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

[Turn over

(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

(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) 5×2=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 : 2×10=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

(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. 10

4. Write short notes on any *six* : 5×6=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 : 14×1=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