



3rd Semester End Term Examination: Dec - 2022.

Subject : General Microbiology
Course : B. Sc. – Biotechnology
Full Marks : 60

Roll No:
Time : 3 Hours.

Instructions to the Candidates:

- Read the question paper very carefully.
- Start writing from 2nd page onwards; Don't Write On The 1st Page Backside.
- Question Paper is divided into Three Parts -A, B & C.
- Part-A is containing 10 multiple choice questions & 5 very short Question Answer.
- Part- B containing SIX questions out of which FOUR questions are to be answered.
- Part C containing FOUR questions out of which TWO questions are to be answered.
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PART - A

Multiple Choice Questions

[10x1=10]

1. i) A culture medium the exact composition of which is not known was called as
a) Simple
b) Complex
c) Defined
d) Natural
ii) The technique used to avoid all microorganisms is accomplished by
a) Sterilization
b) Disinfection
c) Cleaning
d) none of these
iii) Which of the following method of sterilization has no effect on spores?
a) Drying
b) Hot air oven
c) Autoclave
d) none of these
iv) A spore differs from an actively replicating bacterium in that the spore
a) is produced during a process involving asymmetric division
b) is able to withstand more extreme conditions than the replicating cell
c) is metabolically inactive
d) all of the above

- v) The bacterial cells are at their metabolic peak during
- | | |
|----------------------|----------------|
| a) Lag phase | b) Log phase |
| c) Stationary phase. | d) Death phase |
- vi) Food intoxication is the ingestion of
- | | |
|------------------------------------|----------------------------------|
| a) Toxin produced by microorganism | b) Toxin producing microorganism |
| c) None of both | d) Both of these |
- vii) The main product of glycolysis under aerobic conditions is
- | | |
|-----------------|------------------|
| a) Pyruvate | b) Lactate |
| c) Both a and b | d) None of these |
- viii) Gaseous antimicrobial compound is
- | | |
|------------|-------------------|
| a) Alcohol | b) Aldehyde |
| c) Halogen | d) Ethylene oxide |
- ix) Calcium dipicolinate on endospore help in
- | | |
|---------------------|------------------|
| a) Heat resistance | b) Sporulation |
| c) Cortex synthesis | d) none of these |
- x) Five kingdom classification given by
- | | |
|---------------------|---------------------|
| a) Robert Whittaker | b) Carolus Linnaeus |
| c) Ernst Haeckel | d) Carl woese |

Very Short Question Answer

[5x2=10]

2. a) Coliforms bacteria
 b) Microbial phylogeny
 c) Food intoxications
 d) Amphi-catabolic pathway
 e) Generation time

PART - B

Answer any FOUR out of SIX

[4x5=20]

3. Describe different methods of preservation of microorganism.
4. Write the difference between prokaryotic and eukaryotic cell.
5. Describe various microorganisms in food microbiology.
6. Describe the structure of endospore.
7. What is fermented food? Write the application of fermented food.
8. Describe the role of alcohol as antimicrobial agent.



3rd Semester End Term Examination: Dec - 2022.

Subject : Bacteriology and Virology

Course : B. Sc. – Biotechnology

Full Marks : 60

Roll No:

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PART - A

Multiple Choice Questions

[10x1=10]

- i) Monomer of polyphosphate granules is
 - a) Phosphoric acid
 - b) Orthophosphates
 - c) Met phosphate
 - d) None of these
- ii) Entire virus particle consisting of an outer protein shell called a capsid and an inner core of nucleic acid is called
 - a) Viroids
 - b) Virion
 - c) Priones
 - d) None of these
- iii) Receptor for HIV is/are
 - a) CD4
 - b) CD155
 - c) ICAM
 - d) Sialic-acid-containing glycoprotein
- iv) Sulfur globules occur in
 - a) Periplasm
 - b) Cytoplasm
 - c) Both of these
 - d) Vacules

- v) Which of the following is/are vapor-phase disinfectant/s?
 a) Formaldehyde
 b) Ethylene oxide
 c) Both of these
 d) Halogens
- vi) Unique feature of virus are
 a) Host specific
 b) Contain either DNA or RNA
 c) Non-cellular
 d) All of these
- vii) Nitrogen-rich, polypeptide-like storage material of cyanobacteria and heterotrophic bacteria is called
 a) Poly- γ -hydroxybutyrate (PHB)
 b) Cyanophycin (CGP)
 c) Sulphur globules
 d) Polyphosphate granules
- viii) The nucleic acid of Influenza viruses is
 a) Ds DNA
 b) SsDNA
 c) SS (-) RNA
 d) Ss (+) RNA
- ix) The process by which foreign DNA is introduced into bacteria by virus is called
 a) Transduction
 b) Transformation
 c) Replication
 d) Conjugation
- x) Iodophores are mixture of
 a) Iodine and Aldehydes
 b) Iodine and surface active agents
 c) Iodine and alcohols
 d) Iodine and phenols

Very Short Question Answer

[5x2=10]

2. a) Prion
 b) HIV
 c) Growth curve
 d) Capsid
 e) Magnetosomes

PART - B

Answer any FOUR out of SIX

[4x5=20]

3. What is virus? Write the different unique features of virus.
4. What is virus receptor? Give example of two virus receptor.
5. Describe germination of endospore.
6. Describe cancer virus.
7. Describe different mode of nutrition in bacteria.
8. Describe different mode of transport mechanisms in prokaryotes.

