



ARKA JAIN University, Jharkhand

3rd Semester Final Examination – 2018-19

Subject: General Microbiology

Full Marks: 60

Time: 3Hours

Course: Biotechnology

Pass Marks: 24

- Candidates are required to give their answers in their own words as far as practicable.
- Question Paper is divided into **Three Parts –A, B & C**
- **Part-A** is compulsory.
- **Part- B** contains **FIVE** questions out of which **FOUR** questions are to be answered.
- **Part- C** contains **THREE** questions out of which **TWO** questions are to be answered.

PART A

Q.1) All questions are compulsory

A] Multiple Choice Questions

(10x1=10)

- a) The organisms which can use reduced inorganic compounds as electron donors are known as
- | | |
|------------------|------------------|
| i) Chemotrophs | ii) Organotrophs |
| iii) Lithotrophs | iv) Phototrophs |
- b) Food intoxication is the ingestion of
- | | |
|------------------------------------|-----------------------------------|
| i) Toxin produced by microorganism | ii) Toxin producing microorganism |
| iii) Non of both | iv) Both of these |
- c) Lipopolysaccharide in cell walls is characteristic of?
- | | |
|---------------------------|----------------------------|
| i) Gram-positive bacteria | ii) Gram-negative bacteria |
| iii) Fungi | iv) Algae |
- d) The media which allow growing a specific type of bacteria is called
- | | |
|-----------------------|---------------------|
| i) Differential Media | ii) Selective Media |
| iii) Enriched Media | iv) All of these |
- e) Which of the following is not a water borne disease?
- | | |
|--------------|---------------|
| i) Typhoid | ii) Cholera |
| iii) Scabies | iv) Hepatitis |
- f) Iodophores are mixture of
- | | |
|--------------------------|--------------------------------------|
| i) Iodine and Aldehydes | ii) Iodine and surface active agents |
| iii) Iodine and alcohols | iv) Iodine and phenols |
- g) Any change that renders food unfit for human consumption is called
- | | |
|--------------------|------------------|
| i) Processing | ii) Spoilage |
| iii) Deterioration | iv) Preservation |
- h) Which of the following is best to sterilize heat labile solutions?
- | | |
|--------------------------|--------------------|
| i) Dry heat | ii) Autoclave |
| iii) Membrane filtration | iv) Pasteurization |

- i) The process by which foreign DNA is introduced into a bacteria from environment directly is called
- | | |
|------------------|--------------------|
| i) Transduction | ii) Transformation |
| iii) Replication | iv) Conjugation |
- j) The process of preserving food by rapid freezing followed by dehydration under vacuum is called
- | | |
|-----------------------|----------------------|
| i) Lyophilisation | ii) Sterilization |
| iii) Cold dehydration | iv) Cryopreservation |

B] Very Short question

(5x2=10)

- Unique feature of virus
- Amphi-catabolic pathway
- Generation time
- Chemotherapeutic Agents
- Microbial taxonomy

PART B

Answer any Four:

(4x5=20)

- Write short notes on
 - Endospore and
 - Transduction
- What is Fermented Foods? Give two examples.
- Write the factors affecting growth of bacteria.
- Write the different methods of preservation of bacteria?
- Write the difference between Prokaryotic and Eukaryotic cells.

PART C

Answer any two:

(2x10=20)

- What is transformation? Describe the mechanism of transformation in gram negative bacteria.
- What is swage? Describe different methods of sewage treatment.
- What is microbial metabolism? Describe any one microbial metabolic pathway.
- Discuss the Chemical method of control of microorganisms.



