

2024

PHYSIOLOGY — HONOURS

Paper : SEC-B-1 and SEC-B-2

The figures in the margin indicate full marks.

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

SEC-B-1

(Detection of Food Additives/Adulterants and Xenobiotics)

Full Marks : 80

Group - A

1. Answer *any ten* questions :

2×10

- (a) Distinguish between additives and adulterants.
- (b) Why is margarine more harmful than butter?
- (c) State any two hazardous effects of aluminium foil.
- (d) State the importance of glucuronide conjugation.
- (e) Which food additive can be added to salt to make it 'free flowing'?
- (f) Name the foods where Mercury and Cadmium present as contaminants.
- (g) Why saccharine is harmful to our body?
- (h) Mention the processes by which xenobiotics enter into the cells.
- (i) State any two purposes of biotransformation reactions of xenobiotics.
- (j) What is the difference between Bisphenol A and Bisphenol S?
- (k) Name two adulterants present in milk.
- (l) Mention any two pathophysiological effects of arsenic.
- (m) What are azo dyes? Give example.
- (n) What is the toxic effect of aflatoxin?
- (o) What is 'Chinese Restaurant Syndrome'?

Group - B

2. Write short notes on (*any four*) :

5×4

- (a) Food additives
- (b) Lead induced nephrotoxicity and respiratory dysfunction
- (c) Pathophysiological effects of polychlorinated biphenyls

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- (d) Characteristic features of xenobiotics
- (e) Bisphenol exposure and human health
- (f) Role of saccharine on gut microbiota.

Group - C

Answer *any four* questions.

3. Name the adulterants present in the following food substances along with their harmful effects : 2×5
- (a) Hone
 - (b) Mustard oil
 - (c) Turmeric
 - (d) Besan
 - (e) Vanaspati.
4. How can the presence of adulterants in the following food items be detected? 2×5
- (a) Butter
 - (b) Atta
 - (c) Chana dal
 - (d) Chilli powder
 - (e) Black pepper.
5. (a) Classify food preservatives with examples.
(b) What is MSG? Discuss its harmful effects on human health.
(c) What are sequestrants? 3+(1+4)+2
6. (a) Discuss the properties of human cytochrome P450 enzyme system.
(b) Discuss the conjugation and oxidation reaction of detoxification. 5+5
7. (a) Xenobiotics can act as mutagen, carcinogen and teratogen. — Justify the statement.
(b) Discuss the role of kidney in xenobiotic excretion. 6+4
8. Explain your idea about the following : 5+5
- (a) Obesogenic effects of Bisphenols
 - (b) Pathophysiological effects of chicory on human body.

SEC-B-2
(Bioinformatics)
Full Marks : 80

Group - A

1. Answer *any ten* questions :

2×10

- (a) What are the uses of FASTA programme?
- (b) What do you mean by Metagenomics?
- (c) What is OMIM?
- (d) What is in-silico PCR?
- (e) What is gene prediction?
- (f) Name two tools used in phylogenetic analysis.
- (g) What is RasMol?
- (h) What is microarray?
- (i) What is protein BLAST?
- (j) What is meant by gene prediction?
- (k) Name two primary databases.
- (l) What is computational Biology?
- (m) What is the importance of SAR?
- (n) What are the objectives of maintaining Gene Bank?

Group - B

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

5×4

- (a) Transcriptomics
- (b) Phylogenetic analysis tools
- (c) RPS-BLAST
- (d) Molecular docking
- (e) Artificial neural network
- (f) Epigenome.

Group - C

3. Answer *any four* questions :

- (a) (i) What are the steps of sequence alignment?
(ii) What is global sequence alignment?
(iii) Why is local alignment important in bioinformatics? 6+2+2
 - (b) (i) What are the steps of Computer Aided Drug Designing (CADD)?
(ii) Write the importance of modeling 3-D structure of a protein. 6+4
 - (c) (i) Differentiate between bioinformatics and computational biology.
(ii) How is bioinformatics applied in the identification of unknown proteins?
(iii) What is meant by full gene comparison? 4+4+2
 - (d) (i) What are the prerequisite information necessary for constructing a phylogenetic tree using bioinformatics tool?
(ii) How can bioinformatics assist in the prediction of disease-associated genes? 6+4
 - (e) Write short notes on *any two* of the following : 5×2
 - (i) In-silico drug design
 - (ii) Application of Micro-array
 - (iii) Drug design.
 - (f) (i) What is gene annotation?
(ii) Write the steps of mining database by bioinformatics tools.
(iii) Mention the importance of bioinformatics in biological science research. 2+4+4
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