PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2022
(First Semester)

Branch – APPLIED MICROBIOLOGY

CELL BIOLOGY & MOLECULAR DYNAMICS

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1 When a cell releases a signal molecule into the environment and a number of cells in the immediate vicinity respond, this type of signaling is
(i) Typical of hormones (ii) Autocrine signaling
(iii) Paracrine signaling (iv) Synaptic signaling

2 A mutation in DNA gyrase is likely to result in resistance to which one of the following antibiotics?
(i) Amphotericin B (ii) Ciprofloxacin
(iii) Penicillin (iv) Streptomycin

3 To which class of transcription factor do nuclear receptors belong?
(i) Zinc finger proteins (ii) Leucine zipper proteins
(iii) Helix-turn-helix proteins (iv) Helix-loop-helix proteins

4 Which of the following about mRNA stability is not correct?
(i) Regulation of mRNA stability is a way of regulating gene expression
(ii) Prokaryotic mRNAs have a half-life of only a few minutes
(iii) Histone mRNAs have especially long poly-A tails and are stable
(iv) It is thought that poly-A tails stabilize eukaryotic mRNAs

5 Which of the following bacterial operon is not controlled by attenuation?
(i) Arabinose (ii) Tryptophan
(iii) Leucine (iv) Histidine

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 a Explain the mechanism of Ras-dependent RTK pathway.
OR
b "cAMP as a second ary messenger" – justify.

7 a Evaluate the functions of repetitive gene sequences in a DNA.
OR
b A cell genome consist of mutant primase and DNA Pol-1, 5'→3' exonuclease activity, what will be happened during the genome replication. Resolve this issue.

8 a Derive the trans-splicing events of mRNA.
OR
b Demonstrate the functions of general transcriptional factors.

Cont...

9 a Demonstrate the concept of Wobble hypothesis.

OR

b Elucidate the mechanism of tRNA activation.

10 a Illustrate the genetics of Gal operon.

OR

b Analyze the importance of enhanceosome on gene regulation with suitable examples.

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 a "Secondary messengers act as major signaling molecules involved in cardiac muscle and adult brain functions" – Justify with suitable examples.

OR

b Comment on the mechanism of Ras on MAP-kinase pathway.

12 a Illustrate the pre-initiation complex of transcription and their modification during RNA elongation.

OR

b Distinguish between cis- and trans- splicing in eukaryotes.

13 a Describe the "one gene one polypeptide concept" by taking evidence from biochemical mutation in human and Neurospora.

OR

b Explain the events in replication in eukaryotic genome.

14 a Explain the molecular mechanism of termination of protein synthesis.

OR

b Explain the role of ERGIC on protein function. Give suitable illustrations.

15 a Demonstrate the ß-gal functions of the following gene orientation with suitable illustrations. i) $I^+O^+Z^+$; ii) $I^-O^+Z^+$; iii) $I^-O^-Z^+$; iv) $I^+O^-Z^+$.

OR

b Explain the functions of siRNA on Gene expression.

Z-Z-Z END