PH 501.2 Reg. No. | | | | | | |

St Aloysius College (Autonomous)
Mangaluru
Semester II – P.G. Examination - M.Sc. Biotechnology
April - 2018
MOLECULAR BIOLOGY

Time: 3 Hours **Max. Marks: 70**

Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary

I. Write short notes on any FIVE of the following **(5x3=15)**

1. 5'capping of m-RNA
2. Prokaryotic DNA polymerase
3. Warburg effect
4. Physical agents causing cancer
5. Steroid hormones in regulation of gene expression
6. Salient features of genetic code
7. Termination of protein synthesis in prokaryotes
8. Role of DNA methylation in regulation of gene expression

II. Write explanatory notes on any FIVE of the following **(5x5=25)**

9. Eukaryotic transcription factors
10. Mechanism and significance of m-RNA splicing
11. Transcriptional control by attenuation in tryptophan operon
12. Post translational modification of protein
13. Post translational control of gene expression in eukaryotes
14. Dorsal proteins and their role in specifying dorsoventral axis in Drosophila
15. Oncovirus – Types and mechanism of carcinogenesis
16. Tumor suppressor genes and their role in cell cycle control

III. Answer any THREE of the following: **(3x10=30)**

17. Discuss the molecular mechanisms of transformation of normal cells into cancer cells.
18. Discuss the environmental factor affecting gene expression in eukaryotes by giving any two examples.
19. Give a detailed account on prokaryotic transcription.
20. Narrate eukaryotic DNA replication and add a note on eukaryotic DNA polymers.
21. Illustrate transcriptional control of gene expression in eukaryotes.

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St Aloysius College (Autonomous)
Mangaluru
Semester II – P.G. Examination - M.Sc. Biotechnology
April - 2018
Genetic Engineering

Time: 3 Hours **Max. Marks: 70**

Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary

I. Write short notes on any FIVE of the following **(5x3=15)**

1. Cosmid
2. pET series vector
3. Linkers and adaptors
4. Restriction – Modification System
5. Applications of Genomics
6. Preparation of Gene probe
7. Reporter Gene
8. Substractive hybridization

II. Write explanatory notes on any FIVE of the following **(5x5=25)**

9. DNA finger printing techniques
10. Construction of cDNA library
11. Expression of a gene using an expression vector
12. Artificial chromosome vectors
13. Screening of positive clones by colony hybridization
14. Southern blotting
15. DNase foot printing
16. Translational fusion

III. Answer any THREE of the following: **(3x10=30)**

17.a) Describe the principle of Taq Man and SYBR Green chemistry of real time PCR. **(6)**

b) Mention the advantages of real time PCR over conventional PCR. **(4)**

18. Compare Sanger and Maxam Gilbert's method of DNA sequencing.
19. Explain various techniques of introducing genes in prokaryotes and eukaryotes.
20. Discuss various methods of gene expression analysis.
21. Discuss direct screening method used to identify positive clones.

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St Aloysius College (Autonomous)
Mangaluru
Semester II – P.G. Examination - M.Sc. Biotechnology
April - 2018
Enzymology

Time: 3 Hours **Max. Marks: 70**

Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary

I. Answer any FIVE of the following briefly **(5x3=15)**

1. What are coupled enzyme assays? Explain with an example
2. List the properties of Enzymes
3. Eddie-Hofstee Plot
4. What are coenzymes? What is their role in enzymes?
5. Distinguish between specificity and specific activity of an enzyme
6. Concerted model of ATCase
7. Explain Penicillin as a suicide inhibitor
8. Function and regulation of PDC

II. Write explanatory notes on any FIVE of the following **(5x5=25)**

9. How is Lineweaver Burk plot different from Hanes plot?
10. What is meant by Proximity and orientation? Explain with an example
11. Give the nomenclature and classification of enzymes
12. What criteria will you use to show that an enzyme is pure?
13. What are isoenzymes? Explain the isoenzymic properties of LDH
14. Explain Competitive, inhibition with the kinetics
15. What is enzyme engineering? Explain with an example
16. How are enzymes used as analytical tools in clinical chemistry?