Subject: Chemistry-I
Full Marks: 60
Time: 3Hours

Course: Biotechnology
Pass Marks: 24

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PART A

Q.1) All questions are compulsory

A] Multiple Choice Questions:

(10x1=10)

- Causes of geometrical isomerism:
 - presence of one asymmetric carbon atom
 - oscillation of H atom between two polyvalent atoms
 - presence of different groups on C=C bonds
 - joint of different groups on one carbon.
- Optical activity is shown by a molecule which
 - contains at least three asymmetric centres
 - is asymmetric as a whole
 - contains double bond
 - has a centre of symmetry
- The intermediate involved in the base catalysed aldol condensation
 - Carbonium ion
 - Carbanion
 - Free radicals
 - Free diradicals
- An active methylene group is needed for
 - Knoevenagel reaction
 - Aldol condensation
 - Cannizaro's reaction
 - Kolbe-Schmitz synthesis
- Chlorination of methane is a/an
 - free radical reaction
 - elimination reaction
 - electrophilic substitution
 - nucleophilic substitution
- Which compound will give Walden Inversion in SN2 reaction
 - CH₃-CH₂-Br
 - CH₃-CHD-Br
 - CH₃-Br
 - C₆H₅-CH₂-CH₂-Br

- g) The number of Pi-electrons in Benzene is
- 2
 - 4
 - 6
 - 8
- h) Dehydrohalogenation agent is
- Alc.KOH/ Δ
 - NaH/ Δ RONa/ Δ
 - All of these
- i) Dehydrating agent of alcohol is
- P₂O₅
 - Conc. H₂SO₄
 - Anhy. ZnCl₄
 - All of these
- j) Reaction intermediate of E1 reaction is
- carbocation
 - carbanion
 - carbene
 - free radical.

B] Very Short question

(5x2=10)

- Optical Activity
- Hoffmann's Elimination.

What happen when?

- Carbonyl compounds react with HCN.
- Action of sodium alkoxide with alkyl halide.
- Action of alc.KCN with Benzyl alkyl halide.

PART B

Answer any Four:

(4x5=20)

- Q.2) What is the importance of configuration notations R& S? Explain.
- Q.3) Explain the mechanism of the following
- Ethylene reacts with Ozone
 - Hydroboration of alkene.
- Q.4) Write notes on Aldol condensation and Cannizaro reaction.
- Q.5) Describe the mechanism of halogenation of benzene.
- Q.6) Explain the mechanism of Wolf- Kishner reduction.

PART C

Answer any two:

(2x10=20)

Q.7) Draw the diagrams of boat conformation of methyl cyclohexane (i) equatorial position (ii) axial position. Which conformation is more stable?

Q.8) Explain the following:-

a) Chlorination of methane.

b) Chlorination of isobutene gives tertiary butyl chloride in 36% yield while bromination gives Tertiary butyl bromide in more than 99% yield. Why?

Q.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.

Q.10) Electrolytic reduction of Nitrobenzene in

a) Acidic Medium.

b) Alkaline Medium.

c) Neutral reducing agent.



ARKA JAIN University, Jharkhand

3rd Semester Final Examination – 2018-19

Subject: Bacteriology & Virology
Full Marks: 60
Time: 3Hours

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PART A

Q.1) All questions are compulsory

A] Multiple Choice Questions

(10x1=10)

- a) When a virus enters a cell but does not replicate immediately, the situation is called
- | | |
|----------------|---------------|
| i) Lysogeny | ii) Symbiosis |
| iii) Synergism | iv) Lytic |
- b) Which of the following virus is enveloped?
- | | |
|------------|-------------------|
| i) Adeno | ii) Herpes |
| iii) Polio | iv) None of these |
- c) Which is the reserved food material of bacteria
- | | |
|------------------------|--------------------------|
| i) Polyhydroxybutyrate | ii) Cyanophycin granules |
| iii) oil droplets | iv) All of these |
- d) A fully formed infectious viral particle is called as
- | | |
|-------------|--------------|
| i) Viroid | ii) Capsid |
| iii) Virion | iv) Virusoid |
- e) Which of the following does not kill Endospores?
- | | |
|----------------------------|--------------------|
| i) Autoclave | ii) Pasteurization |
| iii) Hot air sterilization | iv) Incineration |
- f) The receptor recognized by HIV for the attachment to the host cell is
- | | |
|------------------|-------------|
| i) ICAM-1 | ii) CD46 |
| iii) CD4 & CXCR4 | iv) DC-SIGN |
- g) The media which allow to grow a specific type of bacteria is called
- | | |
|-----------------------|--------------------|
| i) Differential Media | ii) Enriched Media |
| iii) Selective Media | iv) None of these |
- h) Three kingdoms classification was given by
- | | |
|--------------------|----------------------|
| i) Carl Woese | ii) Robert Whittaker |
| iii) Ernst Haeckel | iv) Carolus Linnaeus |

