2020

BOTANY

(Major)

Paper : 6·1

(Molecular Biology and Plant Biochemistry)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions as directed : 1×7=7

   (a) _____ system is an example where negative control of gene expression is illustrated. *(Fill in the blank)*

   (b) _____ is the amino acid which initiates the polypeptide chain in prokaryotic cells. *(Fill in the blank)*

(c) Why does mRNA not last long at all in prokaryotes ?

(d) The lac operon is a unit of _____ DNA.
(Fill in the blank)

(e) What is the full form of MVD ?

(f) The polysaccharide present in both, the cell wall of fungi and exoskeletons of arthopods is _____.
(Fill in the blank)

(g) Name the most extensively used chemical mutagen in microorganisms, higher plants and animals.

2. Answer the following in brief : 2×4=8

(a) Exons and Introns

(b) Monosaccharides

(c) Lac repressor

(d) Nonsense codon.

3. Write short notes on ***any three*** of the following : 5×3=15

(a) Role of Leghaemoglobin in biological N_2-fixation

(b) Base Analogues

(c) Difference between B-DNA and Z-DNA

(d) Structure of gene

(e) Justify the statement—"Enzymes are biological catalyst".

4. Answer ***any three*** of the following :
10×3=30

(a) What do you mean by semi-conservative replication. Give an account of the process of DNA replication in *E.coli.* 2+8=10

(b) What is regulator gene ? Give an account of the 'Lac Operon Model' for regulation of gene activity. 2+8=10

(c) Define enzyme Nitrogenase. What are its different components ? Explain the mechanism of action of the enzyme in different biological systems.
1+3+6=10

(d) What are the different kinds of RNA found in cell ? Describe the characteristics and functional role of each of them. 2+8=10

(e) Is point mutation always damaging? What are the causes of point mutation? Explain with the help of example. 2+8=10

(f) Explain the "central dogma of life". Why is it important in molecular biology and genetics? 10

2020

BOTANY

(Major)

Paper : 6·2

(Bioinformatics, Computer Application and Biotechnology)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Fill In the blanks : 1×7=7

(a) _____ program is used for searching nucleotide databases using a nucleotide query.

(b) Cartagena Protocol is related to _____.

(c) Class _____ restriction enzymes are used for cloning purposes.

Contd.

(d) Roundup soybean is tolerant to _____.

(e) PubMed is a _____ database.

(f) RNA is starting material for _____ library construction.

(g) During Agrobacterium mediated gene transfer, virulence gene _____ product senses the presence of phenolic compounds released by wounded plant tissue.

2. Define the following : 2×4=8

(a) Probes and primers

(b) Binary vectors

(c) Restriction enzyme

(d) Micropropagation.

3. Write on ***any three*** of the following : 5×3=15

(a) Genetic features of Ti plasmid

(b) Cloning and expression vectors

(c) Plant functional genomics in crop improvement

(d) Maxam-Gilbert method of DNA sequencing

(e) DNA library.

4. Answer ***any three*** of the following : 10×3=30

(a) Discuss the scope and importance of Biotechnology and Bioinformatics in present context of Biological research. What further development do you foresee in the area of Biotechnology and Bioinformatics in India? 6+4=10

(b) Define transgenic plants. Discuss the advantages and disadvantages of genetically modified crops. 2+8=10

(c) Explain different methods available for production of haploid plants. Discuss the use of haploids in plant breeding. 5+5=10

(d) What is DNA fingerprinting? Describe the procedure of DNA fingerprinting. Mention some important uses of DNA fingerprinting technology. 2+5+3=10

(e) Define operating system. Discuss the advantages/disadvantages of using Windows and Linux operating system. 2+8=10

(f) With the help of appropriate diagram, explain the molecular mechanisms associated with Agrobacterium mediated genetic transformation. 10

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3 (Sem–6) BOT M3

2020

BOTANY

(Major)

Paper : 6·3

(Plant Physiology)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : 1×7=7

   (a) Who proposed K^+ exchange hypothesis for opening and closing of stomata ?

