

Total No. of printed pages = 5

63/2 (SEM-3) BOT-302

2021

(held in 2022)

BOTANY

(Theory Paper)

Paper Code : BOT-302

(Molecular Biology and Plant Biotechnology)

Full Marks – 80

Time – Three hours

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

1. Answer the following multiple choice questions :

1×6=6

(a) DNA fingerprinting involves identification of differences in _____, a specific sequence of DNA.

(i) Non repetitive DNA (iii) Satellite DNA

(ii) Repetitive DNA (iv) Histone DNA

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(b) Pribnow box is composed of the sequence _____.

- (i) ATATAT (iii) TATATA
(ii) TATAAT (iv) TAATAA

(c) Phosphorylation of _____ residue at _____ position leads to capping of hn mRNA at 5' end

- (i) Serine, 2nd (iii) Serine, 5th
(ii) Threonine, 2nd (iv) Proline, 5th

(d) Signaling where blood plays an important role is _____.

- (i) Juxtacrine (iii) Autocrine
(ii) Paracrine (iv) Endocrine

(e) The process of introducing recombinant DNA into the host is known as

- (i) Ligation (iii) Transformation
(ii) Recombination (iv) Screening

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(f) Which organism has the highest number of vectors?

- (i) Yeast (iii) E. coli
(ii) Mammalian cell (iv) Fungi

2. Answer the following short questions: (All are compulsory) $5 \times 2 = 10$

(a) State the differences between replication and transcription. 2
(b) Citing example explain the phenomenon of chemotaxis. 2
(c) In *Arabidopsis*, DNA replication is immediately followed by transcription. Write true or false for the above statement. Give reasons for your answer. $1 + 1 = 2$

(d) What is molecular cloning? 2
(e) What are the necessary components of a plasmid? 2

3. Answer any two of the following questions: $2 \times 10 = 20$

(a) What is cell signaling? State the various components of cell signaling. Illustrate the mechanism of cell signaling using GPCR. $2 + 2 + 6 = 10$

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(b) What does RNA processing mean ? Illustrate its various types. $2+8=10$

(c) What is genetic engineering ? With diagrams, discuss the various tools and techniques of genetic engineering. $2+8=10$

(d) Explain how biotechnology is used in healthcare, agriculture and the environment.

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4. Write short notes on any six : $5 \times 6 = 30$

(a) Enzymes involved in DNA replication

(b) Cryptochrome

(c) DNA recombination

(d) Quorum Sensing

(e) Enzyme linked receptor

(f) 16S rRNA gene

(g) Restriction endonuclease

(h) Microinjection.

5. Answer any *one* of the following questions :

$14 \times 1 = 14$

(a) Describe the various factors that cause damages to DNA. 14

(b) What is totipotency and why is it important in plant tissue culture ? Using a diagram, describe the various types of tissue culture techniques. $8+6=14$