- i). The envelope of an enveloped virus is derived from
- i) Cell membrane
 - ii) Mitochondrion of the cell
 - iii) Endoplasmic reticulum of the cell
 - iv) None of these
- j) Which of the following viruses has not been associated with human cancer?
- i) Hepatitis C virus
 - ii) Vercelli-Zoster virus
 - iii) Hepatitis B virus
 - iv) Herpes simplex virus type 2

B] Very Short question

(5x2=10)

- a) Carboxysomes
- b) HIV
- c) Unique feature of fungi
- d) Synchronous culture
- e) Magnetisms

PART B

Answer any Four:

(4x5=20)

Q.2) Write short notes on

- a) Whittaker's five kingdom and
- b) Transduction

Q.3) What is Transformation?

Q.4) Write the factors affecting growth of bacteria.

Q.5) Write the different methods of preservation of bacteria?

Q.6) Describe different mode of transport mechanisms in prokaryotes.

PART C

Answer any two:

(2x10=20)

Q.7) What is transformation? Describe the mechanism of transformation in gram negative bacteria.

Q.8) Describe the mechanism of attachment and penetration of virus to host cell.

Q.9) Describe different reserve food material of bacteria.

Q.10) Describe any viruses causing diseases in man.



ARKA JAIN University, Jharkhand

3rd Semester Final Examination – 2018-19

Subject: Molecular Diagnostics
Full Marks: 60
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Course: Biotechnology
Pass Marks: 24

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PART A

Q.1) All questions are compulsory

A] Multiple Choice Questions

(10x1=10)

- The PCR cycle have following steps
 - Annealing, Denaturation, Elongation
 - Denaturation, Annealing, Elongation
 - Elongation, Annealing, Denaturation
 - Denaturation, Elongation, Annealing
- Variation between individuals due to single base change is called as
 - SNPs
 - ESTs
 - Contigs
 - None of these
- Western blotting is the technique for the detection of
 - Specific DNA in a Sample
 - ii) Specific RNA in a Sample
 - Specific Protein in a Sample
 - iv) Specific glycolipid in a Sample
- Factors influence immunogenicity include
 - Foreignness
 - Chemical composition
 - Molecular size
 - None of these
- Which of the following is the first step in immunohistochemistry??
 - Treating samples with fixative
 - Blocking binding sites with low-fat milk
 - Antigen retrieval
 - Applying the primary antibody
- The concentration of antibiotic which show no visible growth of bacteria is called
 - Minimum inhibitory concentration
 - Maximum inhibitory concentration
 - Maximum bactericidal concentration
 - All of these
- Enzyme immunoassays is widely use for molecular diagnosis because

- i) Safe
 - ii) High- throughput
 - iii) High sensitivity
 - iv) All of these
- h) Which of the following can influence the level and pattern of transgene expression?
- i) If the location(s) of transgene insertion is random
 - ii) If the number of transgene copies that integrate into the genome is random
 - iii) If the transgene may be inserted into a region of transcriptionally silent DNA
 - iv) All of the above
- i) Which fluorescent dye can be used for red fluorescence?
- i) Rodamine
 - ii) Carmine
 - iii) DAPI
 - iv) Fluorescein
- j) Which among the following helps us in getting a three-dimensional picture of the specimen?
- i) TEM
 - ii) SEM
 - iii) Both of these
 - iv) None of these

B] Very Short question

(5x2=10)

- a) Enzyme immunoassays
- b) RFLP
- c) Epitope
- d) Horse reddish peroxidase
- e) Antiidiotypes

PART B

Answer any Four:

(4x5=20)

Q.2) Write short notes on

- a) DNA hybridization and
- b) RFLP

Q.3) What is PCR? Write the steps of PCR.

