

GENETICS DISCUSSION QUESTIONS

SHORT QUESTIONS

1. Cattle may be red or white and a hybrid is described as roan colour. If a roan cow is crossed with a roan bull, the offspring would be expected to be...show your working
2. In cattle, the gene for hornless is dominant to the gene for horns (gene P and p respectively). If a bull and cow with genotypes Pp are crossed, what percentage of the offspring would be expected to have horns? Show your working
3. Give all the genotypes of offspring from a father and a mother of blood group A and B respectively.
4. A defect affecting shape of blood cells which can be inherited is known as
5. Genes responsible for ABO blood groups in man are examples of.....
6. If a normal heterozygous man marries an albino woman, what will be the genotype of the offspring? Show your working.....
7. A trait which does not express itself unless homozygous is said to be.....
8. In peas, the gene for tallness (T) is dominant over that for shortness (t). If peas of different genotypes were crossed and all off springs appeared tall, what would be the genotype of the parental peas? Show your working
9. A heterozygous red flowered plant R is crossed with a homozygous white flowered plant (rr). If R is dominant over r, what will be the phenotypes of the offspring?
10. If a man of blood group A is married to a woman of blood group O, what are the possible genotypes of their children? Show your working
11. What is meant by the term variation and give two types of variation with examples in each case?
14. In cattle, when a bull is mated with a red cow, the offspring is roan. This indicates that the gene for white is.....
15. What would be the ratio of the phenotypes if a roan bull and roan cow from the offspring referred to in question above were mated?
16. Albinism, is inherited through double recessive genes. If A stands for normal skin colour and a the recessive character, which parental crosses would produce 25% albino offspring? Show your working....
17. Red flowered peas were crossed with white flowered peas. The F1 were all pink flowered.
 - (i)What would be the results of selfing these pink flowered peas? Show your working
 - (ii) why is the F1 pink flowers
18. Fingers in man are controlled by a sex-linked recessive gene. If a normal woman marries a six fingered man, which children will have six fingers? Show your working
19. In plants, tallness is dominant to shortness. When two heterozygous parents from F2 generation were crossed, 2508 offsprings were produced. What was the number of tall plants among the offsprings?
20. One of two identical twins brought up differently was fatter and more healthy than the other. What kind of variation do these show?.....
21. A couple produced four children who were of different blood groups with the following genotypes: AO, B, AB and OO. What were the genotypes of their parents? Show your working.....

22. A mother of twins has blood group A. One of the sons has blood group AB while the other has blood group O. What is the blood group of the father? Show your working.
23. A heterozygous red flower plant (Rr) is crossed with a homozygous white plant (rr). If R is dominant over r, what will be the phenotypes of the offspring? Show your working.....
22. A heterozygous red flowered plant is crossed with a homozygous white flower. If red is dominant over white, what will be the phenotypes of the offspring? Show your working.....
23. In humans, the male sex chromosomes are X and Y (XY) and the female sex chromosomes are X and X (XX). When a male gamete fuses with a female gamete the sex ratio is? Show your working
24. In cattle the gene for red coat colour, R is co-dominant to that for white coat colour, W. If a red cow was mated to a white bull, what would be the phenotype of the F₁ generation? Show your working

Structured questions

25. (a) Explain briefly what you understand by the terms:
- Miosis
 - Mitosis
- (b) Where do meiosis and mitosis occur?
- (c) A plant with yellow leaves was crossed with a plant with green leaves. The gene for yellow leaves is recessive to that of green leaves. The offspring obtained were all green.
- What is the genetic ratio if F₁ is selfed? Show your working.
 - What is the phenotypic ratio of F₂?
26. (a) What is meiosis and where does it occur in plants and animals?
- (b) What is the relevance of meiosis in reproduction?
- (c) In a breeding experiment, plants which were homozygous for white flowers were crossed with those homozygous for red flowers. The resultant F₁ generation all had red flowers.
- Explain the absence of white flowers in the F₁ generation.
 - Using genetic symbols, show the results in the F₂ generation after selfing the F₁ generation.
27. In an experiment, a long winged male drosophilla was crossed with a short winged female drosophilla. All the offspring in the F₁ generation were long winged. When two members of the F₁ generation were mated, the F₂ generation consisted of 62 long winged flies and 21 short winged flies.
- (a) Suggest an explanation why all the F₁ generation flies were long winged.
- (b)
 - What type of flies would develop from a mating between short winged flies in the second generation?
 - Give a reason for your answer.

