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3 (Sem–6/CBCS) BOT HC 1

2022

BOTANY

(Honours)

Paper : BOT–HC–6016

(Plant Metabolism)

Full Marks : 60

Time : Three hours

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

1. Answer ***any seven*** questions from the following : 1×7=7

   (a) What are the *two* types of enzyme regulation ?

   (b) Name a cellular organelle containing cytochrome oxidase.

   (c) Cytochromes are _____ proteins.
   (Fill in the blank)

   (d) What are accessory pigments ?

Contd.

(e) Name a copper containing protein acting as an electron carrier in thylakoid membrane.

(f) Why is TCA cycle amphibolic?

(g) What are the types of second messengers?

(h) Photorespiration is completed in _____, _____, and _____. *(Fill in the blanks)*

(i) Name the component of the enzyme nitrogenase.

(j) Protein part of the enzyme is called as _____. *(Fill in the blank)*

2. Answer ***any four*** questions from the following : 2×4=8

(a) What do you mean by oxidative decarboxylation of pyruvate? Where does it occur?

(b) What are the roles of uncouplers in ATP synthesis?

(c) Distinguish between apoenzyme and prosthetic group.

(d) Differentiate between RuBP and RUBISCO.

(e) What regulates the PDH complex?

(f) Photosynthesis is driven by two photochemical processes which are associated with two groups of photosynthetic pigments. Name them.

(g) What is oxidative phosphorylation? Mention the *two* components of oxidative phosphorylation.

(h) What is NADH shuttle? Name the *two* types of NADH shuttle.

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

(a) Crassulacean acid metabolism (ACM)

(b) Synthesis and degradation of sucrose

(c) Allosteric inhibition

(d) Co-enzymes and co-factors

(e) Cyanide-resistant respiration

(f) Photorespiration

(g) Biological nitrogen fixation

(h) Receptor-ligand interactions

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

(a) What is photophosphorylation ? Give an account of cyclic and non-cyclic photophosphorylation.

(b) Describe the β-oxidation pathway of fatty acids.

(c) What are the fates of pyruvate in glycolysis ? Explain briefly.

(d) Describe mitochondrial electron transport.

(e) What are enzymes ? How are they classified ? Give a brief account of classification and nomenclature of enzymes.

(f) What are second messengers ? Mention the types of second messengers. Describe the mechanism of receptor mediated activation and inhibition of cyclic AMP.

(g) Describe C4 pathway and compare it with Calvin cycle.

(h) Explain glyoxylate cycle. What is its significance ?

Total number of printed pages–4

3 (Sem–6/CBCS) BOT HC 2

2023

BOTANY

(Honours Core)

Paper : BOT–HC–6026

(Plant 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) Molecules having new combination of sequences that were not present before are called as _____.

   (b) A single stranded, radiolabelled molecule of nucleic acid is called as _____.

   (c) Golden rice is a bioengineered crop with yellow coloured endosperm that contains _____.

Contd.

(d) Digestion of DNA using two restriction enzymes in a single reaction is called as _____.

(e) The two antibiotic resistant genes of vector p^{BR322} imparts resistance against _____ and _____.

(f) _____ is the first commercially produced human hormone using r-DNA technology.

(g) _____ vectors are designed to replicate in cells of two different host species.

2. Answer the following very briefly : 2×4=8

(a) What is the role of DMSO in cryopreservation ?

(b) What are cosmids ?

(c) What is the source of Luciferase gene ?

(d) State the difference between somatic and zygotic embryogenesis.

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

(a) Discuss the practical applications of somatic embryogenesis.

(b) Write a note on Lambda phage vector.

(c) Describe an engineered DNA molecule used to clone DNA sequences stating the common gene components present in it.

(d) What is an adaptor molecule ? How does it differ from linkers ?

(e) Why thermostable polymerase is used in PCR ? Mention *one* disadvantage of taq polymerase.

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

(a) What are restriction endonuclease enzymes ? Describe the specific properties of type I and type II restriction endonucleases enzymes. Why are they so important for recombinant DNA technology ? 1+6+3=10

(b) Describe various steps for the construction of cDNA library.

(c) Discuss elaborately the direct methods of gene transfer by electroporation and microinjection. 5+5=10

(d) What are organic supplements ? Give an account of organic supplements used in tissue culture media.

(e) What are secondary metabolites ? Describe a tissue culture strategy for the production of secondary metabolites.

(f) Give an account of role of transgenics in bioremediation.
