PS 511.4

Reg. No: ☐☐☐☐☐☐

St Aloysius College (Autonomous) Mangaluru
Semester IV - P.G. Examination - M.Sc. Biochemistry
September - 2020
IMMUNOLOGY

Time: 3 Hours

Max.Marks:70

(10×2=20)

I Answer any TEN of the following:

1. Distinguish between antigenicity and immunogenicity.

2. How precipitation is different from agglutination?

3. What are tumor associated antigens? Give an example.

4. What are haptens? Give an example.

5. What is meant by valency of an antigen?

6. Differentiate innate immunity from acquired immunity.

7. What are epitopes and paratopes?

8. Distinguish between the isotypic and allotypic variations.

9. What are vaccines? Mention their importance.

10. What are interleukins? Give an example.

11. What is immunotolerance?

12. Name the primary and secondary lymphoid organs.

II Answer any SIX of the following:

(6×5=30)

13. Explain the exogenous pathway of antigen processing and presentation.

14. Discuss the classical pathway of complement activation.

15. Give a note on ELISA.

16. Discuss the immune response to bacterial infections.

17. What is MHC? What is its role?

18. Draw the structure of a typical antibody molecule and identify functional domains.

19. What are autoimmune diseases? Explain with an example.

20. Explain the complement fixation technique. What is its application?

III Answer any TWO of the following:

(2×10=20)

21. Describe the structure and function of T cell receptor.

22. Describe in detail about the mechanism of antibody diversity.

23. a) Name the cells of the immune system and give their important function.

    b) How do phagocytic cells kill the invading pathogens?

24. Explain in detail about the type I and type II hypersensitivity reactions.

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Semester IV - P.G. Examination - M.Sc. Biochemistry
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CELLULAR BIOCHEMISTRY

Time: 3 Hours

Max.Marks:70

(10×2=20)

I Answer any TEN of the following:

1. What is caveolae and rafts?
2. What are liposomes? Give any two applications.
3. What is troponin and tropomyosin? Mention their functions.
4. What do you mean by quorum sensing?
5. What are retroviral oncogenes?
6. Define contact inhibition.
7. What is the role of eGMP in vision?
8. Define metastasis.
9. What are peroxisomes? Give any two functions.
10. What is patch-clamp technique?
11. What are aquaporin channels? Mention their functions.
12. Define "Warburg effect".

(6×5=30)

II Answer any SIX of the following:

13. Write a note on the structure and importance of mitochondria.
14. Explain the role of integrins and selectin receptors in cell –cell communication.
15. Explain the mechanism of intracellular transport in Golgi apparatus.
16. Briefly explain the mechanism of receptor mediated endocytosis and exocytosis.
17. Write a note on telomerases and its role in cancer.
18. Briefly explain primary and secondary active transport system with examples.
19. Give an account on second messengers.
20. Write a note on factors causing cancer.

(2×10=20)

III Answer any TWO of the following:

21. Describe the structure and functions of different types of muscles. Add a brief note on mechanisms of contraction & relaxation of muscles.
22. Discuss the properties of biological membrane. Add a note on different models of membrane.
23. Explain the differences between normal and cancer cells. Discuss the role of tumor suppressor genes in cell cycle control and tumor development.
24. Explain the mechanism of cell signaling by G-protein coupled receptors with an example.

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PS 514.4

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Mangaluru
Semester IV - P.G. Examination - M.Sc. Biochemistry
September - 2020
GENETIC ENGINEERING

Time: 3 Hours

Max.Marks:70

(10×2=20)

I Answer any TEN of the following:

1. What is blunt-end ligation?

2. What is a COSMID?

3. Define transformation

4. Compare *in-situ* hybridization and colony hybridization.

5. Define Karyotype.

6. What is a reporter gene? Give an example.

7. Compare DNA fingerprinting & footprinting.

8. Define gene therapy.

9. What is phage display? List its merits.

10. List out the methods available for gene expression analysis.

11. What are the different types of IPR?

12. List the applications of rDNA technology in medicine.

II Answer any SIX of the following: (6×5=30)

13. Why nucleases are useful tools in DNA investigations?

14. Write the salient features of M13 phage vector.

15. Describe the method of insertional inactivation.

16. A DNA when digested with restriction enzymes yields fragments given in the table below. Perform restriction mapping and assemble the genome.

EcoRI (kb)	BamHI (kb)	EcoRI +BamHI (kb)
1.5	0.7	0.2
3.4	1.0	0.5
	1.2	1.2
	2.0	2.0
		1.0

17. Write an account on patenting procedures.

18. Describe 2D Electrophoresis and its use in proteomics.

19. Discuss the shotgun sequencing method.

20. Describe Gel mobility shift assay and its applications.

III Answer any TWO of the following: (2×10=20)

21. a) Discuss the use of linkers and adapters in cloning.

    b) Give an account of Bacterial artificial chromosome.

22. Explain different techniques for selection of recombinants.

23. Discuss serial analysis of gene expression and its applications.

24. Write a detailed account on Human Genome project.

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Mangaluru
Semester IV - P.G. Examination - M.Sc. Biochemistry
September - 2020
BIOSTATISTICS AND BIOINFORMATICS

Time: 3 Hours   Max.Marks:70

I Answer any TEN of the following: (10×2=20)

1. Why are population and sample important in biostatistics?

2. Enlist the properties of arithmetic mean. Compute arithmetic mean for the following data: 97,68,71,54,85

3. Define Skewness.

4. What is probability? Mention the fundamental rules of probability.

5. Define hypothesis, type I error, type II error and level of significance.

6. What is p-value of statistics?

7. Define database. What is the data retrieval tool of Gen Bank?

8. What are database management system and relational database management system?

9. Expand and define CATH and SCOP.

10. What is BankIT?

11. Define orthologs and paralogs with an example for each.

12. What is PAM and BLOSUM ?

II Answer any SIX of the following: (6×5=30)

13. What are the measures of central tendency? Calculate mode and median from the following data:

Age	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	120	90	140	80	70	50	60

14. Write briefly on methods of measuring dispersion. Compute standard error for the following data.

    Variable (x)=13, 15, 22, 24, 34, 39, 33, 44

15. Describe various sampling techniques. Add a note on their advantages & disadvantages.

16. Discuss about randomized block design of experiments and analysis.

17. What is homology modeling? Write a note on protein families.

18. Define Bioinformatics. Explain the organization of NCBI database.

19. Write a note on BLAST.

20. Discuss briefly on methods of multiple sequence alignment.

III Answer any TWO of the following: **(2×10=20)**

21. What is frequency distribution? Discuss on various types of graphical representation of data with advantages and disadvantages over each other.

22. How is scatter plot useful? Calculate the regression coefficient and find out its significance for the following data representing heights (measured to nearest 20 m) and the weights (measured to nearest kilogram) of 10 men.

Height	182	174	168	183	175	169	173	175	186	184
Weight	76	84	72	92	76	68	82	88	89	64

23. Explain protein sequence and structural databases. Write a note on protein structural viewing tools.

24. What is phylogenetic tree? Explain the different methods of construction of phylogenetic tree.

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