(c) Mating between a short winged fly in F₂ generation with a long winged fly in F₁ generation produced 90 flies. How many of them were long winged? Show your working.

28. (a)(i) Which chromosomes are responsible for determining sex in humans?

(ii) Using appropriate symbols show how sex is determined in humans.

(b) Red - green colour blindness is a defect caused by a recessive gene carried on the X chromosome. What would be the phenotype of the offspring when a normal women marries a colour blind man? Show your working.

29 (a) What is meant by the term mutation?

(b)The gene for normal production of haemoglobin is dominated to the mutant gene which causes sickle cell anaemia. If a female heterozygous for the sickle cell anaemia marries a Norman man, illustrate, using suitable symbols, the possible genotypes and phenotypes of the offspring.

30. (a) Distinguish between dominance and codominance in genetics. (02 marks)

(b) When tall pea plants were crossed with short pea plants, all the plants in F₁ generation were tall. When two plants of the F₁ generation were crossed, both tall and short plants were produced in the F₂ generation.

(i) why were all plants tall in the F₁ generation.

(ii) using suitable symbols, show the crosses to produce the F₁ and F₂ generations.

(c)In rose plants, when a red flowered plant is crossed with a white flowered plant, all plants produced bear pink flowers. Using suitable symbols show the result of crossing a pink flowered plant and a white flowered plant.

31. (a) What do you understand by a recessive gene

(b) A man who is a carrier for albinism married a normal woman. Using suitable symbols, work out the proportions of the possible genotypes and phenotypes of their children.

(c)Give two benefits of studying human genetics.

32. In a mixed day school, Angela got pregnant and she is of blood group B, Kapere a fellow student was accused to be responsible for her condition, which he denied. Angela gave birth to bouncing baby boy of blood group O. As an investigation was done Kapere was un cooperative and his blood group would not be discovered, but both his parents were of blood group A. Work out to find whether kapere would be the likely father of the baby.

33. A woman of blood group A claims that a man of blood group AB is the father of her child. A blood test reveals that the child's blood group is O. is it possible that the woman's claim is correct? Could the father have been of blood group B? Explain your reasoning.

34. (a) Distinguish between a heterozygous and homozygous state in genetics.

(a) When a tall pea plant was crossed with a short pea plant, only tall pea plants were produced in F₁ generation. When two plants from the F₁ generation were crossed, the resulting F₂ generation had a mixture had of tall and short pea plants.

(i) Using suitable symbols, show genetic crosses to produce F₁ and F₂

(ii) If the F₂ generation had 81 plants determine how many would be short and tall

- (c). Giving a reason state the phenotype which is recessive in pea plants
35. Define the following terms used in genetics
- (a) Gene
 - (b) Mutation
 - (c) Allele
 - (d) Dominant gene
 - (e) Recessive gene
 - (f) Phenotype
 - (g) Genotype
36. (a) Describe what happens in an animal cell during each of the following stages of mitosis
- (i) Prophase
 - (ii) Anaphase
- (b) State the importance of
- (i) Mitosis
 - (ii) Meiosis
- (c) Give three differences between mitosis and meiosis
37. (a) What is meant by the term test cross
- (b) Give the application of test cross in Agriculture
38. Discuss the importance of studying genetics
39. (a) What is meant by the term variation
- (b) With the relevant examples discuss the two types of variation
40. Sickle cell anaemia is a hereditary disease due to gene mutation that changes Normal Haemoglobin(HbA) to Abnormal Haemoglobin(HbS).
- (a) What are the possible phenotype of offsprings of a man who is heterozygous and a woman who is also heterozygous for the sickle cell trait.
- (b) What proportion of the offspring would be;
- (i) Severly anaemic
 - (ii) Mildly anaemic