

(6 pages)

Reg. No. :

Code No. : 7147

Sub. Code : PBOM 22

M.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2018.

Second Semester

Botany

GENETICS, CELL AND MOLECULAR BIOLOGY

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Type of gene mutation involving a change from purine to purine or pyrimidine to pyrimidine
(a) Transversion (b) Inversion
(c) Transduction (d) Transition
2. Criss-cross inheritance pattern is commonly observed due to
(a) X-linked genes (b) Y-linked genes
(c) XY-linked genes (d) XX-linked genes

3. If heavy DNA (N^{15}) are replicated two times in the medium of N^{14} , what is obtained?
(a) 100 heavy and 100 light
(b) 100 half heavy and half light and 100 light
(c) 200 half heavy
(d) None of these
4. The C-value of DNA refers to
(a) Amount of DNA present in heterosomes
(b) Total amount of DNA per somatic cell
(c) Total amount of DNA per haploid genome
(d) Amount of DNA present in autosomes
5. The actual transformation of bacterial form involved
(a) SII → SIII
(b) SII → RIII
(c) RII → SIII
(d) SII → RII
6. Which of the following is a bypass repair system?
(a) BER
(b) NER
(c) SOS
(d) Recombinational repair

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7. Which general transcription factor contains both a helicase subunit and a protein kinase subunit?
- (a) TFIIA (b) TFIIB
(c) TFIID (d) TFIIH
8. An amino-acyl synthetase is responsible for
- (a) formation of peptide bond
(b) attaching an amino group to an organic acid
(c) movement of tRNA molecule from A to P sites on a ribosome
(d) joining an amino acid to a tRNA
9. The three structural genes in lac operon, lacZ, lacY and lacA encoding the enzymes
- (a) galactoside permease, galactosidase and galactoside tranacetylase
(b) galactoside tranacetylase, galactoside permease and galactosidase
(c) galactosidase, galactoside permease and galactoside tranacetylase
(d) only galactosidase

10. Genomic imprinting occurs when
- (a) Genes are incorrectly silenced due to DNA methylation, resulting in altered phenotypes
(b) Only one of a pair of genes is expressed, the other being methylated and silenced
(c) DNA methylation patterns in a genome are passed onto the offspring
(d) DNA methylation is removed allowing for genes that should be silenced to be expressed

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Describe the process of amitosis briefly.
- Or
- (b) How will you differentiate sex influenced genes from holandric genes?
12. (a) Give an account of mitochondrial genome.
- Or
- (b) Give an account of the denaturation and renaturation kinetics of DNA.



13. (a) What are the causes of DNA damage?

Or

- (b) Describe the phenomenon "Transformation" in bacteria.

14. (a) Explain Wobble hypothesis. How it contributes for the degeneracy of genetic code?

Or

- (b) Describe the mechanism of transcription in prokaryotes.

15. (a) Describe the cis-trans complementation test with suitable example.

Or

- (b) What is transcriptional attenuation? Is the trp operon always on or off?

PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Write an essay on sex-determination in plants.

Or

- (b) Describe the molecular organization of eukaryotic chromosome.

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17. (a) Discuss the replication of DNA in eukaryotic systems.

Or

- (b) Explain the process of DNA methylation and its role in gene expression

18. (a) Write short notes on :

- (i) 'SOS' repair mechanism
- (ii) DNA repair by direct reversal.

Or

- (b) What is meant by specialized transduction? Add note on site specific recombination.

19. (a) Describe the process of protein synthesis in detail.

Or

- (b) Outline on Post-transcriptional processing of mRNA.

20. (a) Give a detailed account on transcriptional regulation of GAL gene cluster of galactose pathway.

Or

- (b) Give a detailed account on Gene silencing mechanisms and applications.

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