) What is gene? Explain concept of gene briefly.
- 6) Compare: Chromatin organization in Prokaryote & Eukaryote.

❖ **Q.5 Question for 6 Marks.**

- 1) Describe nature & properties of genetic code.
- 2) What is splicing? Explain Intron with self splicing activity.
- 3) What is Chromatin? Explain its organization.
- 4) Explain the process of nucleosome formation.

## Unit II: DNA Replication & Damage

❖ **Q.1 Question for 2 Marks (Objective).**

- 1) ..... enzyme relaxes the supercolling of double stranded DNA molecule
 

a) DNA Polymerase	b) Topoisoemerase
c) DNA helicase	d) DNA Ligase
- 2) The agents that are responsible for bringing variation in genetic message, known as .....
 

a) Unusual bases	b) Tautomers
c) Mutagen	d) Isomers
- 3) DNA polymerase – I enzyme was isolated by .....
 

a) Beadle	b) Tatum
c) Kornberg	d) Edman
- 4) ..... react with bases that contain amino group for mutation.
 

a) Nitrous Acid	b) Nitric Acid
c) Acetic Acid	d) Ammonium Nitrate
- 5) DNA photolyse enzyme absorbs light of wavelength ranging from ..... to ..... nm.
 

a) 100 to 300	b) 200 to 300
c) 350 to 450	d) 300 to 500
- 6) RNA primers are synthesized by a template independent enzyme .....
 

a) dna B protein	b) dna G protein
------------------	------------------

- c) DNA polymerase-I                      d) Topoisomerases
- 7) Replacement of a purine residue by a pyrimidine residue, the effect termed as .....
- a) Mutation                                      b) Substitution mutation
- c) Transversion                                d) Transition
- 8) DNA polymerase – III add about ..... nucleotide / sec.
- a) 1000    b) 100
- c) 10000    d) 10
- 9) ..... part of DNA polymerase–III enzyme confers processivity
- a) core enzyme                                b) clamp loader
- c) both a & b                                    d) clamp
- 10) In base excision repair ..... enzyme removes unusual bases.
- a) DNA glycolyses                            b) DNA photolyse
- c) DNA ligase                                    d) AP endonuclease
- 11) ..... protein brings termination of DNA replication.
- a) stop    b) tus
- c) single strand binding                    d) ter
- 12) ..... is known as long patch repair.
- a) Mismatch repair                            b) Nucleotide excision repair
- c) Direct repair                                 d) Base excision repair

❖ **Q.2 Question for 2 marks each**

- 1) Define leading & lagging strand.
- 2) Explain role of DNA helicase.
- 3) Comment on action on DNA ligase.
- 4) Explain termination event in DNA replication.
- 5) Define substitution mutation with sub types.
- 6) Draw a diagram of Okazaki fragment formation.
- 7) Comment on role of dnaA & dnaB protein in DNA replication.
- 8) Explain briefly process of Alkylation.
- 9) Comment on direct repair mechanism.
- 10) Give role of DNA glycolyses & AP endonuclease in base excision repair.

❖ **Q.3 Question for 3 marks each**

- 1) What is oxidative deamination? Explain it.
- 2) Explain activities of DNA polymerase - I
- 3) Describe Okazaki fragment formation.
- 4) Comment on Direct repair mechanism.
- 5) Define Mutation & mutagenic agent
- 6) Compare: Natural & Artificial mutation.
- 7) Write a note on structure of DNA polymerase - III
- 8) Explain the initiation event in prokaryotic DNA replication.
- 9) Define Chemical & Physical mutagen.
- 10) Add a note on DNA ligase.
- 11) Comment on alkylation as chemical mutation.
  
- 12) Explain role of DNA helicase & single strand binding protein in DNA replication.

❖ **Q.4 Question for 4 marks.**

- 1) Describe formation of Okazaki fragment.
- 2) Comment on formation of pyrimidine dimer
- 3) Describe base excision repair
- 4) Write a note on structure & function of DNA polymerase - I
- 5) What is mutation? Describe oxidative deamination.
- 6) Explain the role of primer & template in DNA replication.
- 7) Comment on mismatch repair
- 8) Add a note on Nucleotide excision repair.

❖ **Q.5 Question for 6 marks.**

- 1) Enlist the enzymes involved in prokaryotic DNA replication & comment on their function.
- 2) Comment on initiation, elongation & termination events in prokaryotic DNA replication.
- 3) Describe long patch repair mechanism.
- 4) What is physical mutagen? Comment on pyrimidine dimer formation.

- 5) Distinguish between DNA polymerase I & DNA polymerase – II.

### Unit III: Central dogma of Molecular Biology

#### ❖ Q.1 Question for 2 Marks (Objective).

- 1) Which of the enzyme is involved in Transcription.  
a) DNA Polymerase                      b) RNA Polymerase  
c) Amino acyl tRNA transferase      d) both b and c
- 2) .....RNA is exist in high amount in cell.  
a) t-RNA                                      b) m RNA  
c) r RNA                                      d) none.
- 3) Thymine in DNA is replaced by ..... nucleotide in RNA.  
a) Guanine                                  b) Cytosine  
c) Uracil                                      d) Adenine.
- 4) .....is the starting codon in translation.  
a) AUG                                        b) UAG  
c) UGA                                        d) UAA.
- 5) .....is the first amino acid in proteins of bacteria.  
a) N formyl methionine                  b) alanine  
c) glycine                                    d) Leucine.
- 6) 70S ribosome of bacteria are made up of.....and.....subunits.  
a) 50s and 30s                              b) 60s and 40s  
c) 40s and 30s                              d) 60s and 10s
- 7) Activation of amino acid is carried out by ..... enzyme.  
a) DNA Polymerase                      b) Amino acyle tRNA synthatase  
c) peptidyl transferase                  d) both band c.
- 8) EF Tu and EF Ts complex of proteins are involved in .....step of translation.  
a) Initiation                                  b) Elongation  
c) Activation                                  d) Termination.
- 9) IF 150 ribonucleotides are present on mRNA, hence..... number of amino acids on the protein.  
a) 75    b) 50  
c) 100    d) 150.