III. Answer any THREE of the following: **(3x10=30)**

17. Derive Michaelis –Menten equation under steady state approximation.
18. Explain ping pong and random sequential mechanisms with an example and Cleland notation.
19. Discuss the acid – base catalysis in RNase.
20. Activation of Digestive enzymes.
21. Give an account of the isolation of enzymes.

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St Aloysius College (Autonomous)
Mangaluru
Semester II – P.G. Examination - M.Sc. Biotechnology
April - 2018
BIOPHYSICAL AND BIOCHEMICAL TECHNIQUES

Time: 3 Hours **Max. Marks: 70**

Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary

I. Write short notes on any FIVE of the following **(5x3=15)**

1. Write a note on detection of proteins in gel
2. Mention different types of rotors
3. What is half life of a radio isotope? Give one example
4. What is isoelectric focusing? Write its important uses
5. Give the principle of ascending paper chromatography
6. What are isotopes? List biologically important ones
7. Fluorescent Microscope
8. Beer-Lambert's law

II. Write explanatory notes on any FIVE of the following **(5x5=25)**

9. Write on gas liquid chromatography
10. Briefly explain 2-D gel electrophoresis and its application
11. Describe the operation principle and applications of x-ray diffraction
12. What is autoradiography? Mention its uses in biology
13. Write the principle of centrifugation. What are the applications of centrifugation?
14. Write the principle and applications of capillary electrophoresis
15. Give an account on fluorescent *in situ* hybridization (FISH)
16. Explain the principle and applications of thin layer chromatography (TLC)

III. Answer any <u>THREE</u> of the following: **(3x10=30)**

17. How do you determine the position of labeling in a given radio active sample? Give a detailed account of biological hazards of radiations
18. Explain in detail the principles and applications of mass spectroscopy
19. Explain the principle behind affinity chromatography and explain the isolation of any biological molecule of your choice using this technique
20. Discuss the principle and applications of analytical ultra centrifugation
21. Explain the transmission electron microscope. Write a note on preparation of sample and the applications of TEM

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St Aloysius College (Autonomous)

Mangaluru

Semester II – P.G Examination – M.Sc. Biotechnology

April 2019

MOLECULAR BIOLOGY

Time: 3 Hours

Max. Marks: 70

Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary

I. Write short notes on any FIVE of the following. (5x3=15)

1. Functions of transcription factor.
2. Post translational modifications in Prokaryotes.
3. Retroviral oncogenes.
4. Warburg effect.
5. Mechanism of cell transformation.
6. Elongation factors
7. Structure of lac operon
8. Protein kinases in cancer

II. Write explanatory notes on any FIVE of the following. (5x5=25)

9. Mechanism of alternative splicing.
10. Regulation and function of arabinose operon.
11. Different mechanism of DNA rearrangement.
12. Trp operon and its relevance.
13. Role of dorsal protein in dorsoventral polarity.
14. Role of DNA Methylation in gene expression.
15. Tumor suppressor genes in cell cycle control.
16. RNA splicing in rRNA.

III. Answer any THREE of the following (3x10=30)

17. Discuss the effects of hormonal and environmental factors on gene expression. Add a note on genetic basis of differentiation.
18. How do you differentiate normal and cancer cells? Discuss different types of cancer.
19. Explain the process of DNA replication in prokaryotes and eukaryotes.
20. Explain the factors that regulates gene expression in eukaryotes.
21. Describe the process of post transcriptional regulation in prokaryotes.

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PH 502.2

St Aloysius College (Autonomous)

Mangaluru

Semester II – P.G Examination – M.Sc. Biotechnology

April 2019

GENETIC ENGINEERING

Time: 3 Hours Max. Marks: 70

Note: Draw neat labeled diagrams/schematic sketches/structures wherever necessary

I. Write short notes on any FIVE of the following. **(5x3=15)**

1. Write the principle of RT-PCR.
2. Differentiate between phagemid and cosmid.
3. Write a short note on electroporation.
4. What are Restriction enzymes? Give examples.
5. Blue-white screening.
6. Write the principle and application of Southern blotting?
7. What is primer extension assay?
8. What are promoter and reporter genes?

