

2021

PHYSIOLOGY — HONOURS

Paper : CC-9

(Molecular Biology)

Full Marks : 50

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Group - A

1. Answer **any five** questions :

2×5

- (a) What are Okazaki fragments?
- (b) What are plasmids?
- (c) What are polysomes?
- (d) What is the role of Rho factor in transcription?
- (e) What are transgenic animals?
- (f) Name one chemical and one physical mutagen.
- (g) What is meant by polycistronic mRNA?
- (h) What is transcriptome?
- (i) What is RT-PCR?
- (j) Name the type of gene mutation in the following :
 - (i) Sickle cell anaemia
 - (ii) Beta thalassaemia.

Group - B

2. Write short notes on **any two** of the following :

- (a) Write the principle and application of Autoradiography. 5
- (b) Properties of cancer cells. 5
- (c) Write short notes on any **one** of the following : 5
 - (i) Effects of radiation on biological tissues
 - (ii) ELISA
 - (iii) Polyacrylamide gel electrophoresis.

Please Turn Over

- (d) What is codon? Discuss in brief the salient features of genetic code. 1+4
- (e) Discuss the initiation of translation in prokaryotes. What is Shine-Dalgarno sequence? 3+2

Group - C

3. Answer **any three** questions from the following :

- (a) What is replication bubble? How does unwinding of DNA strands take place before replication begins? Describe the semi-discontinuous process of DNA synthesis. 1+4+5
- (b) State the principle of ultracentrifugation. Discuss how this technique is employed to separate subcellular organelles. What is Svedberg unit? 3+5+2
- (c) What are the three basic types of mutation? Discuss about the effects of mutation in genes on the biological action of proteins formed from the mutated genes. 6+4
- (d) What is a recombinant DNA? Describe the process of preparation of recombinant DNA molecules. Name two diseases in which gene therapy has been successfully used as a treatment. What are vectors in gene therapy? 2+4+2+2
- (e) What is an Operon? Write the difference of inducible and repressible operon with example. Name the physiological inducer of Lac Operon. With a clean schematic diagram describe the regulation of gene expression of Lac operon in *E.Coli* in presence of inducer. How CAP regulates Lac operon? 1+2+1+4+2
- (f) What are the three main steps of PCR? State two important applications of PCR. What is Western Blot? Write two differences between Northern Blot and Southern Blot. 3+2+2+3
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