- 10) In eukaryotes ..... enzyme involved in synthesis of mRNA in transcription.
- a) RNA pol 1                      b) RNA pol2  
c) RNA pol 3                      d) none.

❖ **Q.2 Question for 2 Marks (Short answer).**

- 1) Define transcription and what is the role of sigma factor.
- 2) Define translation and add a note on initiation and termination codon.
- 3) What is the role of RNA polymerase?
- 4) Draw the structure of mRNA and explain it.
- 5) Explain 80s ribosome of eukaryotes.
- 6) Write a note on initiation of translation.
- 7) Define transcription and translation.
- 8) Write a short note on 70s ribosome.

❖ **Q.3 Question for 3 Marks**

- 1) Explain the structure of RNA.
- 2) Write a short note on: a)Initiation codon b)termination codon.
- 3) What is the role of t-RNA in translation?
- 4) Write the short note on structure of ribosome.
- 5) Distinguish between 70s and 80s ribosome.

❖ **Q.4 Question for 4 Marks**

- 1) How protein elongation take place in translation?
- 2) Describe the process of translation termination?
- 3) Write a note on activation of amino acids.
- 4) Explain the difference between transcription and translation.
- 5) Explain the process of transcription.
- 6) Explain the structure of 70s and 80s ribosome.
- 7) Explain the role of a) IF1 b) IF2 c) IF 3 d) EF Tu & EF Ts e) RF
- 8) Distinguish between transcription and translation.

❖ **Q.5 Question for 6 Marks**

- 1) Explain the different properties of genetic code.

- 2) Explain the function of tRNA ,mRNA and rRNA.
- 3) Give an account of elongation process of translation.
- 4) Write a note on transcription.

## Unit IV: Regulation of Gene Expression

### ❖ Q.1 Question for 2 Marks (Objective).

- 1) ..... is a DNA sequence that regulates transcription of structural genes.
  - a) Regulatory site
  - b) Promoter site
  - c) Operator site
  - d) Repressor site.
- 2) Operon consists of ..... cluster.
  - a) Protein coding genes
  - b) Structural genes
  - c) Non coding genes
  - d) none.
- 3) Regulatory protein is also known as ..... of operon.
  - a) Inhibitor
  - b) Activator
  - c) Repressor
  - d) Controller.
- 4) .....is an inducer of the lac operon.
  - a) Lactose
  - b) cAMP
  - c) ATP
  - d) Allolactose.
- 5) The lac operon is a good example of .....
  - a) Stringent control
  - b) Negative control
  - c) Positive control
  - d) None.
- 6) Structural genes of operon encodes for.....
  - a) Repressor molecule
  - b) Inducer proteins
  - c) Regulatory enzymes
  - d) Activator molecule.
- 7) ..... Is binding site of RNA polymerase on sequence of DNA.
  - a) Operator
  - b) Binding site
  - c) Regulator
  - d) Promoter.
- 8) ..... type of mRNA transcribed by RNA pol. In Lac operon.
  - a) Polycistronic
  - b) Monocitronic
  - c) Dicistronic
  - d) Multivalent.
- 9) The enzyme.....hydrolyzes lactose to glucose & galactose.
  - a) Galactosidase
  - b) Galactosidase.

- c) Lactose permease                      d) lac convertase
- 10) Concept of Operon was given by .....&.....
- a) Beadle & Tatum                      b) Broom & Gillbert
- c) Jacob & Monod                      d) Richadr & Philip.

❖ **Q.2 Question for 2 Marks**

- 1) Give the role of three enzyme of Lac-operon.
- 2) Comment on importance of cAMP in Lac operon.
- 3) What are structural genes? Explain their role.
- 4) Define Promoter & Operator.
- 5) What is operon? Explain its concept briefly.
- 6) Compare positive & negative regulation.
- 7) Give the role of allolactose in lac operon.
- 8) Give the importance of regulatory genes.
- 9) Enlist enzymes of lac operon & comment on their role.
- 10) Define polycistronic mRNA.

❖ **Q.3 Question for 3 Marks.**

- 1) Comment on concept of operon.
- 2) What is structural gene? Explain in details.
- 3) Describe Regulatory gene?
- 4) Comment on Lac repressor protein.
- 5) Explain promoter & operator of operon.
- 6) Compare Polycistronic & Monocistronic mRNA.
- 7) Give significance of an Inducer in Lac operon.
- 8) Define Operon? Enlist Enzymes of Lac operon with their role.

❖ **Q.4 Question for 4 Marks.**

- 1) Distinguish between Positive & Negative Regulation.
- 2) Comment on Regulation of operon.
- 3) What is Promoter? Explain its Components.
- 4) Explain Catabolite repression.
- 5) Describe operator & structural gene.

❖ **Q.5 Question for 6 Marks**

- 1) Describe the detail mechanism of Lac operon.
- 2) Comment on importance of Catabolite activator protein in lac operon functioning.
- 3) Explain repression & induction mechanism of Lac operon.
- 4) Describe in detail regulation of Lac operon.