II. Write explanatory notes on any FIVE of the following. **(5x5=25)**

9. Briefly explain DNA finger printing techniques.
10. Write a short essay on PCR and its application.
11. List out the important features of pBR322 and pUC19 vectors.
12. Write the salient features of artificial chromosomes.
13. What are probes? Explain its importance in genetic engineering
14. Explain the importance and application of genomics.
15. Discuss about any two methods used to analyse gene expression.
16. Comment on the methods used to manipulate gene expression.

III. Answer any THREE of the following **(3x10=30)**

17. What is DNA sequencing? Describe various methods involved in sequencing of Nucleic acids.
18. Discuss the various methods of gene transformation in eukaryotes.
19. Give a detailed account of recombinant screening.
20. Give an illustrated account of genomic library. Describe the procedures for performing cDNA library.
21. With a neat labeled diagram explain the various methods used for studying promoters. Add a note on DNA binding proteins.

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Mangaluru

Semester II – P.G Examination – M. Sc. Biotechnology

April - 2019

ENZYMOLOGY

Time: 3 Hours **Max. Marks: 70**

Note: Draw neat labeled diagrams/schematic sketches/structures wherever Necessary

I. Write short notes on any FIVE of the following. **(5x3=15)**

1. Extraction of membrane bound enzymes.
2. Concerted model of ATCase.
3. Lineweaver-Burk plot
4. TPP as a coenzyme.
5. Cleland notation of random sequential mechanism.
6. Aspartate amino transferases.
7. Nomenclature of ligases.
8. Enlist three therapeutic applications of any one enzyme with an example each.

II. Write explanatory notes on any FIVE of the following. **(5x5=25)**

9. What does enzyme commission number signify? Explain with two examples.
10. Explain Nucleophilic and Elctrophilic reaction of enzymes.
11. Criteria for purity of enzymes.
12. LDH as an isoenzyme.
13. Explain ping pong mechanism with an example.
14. Pencillin as a suicide inhibitor.
15. Kinetics of competitive inhibition.
16. ELISA

III. Answer any THREE of the following **(3x10=30)**

17. Different types of enzyme assays.
18. Derive Michaelis- Menton equation.
19. Explain the mechanism of action of RNase.
20. Explain non-competitive inhibition and its kinetics.
21. Describe zymogen activation. Give the importance of this mechanism in the functioning of digestive enzymes.

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PS 504.2a

Reg. No:

St Aloysius College (Autonomous)
Mangaluru
Semester II – P.G Examination – M. Sc. Biotechnology
April - 2019
BIOPHYSICAL AND BIOCHEMICAL TECHNIQUES

Time: 3 Hours **Max. Marks: 70**

Note: Draw neat labeled diagrams/schematic sketches/structures wherever Necessary

I. Write short notes on any FIVE of the following. **(5x3=15)**

1. Paper chromatography
2. Beer- Lambert's law
3. Relative centrifugal force
4. Agarose
5. Isoelectric Point
6. Pattern of radioactive decay
7. TAE buffer
8. Freeze fracture

II. Write explanatory notes on any FIVE of the following. **(5x5=25)**

9. Adsorption chromatography
10. Circular dichroism
11. Capillary electrophoresis
12. Application of density gradient centrifugation in cell fractionation
13. Gieger – Muller Counter
14. Applications of genomics in *insitu* hybridization
15. Autoradiography
16. Microcentrifuge and its applications. Add a note on factors affecting centrifugation.

III. Answer any THREE of the following **(3x10=30)**

17. Write an essay on PFGE and its applications.
18. Elaborate on application of stable isotopes in biology and add a note on safety measures.
19. Give a detailed account on resolving powers of different microscopes you have studied and add a note of its application.
20. Write on principle and application of X ray diffraction spectroscope in biology.
21. Explain the principle of affinity chromatography and add a note on its applications.

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