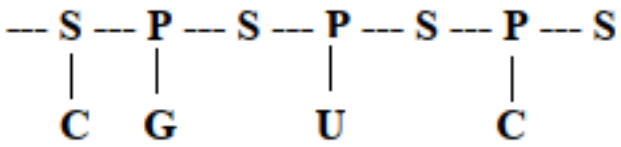
Genetics Questions and Answers - Biology Form 4 Topical Revision Questions

1. The figure below is a structural diagram of a portion from a nucleic acid strand.



   a. Giving a reason, name the nucleic acid to which the portion belongs. (2 marks)
      Name _____
      Reason _____
   b. Write down the sequence of bases of a complimentary strand to that shown above (1 mark)
2. State two structural differences between ribonucleic acid (RNA) and deoxyribonucleic acid (DNA) (2 marks)
3. Name a disorder of human blood that is caused by mutation (1 mark)
4. State the function of deoxyribonucleic acid (DNA) molecule (1 mark)
5. Give a reason why it is only mutation in genes of gametes that influence evolution (2 marks)
6. In an experiment, red flower were crossed with plants with white flower. All the plants in the F1 generation had pink flowers.
   a. (Give a reason for the appearance of pink flower in the F1 generation (1 mark)
   b. If the plants from F1 generation were selfed, state the phenotype ratio of the F2 generation (2 marks)
7. State two characteristics that researchers select in breading programmes. (2 marks)
8. Give an example of sex- linked trait in humans on; (2 marks)
   Y chromosome _____
   X chromosome _____
9. In an experiment, a variety of garden peas having a smooth seed oat was crossed with a variety with a wrinkled seed coat. All the seeds obtained in the F1 had a smooth seed coat. The F1 generation was selfed. The total number of F2 generation was 7324.
   a. Using appropriate letter symbols, work out the genotype of the F1 generation. (4 marks)
   b. From the information above, work out the following for the F2 generation
      i. Genotype ratio (2 marks)
      ii. Phenotype ratio (1 mark)
      iii. Wrinkled number (1 mark)
10. In a certain plant species, some individual plant may have white, red or pink flower. In an experiment a plant with white parent plant were pure lines. All the plants from F1 generation were pink. Using letter R to represent the gene for red colour and letter W for white colour;
    a. Work out the genotype of F1 generation (3 marks)
    b. If the plants from F1 generation were selfed, what would be the phenotypic ratio of the F2 generation? (3 marks)
    c. What is the genetic explanation for the absence of plants with red and white in the flower F1 generation? (2 marks)
11. In a breeding experiment, plants with red flower were crossed. They produced 123 plants with red flowers and 41 with white flowers.
    a. Identify the recessive character. Give a reason
    b. What were the genotypes of the parent plants that give rise to the plants with red and white flowers?

b. Giving your reasons state whether it is part of DNA or an RNA strand.
c. Show the complementary DNA strand
d. Show the complimentary RNA strand

20. In human couples the sex of a baby is determined by the man. Explain this statement.

Answers

a. - Ribonucleic acid
- Has the base 'U' uracil

b. -G- C –A – G

2.

RNA	**DNA**
Has ribose sugar	Deoxyribose sugar
Has uracil as one	Has thyamine of its bases
Single strand	Double strand

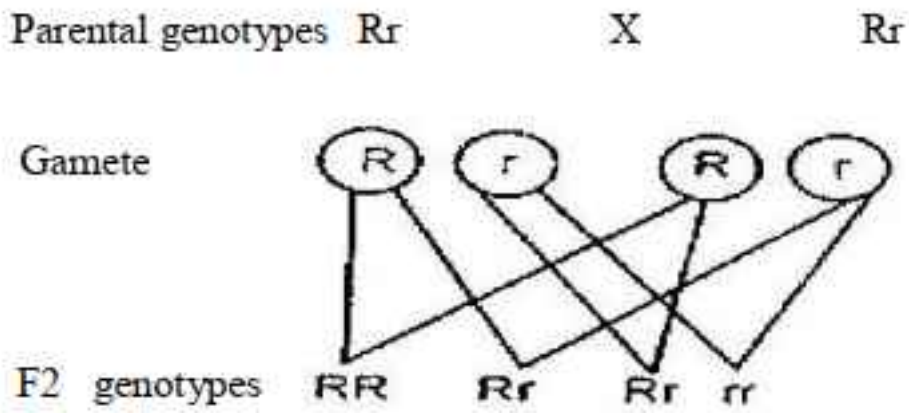
3. Haemophilia (sickle cell anaemia)
4. Controls / regulates enzyme / synthesis for the material for inheritance.
5. Gametes form new offspring
6. Co-dominance / incomplete dominance
7. - High yielding Hybrid vigour
- Resistance to disease, early maturity.
- Resistance to drought early maturity.
8. Y Chromosome – Hairy pinna, tuft and hair sprouting from the pinna, baldness.
X Chromosome – Colour blindness; Haemophilia

a. Smooth seed coat is dominant to wrinkled seed coat. Let R represent gene for smooth and parental genotype RR x rr

	r	r
R	Rr	Rr
R	Rr	Rr

All F1 are .....Rr

b.



i. Genotypic ratio 1RR : 2Rr: 1rr
ii. Phenotype ratio 3 smooth: 1 wrinkled
iii. Wrinkled number ¼ x 7324 = 1831