BIOCHEMISTRY
PAPER-IV

Time: 3 hours BCHEM/J/20/03/IV
Max. Marks:100

Important Instructions:

- *Attempt all questions in order.*
- *Each question carries 10 marks.*
- *Read the question carefully and answer to the point neatly and legibly.*
- *Do not leave any blank pages between two answers.*
- *Indicate the question number correctly for the answer in the margin space.*
- *Answer all the parts of a single question together.*
- *Start the answer to a question on a fresh page or leave adequate space between two answers.*
- *Draw table/diagrams/flowcharts wherever appropriate.*

Write short notes on:

1. Describe the stages of development of vaccine against viral diseases and challenges in development of vaccine against virus causing COVID-19 (SARS-CoV-2). 7+3

2. List the antiviral drugs used in COVID-19 and write their mechanism of action. 3+7

3. Describe the techniques that can be used to produce Spike protein of SARS-CoV-2 virus by genetic engineering techniques. 10

4. a) Two dimensional gel electrophoresis 5+5
   b) Role of chromatography in separation of nucleic acids.

5. a) Multiplex PCR. 5+5
   b) Ct value and absolute count of virus by RT-PCR.

6. Describe the differences between: 5+5
   a) Chemiluminiscence and Bioluminiscence
   b) Turbidimetry and Nephelometry

7. Describe the use of mass spectrometry in analyzing the amino acid, protein and metabolomics. Add a short note on MALDI-TOF. 7+3

8. Write basic principle, instrumentation requirement and clinical application of Fluorescent in situ hybridization (FISH) technique. 5+2+3

9. Describe the techniques used in characterization of a novel protein. 10

10. Write the potential and present uses of artificial intelligence, large data analysis and bioinformatics tool in biochemistry diagnostic research. 3+3+4

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