PART - C

Answer any TWO out of FOUR

[2x10=20]

13. Discuss the any three chemical method of control of microorganisms.
14. Describe different reserve food material of bacteria.
15. Describe the different classes of virus on the basis of their genetic material with example.
16. Describe different therapeutics drug used for the treatment of viruses.



3rd Semester End Term Examination: Dec - 2022.

Subject : Genetics

Course : B. Sc – Biotechnology

Full Marks : 60

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PART - A

Multiple Choice Questions

[10x1=10]

- i) Who is known as the "Father of Genetics"?
 - a) T.H Morgan
 - b) Gregor Mendel
 - c) James Watson
 - d) William Bateson
- ii) The meiotic cell division takes place in the
 - a) Meristematic cells
 - b) Conductive cells
 - c) Reproductive cells
 - d) Vegetative Cells
- iii) Name the event where the paternal and maternal chromosome exchange genetic material during cell division.
 - a) Crossing over
 - b) Synapsis
 - c) G1 Phase
 - d) S Phase
- vi) Which one of the following is a Monohybrid ratio
 - a) 3:1
 - b) 9:7
 - c) 9:3:3:1
 - d) 12:3:1

- v) Bar bodies are found
- In the cytoplasm of female
 - In the nuclei of female
 - In the nuclei of male
- vi) Mutation that takes place at a definite location is called
- Point Mutation
 - Lethal Mutation
 - Frame Shift Mutation
 - Nonsense Mutation
- vii) A condition in which the organisms have more than two complete sets of Chromosomes is called
- Polyploidy
 - Euploidy
 - Aneuploidy
 - None of the above
- viii) The allele which is unable to express its effect in the presence of another is called
- Co-dominant
 - Complementary
 - Supplementary
 - Recessive
- ix) Which of the following has a clover leaf shaped structure
- m-RNA
 - t-RNA
 - r-RNA
 - DNA
- x) An allele is the
- Total number of gene pair
 - Alternate character of gene pair
 - Total number of genes
 - None of the above

Very Short Question Answer

[5x2=10]

- What is Chargaff's Rule?
- What is a Back cross? Give one example.
- What is a Turner Syndrome?
- What is Satellite DNA?
- What is a Chi-square test?

PART - B

Answer any FOUR out of SIX

[4x5=20]

- Define Mutation? Give two examples of application of Mutation in Plant improvement?
- Mention the characteristics present in *Drosophila* that makes it suitable for the experiments of Genetics?
- Show with the help of a punnett square, phenotypic and genotypic ratio of the offsprings obtained by a cross between a homozygous dominant (TT) and a homozygous recessive (tt) plants.

- Explain the terms Cistron, Exon, Intron?
- Why did Mendel choose garden pea as the experimental material in his experiments? Give reason.
- Define Crossing Over. Describe the mechanism of Crossing over.

PART - C

Answer any TWO out of FOUR

[2x10=20]

- Define the classification of Chromosome based on location and number of Centromere?
- Explain Hardy-weinberg Law?
- Explain the Structure of DNA
- What is a Dihybrid Cross? What will be the result of a selfing between F1 generation of Round and Yellow seeded pea plant (YYRR) are crossed with green and wrinkled (yyrr) seeded pea plant?



3rd Semester End Term Examination: Dec - 2022.

Subject : Molecular Diagnostic
Course : B. Sc - Biotechnology
Full Marks : 60

Roll No:
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Multiple Choice Questions

PART - A

[10x1=10]

- i) The Polymerase chain reaction is
 - a) DNA sequencing technique
 - b) DNA degradation technique
 - c) DNA amplification technique
 - d) All of the above
- ii) The technique which is based on Antigen-Antibody interaction
 - a) PCR
 - b) Electrophoresis
 - c) ELISA
 - d) Widal test
- iii) Animals that have their DNA manipulated to possess and express an extra (foreign gene) are known as
 - a) Transgenic animals
 - b) Super animals
 - c) infected animals
 - d) Bt. animals
- iv) Which Fluorescent Dye is used to give red fluorescence?
 - a) Rhodamine
 - b) Fluorecein
 - c) Carmine
 - d) DAPI
- v) Rosie the transgenic cow produced milk, exceptionally suitable for Human infant being rich in
 - a) Human milk protein
 - b) Lactose
 - c) Lactic acid
 - d) All of these

- vi) *Thermus aquaticus* is the source of
- Vent Polymerase
 - Primase enzyme
 - Taq Polymerase
 - Both a and b
- vii) The formation of is a Positive result in the VDRL test
- Flocculant
 - Precipitin
 - Coagulation
 - A bright pink colour
- viii) Western Blotting is a technique used the membrane transfer of
- DNA
 - RNA
 - Protein
 - Lipids
- ix) In an enzyme immunoassay, the enzyme is
- Bound by the antibodies
 - Conjugated to the suspect antigen antigen-binding site
 - Attached to the well of a microtiter plate
 - Bound to constant region of secondary Antibody
- x) In PCR denaturation is the process of
- Heating at 72 °C
 - Heating between 40 to 60°C
 - Heating between 90 to 98°C
 - None of the above

Very Short Question Answer

[5x2=10]

- Epitope
 - Biosensor
 - Hybridoma
 - Antibody
 - Enzymes and used in ELISA (any two)

PART - B

Answer any FOUR out of SIX

[4x5=20]

- Define the process used to detect the blood group.
- What are the common methods used for diagnosis of Cancer?
- What is the difference between Monoclonal and Polyclonal Antibody?
- What is Hemagglutination reaction? Give its significance.
- What is RFLP? How is it used for the diagnosis of disease?
- What is a Thermocycler? How it helps in Molecular diagnostic?

PART - C

Answer any TWO out of FOUR

[2x10=20]

- What is ELISA? Describe the steps of process used for doing Indirect ELISA.
- What is PCR? Briefly describe the steps of PCR process.
- What are Biosensors? What is their application in Clinical diagnosis?
- What is Radioimmunoassay? Describe the process of radioimmunoassay for antigen detection?



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PART - A

Multiple Choice Questions

[10x1=10]

- i) What product is formed in the free radical bromination of methane?
a) Bromoethane
b) Dibromoethane
c) Tribromoethane
d) All of these
- ii) When formaldehyde is treated with 50% NaOH solution, it undergoes
a) Cannizaro reaction
b) Wurtz reaction
c) Aldol condensation
d) Hydrolysis
- iii) The Carbon atom of a Carbonyl group is _____.
a) Sp hybridized
b) Sp² hybridized
c) Sp³ hybridized
d) Not hybridized
- iv) What kind of reactions do dienes most commonly undergo?
a) Nucleophilic addition reaction
b) Electrophilic addition reaction
c) Nucleophilic substitution reaction
d) Electrophilic substitution reaction

7. Give the general mechanism of electrophilic aromatic substitution. Explain the nitration of benzene.
8. Electrolytic reduction of Nitrobenzene in
- Acidic Medium.
 - Alkaline Medium.
 - Neutral reducing agent.

PART - C

Answer any TWO out of FOUR

[2x10=20]

9. What are SN^1 and SN^2 reactions? Discuss the mechanism and stereochemistry of these reactions. In what respect do SN^2 reaction differ from SN^1 reaction.
10. How will you synthesize Toluene, Benzene sulphonic acid and Chlorobenzene from benzene? Explain the mechanism.
11. Write the free mechanism of halogenations for alkanes. Give a short account of orientation and reactivity in chlorination of benzene
12. Explain the following:
- Newman and Sawhorse projection.
 - Enantiomers and Distreoisomer
 - Geometrical isomerism

- v) When ozone is passed through ethylene with Zn/H_2O , it gives two molecules of
- Acetone
 - Acetaldehyde
 - Ozonide
 - Formaldehyde
- vi) In the addition of HX to a double bond, the hydrogen goes to the carbon that already has more hydrogen is a statement of
- Markovnikov's Rule
 - Hunds Rule
 - Huckle rule
 - Saytzeff rule
- vii) Propene reacts with bromine to form 1, 2-dibromopropane. This is an example of
- Nucleophilic addition reaction
 - Electrophilic addition reaction
 - Nucleophilic substitution reaction
 - Electrophilic substitution reaction
- viii) Markovnikov's addition
- Gives most stable carbocation
 - gives the least stable carbocation
 - Is addition to a carbon atom
 - None of these
- containing the least hydrogen atoms?
- ix) Allylic radicals are stabilized by:
- Resonance
 - Interaction with light
 - Electron- withdrawing atoms
 - Oxygen atoms
- x) When Nitrobenzene undergoes reduction with Sn/HCl , it gives final product
- Aniline
 - Phenyl hydroxyl amine
 - Nitrosobenzene
 - Hydrazbenzene

Very Short Question Answer

[5x2=10]

- What happen when Carbonyl compounds react with HCN?
- What happen when Action of alc.KCN with Benzyl alkyl halide.
- What do you understand by walden inversion
- Define Saytzeff rule.
- Give an example of Cis-trans isomerism.

PART - B

Answer any FOUR out of SIX

[4x5=20]

- Write Short notes on:
 - Ozonolysis
 - Markownikoff's Rule
- Discuss the mechanism of Aldol condensation and Cannizzaro reaction.
- Describe with the help of suitable example the R, S system of expressing the configuration in optically active compounds.
- Discuss the mechanism of elimination reactions of alkyl halides.