Q.4) What is an enzyme immunohistochemical technique?

Q.5) Write the use of polyclonal or monoclonal antibodies in enzymes immune assays?

Q.6) What is Single nucleotide polymorphism? Write its applications.

PART C

Answer any two:

(2x10=20)

Q.7) What is Electron microscopy? Describe the working principal of Electron microscopy with labeled diagram.

Q.8) What is enzyme immunoassay? Write the different enzymes available for enzyme immunoassays.

Q.9) What is a transgenic animal? Write the application of transgenic animals.

Q.10) Describe the different methods of laboratory tests in chemotherapy?



ARKA JAIN University, Jharkhand
3rd Semester Final Examination – 2019-20

Subject: Genetics
Full Marks: 60
Time: 3Hours

Course: Biotechnology
Pass Marks: 24

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PART A

Q.1) All questions are compulsory

A] Multiple Choice Questions

(10x1=10)

- a. The phenomenon, in which an allele of one gene suppresses the activity of an allele of another gene, is known as
- | | |
|------------------|------------------|
| i) Epitasis | ii) Dominance |
| iii) Suppression | iv) Inactivation |
- b. The type of chromosomal aberration which does not change the number of genes is
- | | |
|----------------|-------------------|
| i) Deletion | ii) Duplication |
| iii) Inversion | iv) Translocation |
- c) In a genetic cross having recessive epistasis, F_2 phenotypic ratio would be
- | | |
|------------|------------|
| i) 9:6:1 | ii) 15:1 |
| iii) 9:3:4 | iv) 12:3:1 |
- d) Genic balance theory of sex determination was given by
- | | |
|-------------|------------|
| i) Mendel | ii) Darwin |
| iii) Bridge | iv) Morgan |
- e) Genes located on Y chromosomes are called
- | | |
|------------------------|---------------------|
| i) Sex influence genes | ii) Autosomal genes |
| iii) Holandric genes | iv) mutant genes |
- f) In Klinefelter's syndrome, phenotypical males, having;
- | | |
|----------|---------|
| i) XXY | ii) XXX |
| iii) XYY | iv) OX |
- g) Which of the following is correct with regard to aneuploidy?
- | | |
|---|--------------|
| i) Inversion | ii) $2n + 1$ |
| iii) All aneuploid individuals die before birth | iv) $4n$ |

h) Circular, double-stranded and extra chromosomal DNA, can replicate independently of bacterial chromosome, called as

- i) Plasmid
- ii) Cosmic
- iii) Vector
- iv) Template

i) Which of the following is true about the inheritance of haemophilia

- i) Father \rightarrow F₁ son \rightarrow F₂ grand-son
- ii) Father \rightarrow F₁ daughter \rightarrow F₂ grand-son
- iii) Mother \rightarrow F₁ son \rightarrow F₂ grand-daughter
- iv) Both 2 and 3

j) Colchicine arrests which of the following stages of cell division?

- i) Anaphase
- ii) Interphase
- iii) Metaphase
- iv) Telophase

B] Very Short question

(5x2=10)

- a) Penetrance and expressivity
- b) Robertsonian Translocation
- c) Linkage
- d) Monoploidy
- e) Trisomy in humans

PART B

Answer any Four:

(4x5=20)

Q.2) Discuss the role of chloroplast and mitochondria in cytoplasm inheritance

Q.3) Write short notes on

- a) VNTRs and
- b) Constitutive heterochromatin

Q.4) What is pedigree analysis? Write the applications of pedigree charts used in human genetics

Q.5) Explain x linked recessive gene inheritance in humans with example.

Q.6) Differentiate between complete and incomplete linkage

PART C

Answer any two:

(2x10=20)

Q.7). Explain different types of polyploidy

Q.8) Classify different types of gene mutations on basis of size and quality

Q.9) Explain all types of structural aberration of chromosome

Q.10) What is sex determination? Describe various example of sex chromosomal mechanism of sex determination.