   (b) Which mineral element is commonly present in "Cytochrome" and "Ferredoxin" ?

   (c) Name the phytohormone associated with cell division.

(d) Name the stress hormone in plants that functions during draught.

(e) What is scarification ?

(f) What will happen if the transpiration exceeds the amount of water absorbed ?

(g) What is the main role of photosystem–II ?

2. Answer the following questions in brief : 2×4=8

(a) Chemoautotrophs.

(b) What are Xenebiotics ? Why are they recalcitrant ?

(c) What is Vernalization ? Who coined the term Vernalization ?

(d) What is Bioassay ? Name *any two* bioassays for auxins.

3. Answer ***any three*** of the following : 5×3=15

(a) Explain the process of photorespiration.

(b) Write a brief note on Donnan Equilibrium.

(c) Describe the role of K^+ in opening of stomata.

(d) Discuss methods of inducing or breaking of seed dormancy.

(e) Describe the apoplast and symplast pathway.

4. (a) What do you understand by "ascent of sap" ? What are the different theories that have been put forward to explain the mechanism of ascent of sap ? Explain the transpiration pull and coherion-tension theory. 2+3+5=10

OR

Describe the role of cytochrome-pump hypothesis in relation to the entrance of mineral salts. What do you mean by salt respiration ? 7+3=10

(b) What do you mean by translocation of organic solutes ? Describe the process with the help of Munch's mass flow hypothesis. 2+8=10

OR

What do you mean by Emerson Enhancement effect? Describe the existence of two pigment systems in the light reaction of photosynthesis. 5+5=10

(c) What is Senescence? Explain briefly the sequential and simultaneous or synchronous senescence. 2+8=10

OR

What do you understand by water potential? Describe the relationship among metric potential, solute potential, pressure potential and water potential. 2+8=10

2020

BOTANY

(Major)

Paper : 6·4

(Plant Resource Utilization)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Fill in the blanks/Answer the following : 1×7=7

(a) The aromatic resin 'Lal Dhuna' is obtained from _____ tree.

(b) The term 'Pharmacognosy' was introduced by _____.

(c) The characteristic fruit of cereals is known as _____.

(d) What is the centre of origin of Soybean?

Contd.

(e) From which part of the *Bixa* plant, the dye is extracted ?

(f) _____ deals with identification, description and investigation of ingredients which are used in different recipes prepared by aborigines.

(g) Write the botanical name of 'Gamari' plant.

2. Answer the following questions : 2×4=8

(a) Mention the parts used and uses of economicaily important plants :

i. Zinger

ii. Bay leaf.

(b) Mention the economic uses of Jute.

(c) Write a short note on 'Green Revolution'.

(d) Mention the botanical name and chemical constituents of—

i. Henna

ii. Plumbago

3. Answer ***any three*** of the following questions : 5×3=15

(a) Mention the organoleptic evaluation of drugs.

(b) What is crop domestication ? Mention the process of domestication of crop plants.

(c) Write about the importance of traditional knowledge in relation to plant use.

(d) Give a short account of the method of tea cultivation in India.

(e) Write a note on the by-product of sugar industry.

4. Answer the following questions : 10×3=30

(a) Describe with examples, the classification of plant resources on the basis of their uses.

Or

Write about sources, products and their uses of *any two* of the following :

i. Coffee

ii. Black pepper

iii. *Citronella.*

(b) Describe the importance of non-timber plant resources of northeast India.

Or

Write about botany, plant parts used and various uses of *any two* of the following :

i. *Catharanthus*
ii. *Taxus*
iii. *Andrographis.*

(c) Describe the botany, method of cultivation and uses of Sal plant in India.

Or

What is IPR (Intellectual Property Right) ? What are the different types of IPRs ? Mention how IPR is helpful in safeguarding large diversity of traditional products with reference to some Indian context.

Total number of printed pages–4

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