Mid Semester Examination
LS1201 (Total Marks- 25)

1. Match the word or phrase that best defines each statement: (9)

Mutation in which a purine is substituted by a pyrimidine	a) Nonsense mutation
Mutation caused by the addition of a base in a protein coding region	b) Silent mutation
A base change resulting in a stop codon	c) Conditional mutation
Type of mutation that causes mutant sectors to appear on a flower petal	d) Auxotrophic
A base change resulting in a codon specifying the same amino acid	e) Somatic mutation
Mutation in which a pyrimidine is substituted for a pyrimidine	f) Lethal
Mutation that causes a mutant phenotype only under restrictive conditions	g) Frameshift
A biochemical mutant that must be supplied with a certain nutrient for growth	h) Transversion
Mutation that causes death of the zygote	i) Transition mutation

2. 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 (ch^+ , b^+ , cn^+) was mated with a cherub, black, and cinnabar fly (ch, b, cn) and the resulting F1 females were test-crossed with cherub, black, and cinnabar males. The following progeny were produced from the testcross:

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

a. Determine the linear order of the genes on the chromosome (which gene is in the middle? (2)
b. Calculate the recombinant distances between the three loci. (4)

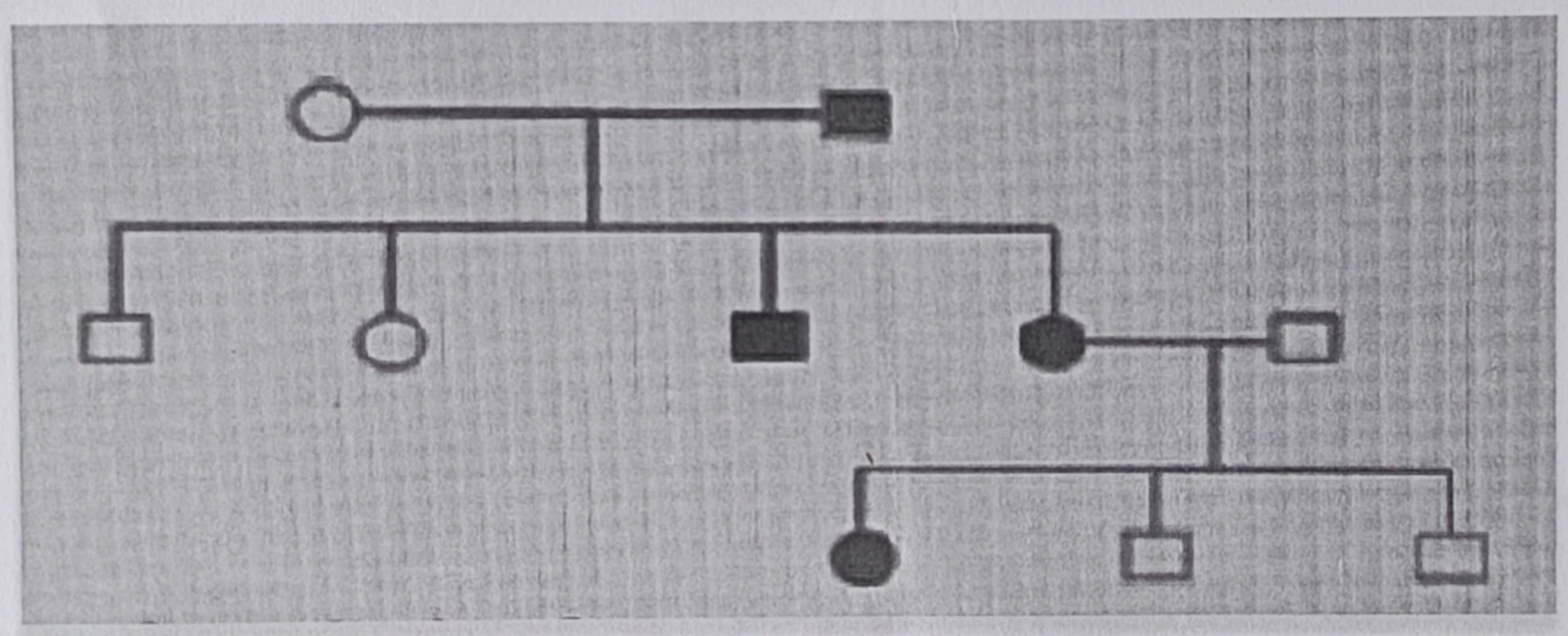
3. The following is the amino acid sequence of a part of a protein encoded by a gene "X"

….Phe Leu Val Pro Ser Tyr Cys…

A mutant for gene "X' is isolated following treatment with a mutagen. The amino acid sequence of the same region encoded by the mutant gene is as follows:
…Phe Leu Phe Arg Arg Ile……

Which mutagen is most likely used and how does it function? (5)

4. Study the Pedigree chart below, and answer the following questions **with Justification.**



(a) Is the trait recessive or dominant? (1.5)
(b) Is the trait sex-linked or autosomal? (1.5)
(c) work out the genotypes of the individuals (2)