punnett square and give phenotypic and genotype ratios of the offspring. 2

a) a red plant and a white plant

b) a red plant and a pink plant

c) a white plant and a pink plant

d) two pink plants

7. For each of the following crosses remember that hemophilia, muscular dystrophy, and color blindness are recessive sex-linked traits in humans. In sex linked traits men will always express the trait if they carry it on the X chromosome. Women can express the trait only if it is found on both X chromosomes. Women have two normal phenotypes: homozygous normal and carrier. Men have only one normal phenotype because they have only one X chromosome. Hemophilia for example: Normal Male: X^HY , Hemophiliac Male X^hY, Normal Female: X^HX^H & X^HX^h (carrier), Hemophiliac Female X^hX^h 2

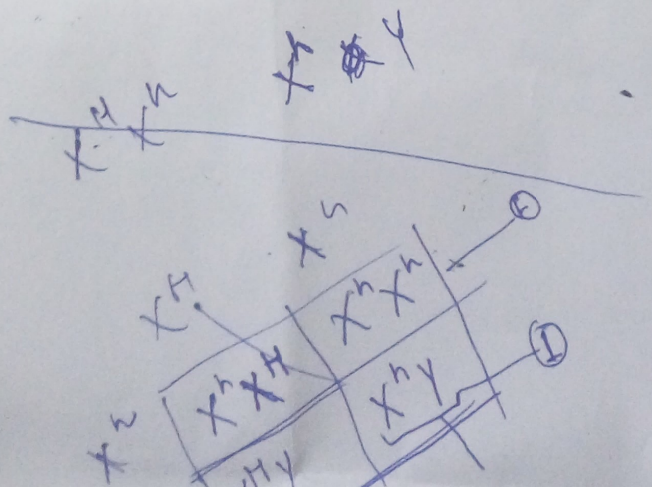
(any two)

1. A women that is a carrier of hemophilia marries a hemophiliac man. What is the probability that their first child will be a hemophiliac?

2. A hemophiliac women has a mother who is phenotypically normal. What are the genotypes of her mother and her father?

3. What is the probability that a normal vision women who marries a man who is color blind , will have a daughter who is color blind?

4. A phenotypically normal man who has a brother with Muscular Dystrophy marries a homozygous normal woman. What is the probability that any of their children will have Muscular Dystrophy.



Minor I BBL231 2016

1. **Do any seven of the following**

You are asked to do cytogenetic analyses to determine copy numbers of a gene in an organism.

a) How can u detect presence or absence of a gene in any organism using cytogenetic studies? Can you also determine which chromosome the gene is present? If yes then how? 1

) What is the meaning of gene copy? How are these generated? (Describe any one method) 1

c) Are the alleles of any gene present on homologous chromosomes can also be called as gene copies? 1

) As a general rule are all the copies of the genes functional? Explain. 1

Will the gene copies always retain the same function? Explain 1

) Non-coding sequences too may be present as several repeats? What has been the major use of this observation and how. Explain 1

) Consider a gene X that is present as two copies on chromosome 1. One copy is in a euchromatic region nd one in the heterochromatic region. Will both the gene copies still be expressed similarly? Explain you answer. 1

) During DNA replication, will both the copies of the gene X be likely to be replicated simultaneously? Explain. 1

In a E.coli mutant, DNA polymerase III has mutation so that it loses its 3'-5' exonuclease activity hile retaining its other activity. What consequences do you envision? 1

) In which portion of the DNA polymerase III gene- Coding region or promoter region do you think the utation might be present? 1

c) If by genetic manipulation, I move the promoter region of a gene from 5'end to 3' end of the gene. 1

i) Will the gene still be replicated?

ii) Will the gene still be functional to produce the same protein?

d) Define a operon. 1

e) One strand of the DNA always takes longer than the other strand for finishing replication. Why? 1

3. What is the basis, prospects and current challenges of DNA nanotechnology? 2

4. What is the significance of histone acetylation? 1

5. Transposon based elucidation of gene functions have often been used in genetics laboratories throughout the world. Can you think how it might help in finding gene functions? 1

6. In Japanese four o'clock plants red (R) color is incompletely dominant over white (r) flowers, and the heterozygous condition (Rr) results in plants with pink flowers. For **any two** of the following, construct a

RR Rr