

B.Sc. (Honours) Agriculture Examination, 2018

Semester-II

Course No: GPB-121

(Fundamentals of Genetics)

Signature of Centre Superintendent

Roll No. : (in figure) _____ (in words) _____

Student Index No. _____ Regn. No. _____ of _____

Time : Two Hours

Full marks : 50

Questions are of value as indicated in the margin

Part - I

(Objective and Short Answer Type)

(Use only ball point pen)

Time : 30 minutes

Full marks : 20

Note: 1. Answer in question paper itself.

2. Striking, rewriting or overwriting are not allowed in the objective type questions.

1. **State True (T) or False (F) in respect the following statements**

0.5×4=2

(i) Colour-blind in human is the sex-linked trait

(ii) Uracil is present in DNA.

(iii) Genotypic and phenotypic ratio are different in incomplete dominance.

(iv) Strength of linkage is related inversely to distance between genes.

2. **Fill up the blanks with most appropriate words :**

0.5×6=3

(i) The diploid chromosome number of *Drosophila* is _____

(ii) The exchange of chromosomal segments between non-sister Chromatids of homologous chromosome is _____ .

(iii) DNA synthesis takes place in _____ phase of cellcycle.

(iv) Genomic formula of nullisomy is _____ .

(v) The initiation codon of protein synthesis in prokaryote is _____ .

(vi) 47 XXY is associated with _____ syndrome.

3. **Tick (✓) the correct alternatives :**

0.5×10=5

(i) Triticum aestivum is (a) Autotetraploid (b) Autohexaploid (c) Allotetraploid (d) Allohexaploid

(ii) The dihybrid test cross ratio is (a) 3:1 (b) 9:3:3:1 (c) 1:1:1:1 (d) 1:1

(iii) The m RNA strand synthesized from DNA is complementary to (a) one of the strand of DNA (b) both the strands of DNA (c) None of the strands of DNA (d) all of the above.

(iv) The power house of cell is called (a) Ribosome (b) Mitochondria (c) Golgibody (d) Lysosome.

P.T.O.

(2)

- (v) A nucleotide consists of (a) base and a phosphate (b) A sugar and a base (c) a sugar, a base and a phosphate (d) a base and an amino acid
- (vi) 5 Bu is the structural base analogue of (a) Ademine (b) Thymine (c) Cytosine (d) Guanine
- (vii) Crossing over causes (a) complete linkage (b) no significant changes (c) recombination of genes (d) none of the above
- (viii) Inheritance of 'AB' blood group shows (a) codominance (b) overdominance (c) complete dominance (d) incomplete dominance
- (ix) One of the termination codon in prokaryote is (a) UUU (b) UAA (c) AUG (d) AAA
- (x) The phenotypic ratio of digenic dominant epistasis is (a) 9:6:1 (b) 12:3:1 (c) 15:1 (d) 9:3:4

4. Answer very briefly (any five) :

2×5=10

(i) Multiple Alleles -

(ii) Penetrance and expressivity –

(iii) Pleiotropy –

(iv) t-RNA –

(v) Transcription –

(vi) Linkage –

(vii) Reciprocal translocation -

B.Sc. (Honours) Agriculture Examination, 2018

Semester-II

Course No: GPB-121

(Fundamentals of Genetics

Part-II

(Descriptive Type)

Time : 90 Minutes

Full marks : 30

Questions are of value as indicated in the margin

Answer *any four* questions

5. Discuss the reasons for Mendel's success. Explain the law of independent assortment with the help of checkerboard. 3+4.5=7.5
 6. What do you mean by extra-chromosomal inheritance? Explain the extra-chromosomal inheritance for shell coiling pattern of *limnaca* sp. with suitable diagram. 2+5.5=7.5
 7. Distinguish DNA and RNA. Highlight the structure of DNA molecule based on Watson and Crick model. 2+5.5=7.5
 8. Differentiate between (any three) 2.5×3=7.5
 - (i) Incomplete dominance and codominance
 - (ii) Pericentric inversion and paracentric inversion
 - (iii) Transition and Transversion
 - (iv) Linkage and crossing over
 9. (a) Write down the characteristics of genetic code.
(b) Describe 'lac'-operon model of gene regulation in prokaryotic 3+4.5=7.5
 10. Define mutation. Classify mutagen. Mention the different types of mutation. 2+2.5+3=7.5
 11. Write short notes on (**any three**) : 2.5×3=7.5
 - (i) RNA processing
 - (ii) Sex-influenced dominance
 - (iii) Okazaki fragments
 - (iv) Epistasis
 - (v) Criteria for detecting sex-linked (x-linked) recessive traits from pedigree.
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