PH 511.4 Reg. No. :

St Aloysius College (Autonomous)

Mangaluru

Semester IV – P.G Examination – M.Sc. Biochemistry

May/June - 2023

IMMUNOLOGY

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

I. Answer any TEN sub-divisions of the following: **(10x2=20)**

1. What is acquired immunity. What cells are responsible for acquired immunity?
2. What are the natural killer cells?
3. What is the role of spleen in the immune system?
4. Write two functions each of IgM and IgG.
5. What is ELISA. What is the basic principle of ELISA?
6. What are epitopes?
7. What are cytokines? State any two cytokines with their role.
8. What is HLA Haplotype? What is its relevance?
9. What are T_H cells?
10. Give short notes on type I hypersensitivity reaction.
11. What is Rheumatoid Arthritis?
12. What is herd immunity?

II. Answer any SIX of the following: **(6x5=30)**

13. Write notes on mechanism of innate immunity.
14. Write notes on basic structure and classes of immunoglobulins.
15. Give an account on cytotoxicity assay.
16. Discuss Antibody class switching
17. Write notes on mechanism of cytotoxic T-cells.
18. Write a note on structure and function of class I and class II MHC molecules.
19. Give a note on host immune response to bacterial infection.
20. Write notes on AIDS and SCID.

III. Answer any TWO of the following: **(2x10=20)**

21. Give an account on structure and function of secondary lymphoid organs.
22. Give an account on production of monoclonal antibodies. Add notes on its applications.
23. Explain in detail Antigen processing and presentation.
24. Discuss in detail on Cancer and Immune system.

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GENETICS

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

I. Answer any TEN sub-divisions of the following: **(10x2=20)**

1. Comment on dominant, recessive, homozygous and heterozygous traits.
2. What are transposons? Give example.
3. What are satellite DNAs? Give an example.
4. Which test is used to locate the mutations in gene? Briefly explain its principle.
5. Comment on polytene chromosomes.
6. How mutations effect the phenotype of an organism?
7. What is karyotyping?
8. What are sex limited and sex influenced traits?
9. What is coevolution? How is it different from convergent evolution?
10. What is chemotherapy? Give an example for a drug used in chemotherapy.
11. What is contact inhibition?
12. Enlist retroviral oncogenes. Mention their significance.

II. Answer any SIX of the following: **(6x5=30)**

13. What is random genetic drift? Describe how mutation and migration lead to genetic drift.
14. Discuss Drosophila and Arabidopsis as models for genetic studies.
15. Describe the three levels of DNA packaging in eukaryotic chromosome.
16. Describe pedigree analysis for X-linked dominant and X-linked recessive traits.
17. What are linkage maps? Discuss tetrad analysis mapping method.
18. Explain various types of genetic recombination.
19. Explain the principle and application of Ames test.
20. Differentiate between oncogene and tumor suppressor genes with examples.

III. Answer any TWO of the following: **(2x10=20)**

21. Describe the Mendel's principles applied to study the inheritance of traits.
22. Describe the methods of microbial genetic transfer.
23. Describe photoreactivation and excision mechanism of DNA repair.
24. Discuss a) the role of telomerase in cancer b) Therapeutic interventions in cancer.

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Semester IV – P.G Examination – M.Sc. Biochemistry

May/June - 2023

GENETIC ENGINEERING AND BIOINFORMATICS

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

I. Answer any TEN sub-divisions of the following: **(10x2=20)**

1. What are plasmids? Why are they used as vectors?
2. Enumerate and draw a schematic diagram showing the salient features of a shuttle vector.
3. Are DNA polymerases thermostable? Justify your answer.
4. What are CHO cells? List their uses in biotechnological applications.
5. List any two applications of bioinformatics.
6. What is Edman's degradation? What is its application?
7. What is SAGE? Explain its principle.
8. What is phage display? How can it be used as an effective technique in proteomics?
9. What is the Global and Local alignment of sequences?
10. What is Clustal Omega? What is its significance?
11. What is a signal peptide database? Give example.
12. What is homology? How is it relevant in bioinformatics?

II. Answer any SIX of the following: **(6x5=30)**

13. Which are the mammalian cell lines used as expression systems in genetic engineering? Include a note on the advantages and disadvantages of different expression systems.
14. What are DNA probes? Explain their applications for screening recombinants.
15. Which are the assays conducted to study site-directed mutagenesis? Explain with schematic representation.
16. Describe the classification of various databases.
17. Describe protein structural databases. Add a note on tools and approaches for structural analysis.
18. Explain the hosts and expression systems in insects and plants.
19. Describe any two DNA sequencing techniques along with their principle, technique, and their applications.
20. Explain the strategy adopted and the major findings of the human genome project.

III. Answer any TWO of the following: **(2x10=20)**

21. Describe any four types of DNA modifying enzymes, their action, and applications in genetic engineering.
22. Explain the tools used for positional cloning along with principle and methodology.
23. What is molecular phylogenetics? Explain the terminology, tools, and application of phylogenetic trees.
24. Discuss the various physical and chemical methods of transformation in prokaryotes as well as eukaryotic cells.

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Semester IV – P.G Examination – M.Sc. Biochemistry

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CLINICAL TOXICOLOGY

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

I. Answer any TEN sub-divisions of the following: **(10x2=20)**

1. Mention 4 routes of drug administration.
2. Write the significance of liposomes in drug delivery.
3. What is AUC?
4. Comment on carbon tetra chloride induced liver toxicity.
5. Differentiate between acute and chronic toxicity.
6. Write the different types of antidotes.
7. What is nephrotoxicity? List the substances that cause nephrotoxicity.
8. What is the medical significance of digoxin?
9. What are anabolic steroids? Give examples.
10. What are emetics and chelating agents? Give examples.
11. What is montelukast? When is it prescribed?
12. What is chloroquine? What is its mechanism of action?

II. Answer any SIX of the following: **(6x5=30)**

13. What are Lipinski's rule of Five?
14. Explain the ethical issues involved in a clinical trial.
15. Discuss with an example how LD50 is calculated. Differentiate between LD50 and ED50.
16. Discuss organizational versus activational effects of endocrine toxicants.
17. Explain how diuresis and dialysis help in eliminating a toxin from the system?
18. Give an account on drugs used against GIT disorders.
19. Discuss the physiological effects of Non-Steroidal Anti-Inflammatory drugs and write the significance.
20. Give a detailed account on drugs of abuse with ethanol and nicotine as examples.

III. Answer any TWO of the following: **(2x10=20)**

21. Discuss the types and mechanisms of action of anti-cancer agents.
22. Explain the different phases of detoxification
23. Discuss the types of respiratory responses to toxins.
24. Describe the pre-clinical phases of assessing toxicity of a compound. Comment on the selection of organisms.

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