B.Sc. (Ag)—IIS (PB-121)

2019

(2nd Semester)

Time : 2 hours

Full Marks : 50

Answer all questions from Section-A and five questions from Section-B

The figures in the right-hand margin indicate marks

Candidates are required to answer in their own words as far as practicable

(FUNDAMENTALS OF GENETICS)

SECTION—A

1. Fill in the Blanks : $\frac{1}{2} \times 14$

(*a*) The term Genetics was coined by_____.

(*b*) The character which suppressed in F_1 is called _____.

(*c*) Crossing over refers to the exchange of genetic information between _____.

(*d*) The normal dihybrid ratio 9 : 3 : 3 : 1 is modified to 9 : 3 : 4 ratio in F_2, this indicates _____.

(*e*) The cytoplasmic inheritance is also referred to as _____.

(*f*) Allosomes also called as _____.

(*g*) The term mutation was coined by_____.

(*h*) In meiosis, crossing over take place during _____

(*i*) Exchange of segments between non-sister homologous chromosomes refers to _____

(*j*) Genes that do not appear to assort independently exhibit _____.

(*k*) The process by which a DNA molecule gives its identical copies is referred to as _____.

(*l*) A group of closely linked genes which act together and code for various enzymes of a particular biochemical pathway is called _____.

(*m*) Transcription is defined as _____.

(*n*) The values of recombination varies from _____.

2. State True (*T*) or False (*F*) in respect of the following statements : $\frac{1}{2} \times 8$

(*a*) Packaging of food material is the main function of Endoplasmic reticulum.

(*b*) Single gene controlling more than one character is called as pleiotropy.

(*c*) The unit representing a map unit between the linked gene is Centimorgan.

(*d*) The occurrence of a segment twice in the same chromosome is called as deletion.

(*e*) The degree of phenotypic expression of a gene in the different individual is known as Penetrance.

(*f*) The group of genes situated on the same chromosome is known as linkage group.

(*g*) Initiation codon for protein synthesis is UAA.

(*h*) Anticodon is the three bases of a tRNA that are complementary to the three bases of mRNA coding for an amino acid.

3. Choose the right answer : $\frac{1}{2} \times 10$

(*i*) Examples of multiple alleles are

(*a*) ABO blood groups

(*b*) Rh factor in human beings

(*c*) Coat colour in rabbits

(*d*) All of these.

(*ii*) Gametes produced by individual AabbCc is :

(*a*) 4

(*b*) 8

(*c*) 2

(*d*) 10

(*iii*) How many contrasting characters were studied by Mendel in his experiments.

(*a*) Six

(*b*) Seven

(*c*) Five

(*d*) Eight

(*iv*) Who discovered ABO blood group in man

(*a*) Oliver

(*b*) Green

(*c*) Landsteiner

(*d*) Benzer

(*v*) Genes which are present on Y-chromosomes are known as

(*a*) Holandric genes

(*b*) Complementary gene

(*c*) Duplicate gene

(*d*) Pseudogene

(*vi*) B-chromosome also known as

(*a*) Accessory chromosomes

(*b*) Super numerary

(*c*) Extra chromosome

(*d*) All of these

(*vii*) Which bases are absent in DNA

(*a*) Adenine

(*b*) Guanine

(*c*) Uracil

(*d*) Thymine

(*viii*) Which mode of DNA replication is universally accepted

(*a*) Dispersive

(*b*) Semiconservative

(*c*) Conservative

(*d*) None of these

(*ix*) Synthesis of DNA from RNA is known as

(*a*) Reverse transcription

(*b*) Reverse genetics

(*c*) Transcription

(*d*) Reverse translation

(*x*) Crossing over occurs at

(*a*) One strand stage

(*b*) Two strand stage

(*c*) Three strand stage

(*d*) Four strand stage

4. Match the following : $\frac{1}{2} \times 8$

Column A (Contribution)	Column B (Scientist)	Answer
1. Discovered genetic linkage in sweet pea	A. G. Mendel	
2. Theory of Acquired characters :	B. August Weismann	
3. Discovered jumping genes in maize	C. W. Bateson and R.C. Punnet	
4. Coined the terms "genotype" and "phenotype"	D. J. D. Watson and Crick	
5. Concept of operon	E. B. McClintock	
6. Germplasm Theory	F. Lamarck	
7. Fundamental principles of heredity	G. W. L. Johannsen	
8. Proposed a model for DNA	H. Jacob and Monad	

SECTION– B

Answer any five questions : **6 × 5**

5. Describe the two laws of inheritance discovered by Mendel and Reasons for Mendel's success. Discuss any one of them with a classical example ?

6. What is multiple alleles, describe about the features of multiple allele and mention the examples of multiple allele and brief description of any one of the examples ?

7. Define Operon ? Explain the operon model of gene regulation in prokaryotes ?

8. Distinguish between any *three* of the following :
   (*a*) Coupling phase linkage and repulsion phase linkage
   (*b*) Crossing over and linkage
   (*c*) Sex linked and sex influenced characters

   (*d*) Qualitative and quantitative characters
   (*e*) Transcription and translation.

9. What is cytoplasmic inheritance ? Describe about the various features of cytoplasmic inheritance with suitable examples ?

10. Draw a labelled diagram of replication fork ? Mention the role of different enzymes in DNA replication ?

11. What is mutation, describe about the features of mutation and differentiate between transition and transversion ?

12. Write short notes on any *three* of the following :
   (*i*) Co-dominance
   (*ii*) Frame shift mutation
   (*iii*) Central dogma
   (*iv*) Protein synthesis
   (*v*) Law of independence assortment.