REVISION EXERCISE 12- gene

1. In maize, the gene for starchy seeds is dominant over that of sugary seeds. Two pure breeding plants were crossed.
   (a) What is the phenotype of the F 1 seeds.
   (b) These F 1 seeds grew into mature plants and were allowed to self-fertilize. What is the expected ratio of starchy to sugary seeds in the F 2 plants?
2. Explain any 2 applications of the genetic engineering that you know.
3. Haemophilia is a sex-linked characteristic caused by a recessive gene carried on the X chromosome. A carrier woman marries a normal man.
   (a) Work out the genotype and phenotypes of the F1 generation.
   (b) What is the probability of the couple getting a haemophillic son?
4. Differentiate between gene mutations and chromosomes.
5. A patch of white hair at the front of the head is a dominant condition in humans. A woman with a patch of white hair at the front of her head married a normal man and they had a daughter with a white patch. The daughter also married a normal man. What is the likelihood that her first child will have a white patch?
6. Sick-cell anaemia is a hereditary disease due to a gene which changes normal haemoglobin (HbA) to abnormal haemoglobin (HbS).
   a) What are the possible phenotypes of the offspring 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) Severely anaemic?
   (ii) Mildly anaemic?

7. Colour-blindness in human being is caused by a recessive sex-linked gene. A carrier woman marries a colour-blind man.
   a) What is the probability that their first child will be colour-blind?
   b) If the man's mother was colour –blind what was her genotype?
   c) What proportion of all the children from this couple is expected to be normal.
8. A red cow was mated with a white bull. All the F1 were neither red nor white. Such individuals are said to be roan.
   a) Using R to represent the gene for red colour and W to represent the gene for white colour work out the genotypes of the F1 offspring.
   b) If the calves were interbred, determine the phenotypic and the genotypic rations.
   c) Suggest a reason why the F1 were all roan.
9. What is the meaning of biotechnology?
   Name any foods that are manufactured using biotechnology.
10. Mendel crossed pure breeding plants having green unripe pods with pure breeding plants having yellow unripe pods.
    The F1 plants had green pods. He allowed these to self-fertilize and he collected 580 F2plants.
    How many of these would be expected to have green pods and how many would have yellow pods.
11. A girl with blood group B claims that a man with blood group A was the father of her child. The

child's blood group was O. If she is right, explain how this is possible.

12. A woman had a brother who died of sickle-cell anaemia. What advice would you give her before she gets married?

14.

a) How is the sex of an individual; determined in human beings?
b) What is the importance of crossing over?
c) Somatic cells of human beings have 46 chromosomes. How many are sex chromosomes.

15.

a) Some students in a Biology class mated fruit flies with red eyes. They looked at the eye colour of 1568 offspring and found that 392 had brown eyes and the other 1176 had red-eyes. Letter R represent the gene for eye colour.
   i. What was likely genotype of the parents?
   ii. Predict the outcome of the cross between the red –eyed flies.
   iii. What was the genotypic ratio of the progeny.

b) State how you can identify the genotype of the red-eyed fly.

16. Pure bred black chickens were crossed with pure bred white ones. All the offspring were black.

a. If the offspring form the F 1 generation were allowed to interbreed, what would be the phenotypic ration of the F2 generation? Show your working using Punnet square.
b. What is the importance of a test cross in genetics?

17. List five practical applications of genetics.

18. Define each of the following terms:

a. Genetic engineering
b. Genetic counseling

19. In an experiment, Drosophila with long wings were crossed with those having vestigial wings. All of the offspring (F 1 generation) from this cross had long wings. Use letter L to denote the gene for the wing size.

a. (i) Give the genotype of the parents
   (ii) Work out the phenotypic ratio of the F 2 generation if the F1 generation was selfed.
b. From (a) (ii) above work out the genotypic ration
c. (i) What is variation?
   (ii) State the importance of genetic variation.
d. Name causes of genetic variation.

20. Distinguish between:

a. Continuous and discontinuous variation.
b. Homozygous and heterozygous
alleles and traits
c. Dominant and recessive alleles.

21. Give three examples of mutagens.

22. a man married twice. With his first wife he had two children whose blood groups were B and O. with his second wife he had two children of types AB and O. his first wife remarried a universal donor and their one child was type A. what were the genotypes of the man and his two wives? Show how you arrive at your conclusion.

23. With a names example, explain the advantages of mutation to:
a. Plants
b. Protozoa
C. Insects

24. List characteristic phenotypes that are selected in agricultural cross breeding

25. The gene for colour-blindness is linked to the X chromosome. The chart below shows the inheritance of colour blindness.

X

Write down the genotype of the:

(a)Parents

(b) F_1

(c)F_2

26. A man with normal skin colour got married to a woman with normal skin colour. They gave birth to three children one of them an albino.

(a) Give the probable genotype of the parents and their children.

(b) If one of the normal boys married a girl who is a carrier for the albino gene, what is the probility that their first child will be normal and not a carrier?

(c) Give both the genotypes and phenotypes of the children arising from a marriage between an albino man and a normal woman (not a carrier)