2018

BOTANY

BOT 302

MOLECULAR BIOLOGY AND PLANT BIOTECHNOLOGY

Full Marks: 80

Time: 3 hours.

The figures in the margin indicates full marks for the questions

1. Answer the following ***multiple choice questions***: 1×8=8

   a. RNA polymerase enzymes responsible for synthesizing t-RNA is

      i. Poly-I iii. Poly-II

      ii. Poly-III iv. None of the above

   b. Which of the following aspect is unique to eukaryotic gene regulation

      i. Transcriptional repressor proteins

      ii. Sequence specific DNA binding proteins

      iii. Alternative sigma factors

      iv. Covalent modification of histone proteins

   c. Transcription factors of RNA polymerase-II are-

      i. TFIIA TFIIB TFIIC TFIIE iii. TFIIA TFIIC TFIID TFIIE

      ii. TFIIA TFIIB TFIID TFIIE iv. All of the above

   d. t-RNA is transcribed by

i. RNA poly-I iii. RNA poly-II

ii. RNA poly-III iv. None of the above

e. Phytohormone responsible for inducing flowering is

i. Cryptochrome iii. Phototropin

ii. Phytochrome iv. None of the above

f. Which of the following is/are needed for PCR ?

i. An origin of replication, specific for the bacterium *Thermophilus aquaticus*

ii. DNA ligase

iii. Fluorescent or radioactive probes to detect DNA fragment of interest

iv. Sense and antisense DNA primers encompassing the DNA region of interest

g. Which of the following is not a thermolabile DNA polymerase ?

i. Klenow fragment of *E. coli* iii. *Tma*

ii. Taq iv. *Pfu*

h. Recombinant DNA technology was discovered by

i. J.D. Watson iii. Har Govind Khorana

ii. Sutton and Boveri iv. Stanley Cohen and Herbert Boyer

2. Answer the following short questions: ***(any eight)*** 2×8=16

a. Mention the various features ideal for a vector. 2

b. What are intercalating agents? Give examples. 1+1=2

c. Differentiate between replication and transcription. 2

d. Mention the role played by topoisomerase in DNA replication. 2

e. What is the function of restriction enzymes? Name some commonly used restriction enzymes. 1+1=2

f. What do you mean by repetitive sequence? What is the significance of it? 1+1= 2

g. What does the term chemotaxis mean? How do a media containing attractant and repellent affect the movement in *E. coli*? 1+1=2

h. In *Arabidopsis*, DNA replication is immediately followed by transcription. Write yes or no for the above statement. Give reasons for your answer. 2

i. What is golden rice? Mention its speciality over normal rice. 1+1=2

3. Answer ***any four*** of the following questions: 6×4=24

a. What do you mean by DNA recombination? Explain the models for homologous recombination in DNA. What are its significance? 1+3+2=6

b. What is cell signaling? What are the components of cell signaling? With the help of neat diagram explain the different types of signaling system. 1+2+3=6

c. What are molecular markers? How are they classified? What are its applications? Give examples. 1+2+2+1=6

d. What is RNA splicing? Write about the molecular mechanism of RNA splicing. 2+4=6

e. What is the full form of PCR? Name the instrument where PCR is run. What are the basic requirements of PCR? Write the working principle of PCR. 1+1+2+2=6

f. What does GMO stands for? Briefly describe the various steps involved in producing GMO. Give a brief account on the advantages and disadvantages of GMO's. 0.5+3.5+2=6

4. Write short notes on: ***(any four)*** 5×4=20

a. RFLP

b. PCR

c. Bacterial chemotaxis

d. Cryptochrome

e. Cybridisation

5. Answer ***any one*** of the following broad questions: 12×1=12

a. Describe the various mechanisms involved in repairing damages caused to DNA. 12

or

b. .What do you mean by tissue culture? Mention the different types of media generally used in tissue culture. Illustrate the steps involved in anther culture. Bring out the advantages and disadvantages of plant tissue culture. 1+2+4+5=12

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