Q.1. ans. autosomal genetic disorders sickle cell

Q. 1. Mention the advantages of selecting pea plant for experiment by Mendel. Ans. Advantages are. (a) Pea plant shows self pollination. (b) It shows stable trait inheritance. (c) The expression of traits is for several generations.

(d) The plants selected were true breeding. Q. 2. (a) What is Punnett square? (b) Mention its one use. Ans.

(a) It is a graphical representation to calculate the probability of all possible genotypes of offspring is a genetic cross. (b) It is used to represent the possible genotypes of offspring of a genetic cross. Q. 3. Define and design a test-cross.

Ans. The cross which helps us to determine the unknown genotype of a dominant phenotype by crossing it with the recessive parent is called a test cross. Q. 4. what was the opinion of Mendel regarding the law of dominance? Ans.

1. The characters are controlled by discrete units called factors. 2. Factors occur in pairs. 3. In a dissimilar pair of factors (heterozygous) one member of the pair dominates (dominant) and the other is recessive. Q. 5.

A child has blood group O. If the father has blood group A and mother blood group B, work out the genotypes of the parents and the possible genotypes of the other offspring’s. Ans. Father’s blood group A – genotype IAi° or IAIB.

Mother’s blood group B – genotype IBi° or IBIB. Child’s blood group O – genotype ii. Other child’s blood group is AB genotype IAIB. Q.

6. Mention any two autosomal genetic disorders with their symptoms. Ans. Autosomal genetic disorders Sickle cell anemia and Phenylketonuria Symptoms: 1. Phenylalanine is accumulated and is converted into phenylpyruvic acid and other derivatives. 2. These are accumulated in brain leading to mental retardation. 3.

These are excreted in urine because of its poor absorption by the kidney. Q. 7. Define the term— sex chromosome and autosome.

Ans. Sex chromosomes: Chromosomes that are involved in determination sex of an individual are called sex chromosomes. Such as — X and Y in human. Autosomes : Chromosomes other than sex chromosomes are called autosomes. They are 22 pairs in human.

Q. 8. How is sex determined in human beings? Ans. Sex determination in human is of xy type. The male and female individual has the same number of chromosomes i. e.

22 pairs autosomes and 1 pair sex chromosomes. The males are heterogametes and responsible for production of two types of gametes— sperms. Sperms with x chromosome and sperms with y chromosome. Females are homogametic and produce ovum with x chromosome only. Condition 1 — Combination/fertilization of sperm with y chromosome with ovum results in male zygote, i. e. xy. Condition 2 — Fertilization of sperm with x chromosome with ovum results in female zygote, i.

e. xx. Therefore, the 1st zygote will form male child and the 2nd zygote will form female child. Sperm with chromosome Y is responsible for male child

and not the women as she is blamed in the society for bearing female child. Q. 9. What are genetic disorders? Classify them with 2 examples to each. Ans.

The disorder caused in the individual due to genes/ chromosomes are broadly called gametic disorders. Q. 10. What are Mendelian disorders? How are they caused? Mention their characteristics and give examples. Ans.

The disorders caused due to change in a single gene or mutation are called Mendelian disorders. These are caused due to mutations. 1. These diseases are transmitted on the same lines of principle of inheritance. 2. These can be traced in the family history by pedigree analysis. 3.

These disorders may be dominant/recessive. 4. These disorders may be linked to sex chromosome — (X-chromosome) and autosomal chromosome. e. g. Hemophilia, sickle cell anemia. Q. 11.

Study the following figures: (a) What is this type of analysis called? (b) Which disease is being represented by it? Name them. (c) It is autosomal or sex linked disease? Ans. (a) This type of analysis is called pedigree analysis. (b) Mendelian disorder. It is myotonic dystrophy and sickle cell anemia. (c) It is autosomal dominant trait— myotonic dystrophy and autosomal recessive trait— sickle cell anemia. Q.

12. what is pedigree analysis? Suggest how such an analysis can be useful? Ans. The pattern of inheritance of Mendelian disorder in (human) family can be traced by study of family history is called pedigree analysis. Such an analysis is useful to know whether the trait is— dominant/recessive,

autosomal/ sex linked. Q. 13. (i) who used Mendelian principles and united the knowledge with chromosomal segregation? (ii) Who verified the chromosomal theory of inheritance? (iii) Name the organism used for the experiment and why? Ans.

(i) Sutton. (ii) T. H. Morghan.

(iii) Drosophila melanogaster (a) Organisms can be grown in simple synthetic medium in the lab. (b) They produce large number of progeny flies in a single mating. Q. 14. Which type of sex determination is shown by— (a) Human beings, (b) Drosophila, (c) Grasshopper, (d) Hen. Ans.

(a) Human beings – XY type. (b) Drosophila-XY type. (c) Grasshopper – XO type. (d) Hen-XO type. Q. 15. Draw the symbols used to represent the following in a pedigree analysis. (a)Male (b) Unspecified sex (c) Mating (d) Consanguineous mating Ans.

(a) Male — ? (b) Unspecified sex — —o (c) Mating— O (d) Consanguineous mating — Q. 16. Mention any 4 characteristics of an individual inflated with Down’s syndrome. Ans. (a) Flat back of the head. (b) There are many ‘ loops’ on finger tips. (c) Palm has many crease. (d) The face is broad and flat.

Q. 17. Define the term aneuploidy.

Name the disorder caused due to it. Ans. The phenomenon of failure of segregation of chromatids during the cell division and consequently the gain/loss of chromosomes is called aneuploidy. Down’s syndrome is due to an extra copy of 21 chromosomes. (46 + 1 = 47) Q. 18.

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? Ans. Suppose two loci linked are— TtYy, TtYy in parents. As they are linked the segregation of traits (dominant and recessive) will not occur and will go as it is in parents, i. e.

gametes will have Tt Yy genotype. A cross will result in same phenotype. All the progeny will have same phenotype tall and yellow trait.