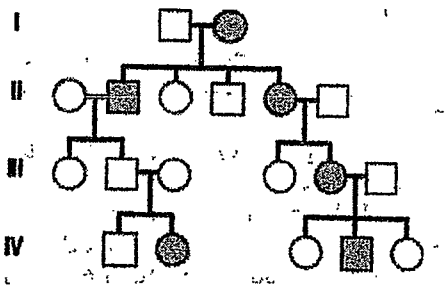
ch	b^+	cn	105
ch^+	b^+	cn^+	750
ch^+	b	cn	40
ch^+	b^+	cn	4
ch	b	cn	753
ch	b^+	cn^+	41
ch^+	b	cn^+	102
ch	b	cn^+	5
Total			**1800**

(i) Determine the linear order of the genes on the chromosome. 5

(ii) Calculate the recombinant distances between the three loci. 5

(iii) Determine the coefficient of coincidence and the interference for these three loci. 5

(b) The following pedigree shows the inheritance of ataxia, a rare neurological disorder characterized by uncoordinated movements. Is ataxia caused by a dominant or a recessive allele? Explain. 3



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This question paper contains 4 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **2048** **I**

Unique Paper Code : 3182011202

Name of the Paper : Principles of Genetics (DSC) (NEP)

Name of the Course : **B.Sc. (H) Biomedical Science**

Semester : II

Time : 3 Hours ***Maximum Marks : 90***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Attempt **five** questions in **all.**

(c) Question No. **1** is compulsory.

(d) Subparts of the questions should be attempted together.

(e) Use of non-programmable calculator is allowed.

1. (a) Mention the contribution of any **four** scientists given below : 4×1=4

(i) Rosalind Franklin

(ii) Alfred Sturtevant

(iii) Joe Hin Tjio and Albert Levan

(iv) Bateson and Punnet

(v) Hermann Muller

(b) State whether the following statements are **true** or **false** and Justify (Any **four**) : 4×2=8

(i) Genetic variation arises only due to mutations in DNA sequence.

(ii) Recombination frequency can be used to determine gene order on chromosomes.

(iii) Polytene chromosomes are commonly found in Drosophila salivary glands

(iv) Sex determination in Drosophila depends on the ratio of X chromosomes to autosomes

(v) Crossing over always results in recombination between genes.

(c) Answer the following in one word (Any **four**) : 4×1=4

(i) Property of DNA that allows accurate copying of information

(ii) Interaction where one gene mask another

(iii) DNA packaging unit consisting of histones and DNA

(iv) Genetic system where sex depends on X:A ratio in Drosophila melanogaster.

(v) Mutation with no change in amino acid sequence

(d) DNA called the blueprint of life. Explain briefly. 2

2. Differentiate between the following (Any **four**) : 4.5×4=18

(i) Conservative and semi-conservative replication

(ii) Nuclear inheritance and Extra-nuclear inheritance

(iii) Autosomal and Sex-linked inheritance

(iv) Sex limited and sex influenced traits.

(v) Constitutive and facultative heterochromatin

3. Write a short note on the following (Any **four**) : 4.5×4=18

(i) Frameshift mutations

(ii) G-banding and Q-banding

(iii) Maternal effect in snail shell coiling

(iv) Mendel's laws of inheritance

(v) Loss-of-function and Gain-of-function mutations

4. (a) Differentiate between insertion elements and transposons. Briefly describe different types of mobile genetic elements found in different organisms with examples of each. 6

(b) What do you understand by maternal effect. Does it follow Mendels laws of inheritance. Explain with a suitable example. 6

(c) Explain the concept of barr body. Why is one X chromosome inactivated in human females. Explain Lyons hypothesis with the aid of an example. 6

5. (a) Explain cytoplasmic inheritance with aid of suitable examples. 6

(b) Explain the interallelic gene interactions that deviate from Mendels dihybrid ratio with aid of one example each. 12

6. (a) In D. melanogaster, cherub wings (ch), black body (b), and cinnabar eyes (cn) result from recessive alleles that are all located on chromosome 2. A homozygous wild-type fly was mated with a cherub, black and cinnabar fly, and the resulting F_1 females were test-crossed with cherub, black and cinnabar males. The following progenies were produced from the testcross: