

B.Sc. (Ag.) Honours Semester-III Examination, 2014

Course No: GPB-211 (Principles of Genetics)

(New Syllabus)

Signature of Centre Superintendent

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

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

Time : Two Hours

Full marks : 40

Questions are of value as indicated in the margin

Part - I

(Objective and Short Answer Type)

(Use only ball point pen)

Time : 20 minutes

Full marks : 10

- 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 (any sixteen):** 0.25×16=4

- (i) Dihybrid test cross ratio is 1:1:1:1 ☐
- (ii) Uracil is present in DNA ☐
- (iii) UAA is the initiation codon in Prokaryotes ☐
- (iv) Quantitative character is controlled by many genes ☐
- (v) Colour blindness is not a sex linked disease ☐
- (vi) Triticale is manmade cereal crop ☐
- (vii) The closely linked genes show weak linkage, while the widely located genes show strong linkage. ☐
- (viii) Multiplication of cell number take place through mitosis ☐
- (ix) Genotypic and phenotypic ratios are different in incomplete dominance ☐
- (x) Homogametic sex produces different types of gametes ☐
- (xi) Messelson and Stahl proved the semiconservative mode of replication ☐
- (xii) Digenic complementary ratio is 9:7 ☐
- (xiii) In positive inducible operon, transcription of structural genes are turned on only in the presence of inducer ☐
- (xiv) UV rays are ionizing physical mutagen ☐
- (xv) For any two genes in a chromosome, the recombination frequency never exceeds 50 percent ☐
- (xvi) The noncoding intervening sequences of primary transcripts of eukaryotes are exons ☐
- (xvii) Differences in reciprocal crosses are always because of cytoplasmic inheritance ☐

2. Fill up the blanks with most appropriate words (any twelve):

0.75×8=6

- (i) The exchange of segments between nonsister chromatids of homologous chromosomes is _____.
- (ii) Genomic formula of Trisomy is _____.
- (iii) Duplication of DNA takes place in _____ phase of cell cycle.
- (iv) A chromosome with two identical arms and identical genes is known as _____.
- (v) The structural aberration due to rearrangement of genes in reverse order is _____.
- (vi) 47, XXY is associated with _____ syndrome.
- (vii) The inversion that include centromere is referred to as _____.
- (viii) The proportion of total phenotypic variance that is due to genotype is called _____.
- (ix) 5-BU is a base analogue of _____.
- (x) Conversion of purine to pyrimidine is _____.

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Part - II

(Descriptive Type)

Time : 100 Minutes

Full marks : 30

Questions are of value as indicated in the margin

Answer any four questions from the following :

3. Explain the law of independent assortment with example. Mention the genetical events or conditions which do not follow the laws of Inheritance of Mendel. 5.5+2=7.5
 4. What is linkage? Differentiate complete and incomplete linkage. What do you mean by linkage group? 2+3+2.5=7.5
 5. What is allopolyploidy? How does it differ from Autopolyploidy? Write down the role of allopolyploidy in the evolution of different species of *Brassica*. 1.5+1.5+4.5=7.5
 6. Give a concise account of Watson-Crick model of DNA double helix. Mention the differences between DNA and RNA. 5.5+2=7.5
 7. Differentiate mitosis and meiosis. Mention the different subphases of Prophase-I in meiosis. Comment on the significance of meiosis. 3+1.5+3=7.5
 8. Write short notes on (**any three**) : 2.5×3=7.5
(i) Monosomy (ii) Multiple allele (iii) Cytoplasmic Inheritance (iv) Down syndrome
(v) Wooble hypothesis (vi) Test Cross.
 9. What is mutation ? Classify mutagen. Discuss briefly the role of mutation in crop improvement. 2+2+3.5=7.5
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