Roll No:

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B.Sc. Biochemistry, Semester-V Examination-2023

Paper Title: GENOMICS, PROTEOMICS AND METABOLOMICS
Paper Code: BBC-DSE05

Time: 3 hour **Max Marks: 75**

Note: *This paper has 3 sections A, B, and C, Attempt all the three sections*
Section A: Answer all the questions; Section B: Answer any 2 out of 4; Section C: Answer all the questions, each question has an internal choice

Abbreviations Used
CLO- Course Learning Outcome, PLO- Program Learning Outcome, BTL- Bloom Taxonomy Level: BT level 1-Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate, BT level 6-Create

Section A (Attempt all questions)

(10X1=10 Marks)

Q. No	Questions	BTL	CLO	PLO
a	1st complete genome was sequenced for ..... genome.	1	2	2
b	..... is the first hand held nanopore DNA sequencer.	1	2	2
c	Ions with ..... mass and ..... charge are deflected more in mass spectrometer.	4	1	3
d	MS/MS technique is also known as	1	3	3
e	2-dimensional polyacrylamide gel electrophoresis involves ..... technique in 1st dimension and ..... technique in 2nd dimension.	2	3	3
f	In NMR spectroscopy, a technique to study metabolomics, NMR stands for.....	4	2	3
g	A database containing information on metabolites found in human serum is known as	1	2	3
h	If Tryptophan levels are high, the tryptophan operon expression is turned	3	5	3
i	If Lactose levels are high and glucose levels are low, the lac operon is turned	3	5	3
j	..... operon is an example of feed forward loop.	5	1	3

SECTION B: Long type Questions (Attempt any two out of four) **(2X15=30 Marks)**

Q. No	Questions (Any Two)	BTL	CLO	PLO
1	What is Sanger's sequencing? Explain its working.	1	2	2
2	Explain the working of Mass Spectrometry and highlight any 2 applications of mass spectrometry	3	3	3
3	Write in detail the metabolomics workflow starting from sample identification to data analysis.	4	1	3
4	Explain the role of genetic switches in Drosophila eve gene development.	5	3	3

SECTION C: Short-type Questions. (Attempt all questions, each question has an internal choice) **(7X5=35 Marks)**

Q. No	Questions	BTL	CLO	PLO
1	Explain the working of Maxam-Gilbert's sequencing **OR** What do you understand by 1st, 2nd and 3rd generation sequencing. Compare and highlight with examples.	2	5	3
2	Explain the working of 454-pyrosequencing **OR** Explain the work flow of RNA sequencing	3	4	2
3	Explain the working of shotgun proteomics. **OR** Explain Gas chromatography - Mass spectrometry.	1	2	2
4	Explain the iTRAQ method of quantifying differential protein expression **OR** Explain the ICAT method of quantifying differential protein expression	3	3	3
5	Name and compare the advantages and limitations of the 2 major techniques used to study metabolomics. **OR** Explain 5 applications of Metabolomics.	3	2	2
6	Explain the 4 ways of gene regulation including negative inducible, negative repressible, positive inducible and positive repressible. **OR** Explain the role of tryptophan repressor and tryptophan in controlling tryptophan operon expression	5	3	3
7	Explain the dual control of Lac operon. **OR** Explain the feed forward loop with an example of an operon.	4	1	3

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