

Time: 3 Hrs.

[Max. Marks: 100]

Paper – I

Cell Biology

Q.P. Code: M2150

Your answers should be specific to the questions asked.

Draw neat labelled diagrams wherever necessary.

Long Essay

10 x 2 = 20 marks

1. Explain the composition and the biological significance of extracellular matrix.
2. Explain the structure and functions of endoplasmic reticulum. Distinguish between smooth and rough endoplasmic reticulum.

Short Essay

5 x 10 = 50 marks

3. Describe the structure, cellular location and functions of ribosome. Explain the significance of polysome.
4. Distinguish between heterochromatin and euchromatin.
5. Describe the biological significance of collagen, elastin and hyaluronic acid in extracellular matrix.
6. Define cell adhesion. Describe their biological significance and give two examples.
7. Describe the composition and significance of spindle apparatus. Describe the role of spindle poison with an example.
8. Describe the composition and biological significance of respiratory chain complex.
9. Describe the mechanism and significance of signal transduction.
10. Explain the role of telomere in cell senescence.
11. Explain the mechanism of cell signalling mediated by epidermal growth factor.
12. Describe the mechanism and types of protein sorting.

Short Notes

3 x 10 = 30 marks

13. Give two examples of cytoplasmic, nuclear and ion channel linked receptors.
14. Describe the salient features of protein half-life.
15. Describe the biological significance of ubiquitination.
16. Describe the role of protein phosphorylation during signal transduction.
17. Describe the attributes of second messenger.
18. Describe the significance of cross-talk in signal transduction.
19. Describe the salient features of hormone responsive elements.
20. Describe the attributes of cell quiescence.
21. Describe the attributes of autophagy.
22. Describe the cellular and molecular basis of inflammation.

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SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH

(A DEEMED TO BE UNIVERSITY)

M.Sc. Molecular Biology & Human Genetics

First Year (Semester - II)

July/August 2019 Examinations

Time: 3 Hrs.

[Max. Marks: 100]

Paper – II

Principles of Genetics

Q.P. Code: M2160

Your answers should be specific to the questions asked.

Draw neat labelled diagrams wherever necessary.

Long Essay

10 x 2 = 20 marks

1. Explain the components and steps involved in transcription
2. Describe the structure of DNA. Distinguish between A, B and Z forms of DNA.
Draw the structure of a trinucleotide.

Short Essay

5 x 10 = 50 marks

3. State and explain the law of independent assortment with an example.
4. Explain the phenomenon of multiple alleles with an example.
5. Describe the salient features of X chromosome inactivation.
6. Describe the factors affecting Hardy-Weinberg Equilibrium.
7. Describe the types of gene polymorphism.
8. Describe the mechanism and significance of mRNA processing
9. Explain the steps involved in eukaryotic translation.
10. List the different types of mammalian DNA polymerases and their functions
11. Describe the regulation of gene expression
12. Describe the structure of nucleosome.

Short Notes

3 x 10 = 30 marks

13. Explain hemizyous condition with special reference to *SRY* gene.
14. Differentiate between prokaryotic and eukaryotic genomes.
15. Distinguish between genome, gene and allele.
16. Describe the salient features of pseudogenes.
17. Distinguish between mutation and polymorphism.
18. Mention the types of DNA repair systems of the human cell.
19. Describe the salient features of non-coding RNA.
20. Describe the biological significance of molecular chaperones.
21. Describe the salient features of post-translational modification of proteins.
22. Justify the statement: 'human gene is a split gene'.

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M.Sc. Molecular Biology & Human Genetics

First Year (Semester - II)

July/August 2019 Examinations

Time: 3 Hrs.

[Max. Marks: 100]

Paper – III

Molecular Biology Techniques

Q.P. Code: M2170

Your answers should be specific to the questions asked.

Draw neat labelled diagrams wherever necessary.

Long Essay

10 x 2 = 20 marks

1. Explain the principle of Sanger sequencing.
2. Explain the principle and applications of Southern, Northern and Western blotting techniques.

Short Essay

5 x 10 = 50 marks

3. Describe the principle and applications of multiplex ligation dependent probe amplification technique (MLPA).
4. Describe the properties of PCR polymerase.
5. Explain the principle and applications of ultracentrifugation.
6. Define spectrophotometry. Explain the principle of DNA estimation by spectrophotometry and draw the absorption spectrum of DNA.
7. Describe the steps involved in polymerase chain reaction.
8. Describe the types of columns and detectors used in HPLC.
9. Distinguish between NTP, dNTP and ddNTP along with their structures.
10. Distinguish between excitation and emission spectra.
11. List the methods for determination of (i) point mutation, (ii) frame-shift mutations, (iii) deletion, (iv) duplication and (v) gene amplification.
12. Explain the principle of dialysis with reference to protein purification

Short Notes

3 x 10 = 30 marks

13. List the applications of real-time polymerase chain reactions.
14. Define reducing agent and justify its usage in SDS-PAGE
15. Justify why next generation sequencing is referred to as massively parallel sequencing.
16. List the applications of mass spectrometry.
17. Describe the advantages of chemiluminescence in developing Western blot
18. Distinguish between oligonucleotide probe and oligonucleotide primer.
19. List the advantages and disadvantages of SDS-PAGE.
20. Describe the salient features of a molecular label and give two examples.
21. Describe the attributes of transcriptome.
22. List the clinical specimens used for protein analysis.

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