

WINTER VACATIONS HOME WORK

CLASS XII (BIOLOGY)

Answer the following questions

Topic- Principles of Inheritance and Variation

1. Mention the advantages of selecting pea plant for experiment by Mendel
2. Differentiate between the following –
 - (a) Dominance and Recessive
 - (b) Homozygous and Heterozygous
 - (c) Monohybrid and Dihybrid.
3. A diploid organism is heterozygous for 4 loci, how many types of gametes can be produced?
4. Explain the Law of Dominance using a monohybrid cross
5. Define and design a test-cross.
6. Using a Punnett Square, workout the distribution of phenotypic features in the first filial generation after a cross between a homozygous female and a heterozygous male for single locus.
7. When a cross is made between tall plant with yellow seeds (TtYy) and tall plant with green seed (Tt yy), what proportions of phenotype in the offspring could be expected to be
 - (a) tall and green.
 - (b) dwarf and green
8. Two heterozygous parents are crossed. If the two loci are linked what would be the distribution of phenotypic features in F₁ generation for a dihybrid cross?
9. Briefly mention the contribution of T.H. Morgan in genetics.
10. What is pedigree analysis? Suggest how such an analysis, can be useful.
11. How is sex determined in human beings?
12. A child has blood group O. If the father has blood group A and mother of blood group B, work out the genotypes of the parents and the possible genotypes of the other off springs.
13. Explain the following terms with example
 - (a) Co-dominance
 - (b) Incomplete dominance
14. What is point mutation? Give one example.

15. Who had proposed the chromosomal theory of the inheritance?
16. Mention any two autosomal genetic disorders with their symptoms.

Topic Molecular Basis of Inheritance

1. Group the following as nitrogenous bases and nucleosides: Adenine, Cytidine, Thymine, Guanosine, Uracil and Cytosine.
2. If a double stranded DNA has 20 per cent of cytosine, calculate the per cent of adenine in the DNA
3. If the sequence of one strand of DNA is written as follows:
5' – ATGCATGCATGCATGCATGCATGC – 3'
Write down the sequence of complementary strand in 5' → 3' direction.
4. If the sequence of the coding strand in a transcription unit is written as follows: 5-ATGCATGCATGCATGCATGCA TGCATGC-3'
Write down the sequence of mRNA.
5. Which property of DNA double helix led Watson and Crick to hypothesise semi-conservative mode of DNA replication? Explain
6. Depending upon the chemical nature of the template (DNA or RNA) and the nature of nucleic acids synthesized from it (DNA or RNA), list the types of nucleic acid polymerases.
7. How did Hershey and Chase differentiate between DNA and protein in their experiment while proving that DNA is the genetic material?
8. Differentiate between the followings:
(a) Repetitive DNA and Satellite DNA
(b) mRNA and tRNA
(c) Template strand and Coding strand
9. List two essential roles of ribosome during translation.
10. In the medium where E. coli was growing, lactose was added, which induced the lac operon. Then why does lac operon shut down some time after addition of lactose in the medium?
11. Explain (in one or two lines) the function of the followings:
(a) Promoter
(b) tRNA
(c) Exons
12. Why is the Human genome project called a mega project?
13. What is DNA fingerprinting? Mention its application.

14. Briefly describe the following:

- (a) Transcription**
- (b) Polymorphism**
- (c) Translation**
- (d) Bioinformatics**