Chapter- 05

PRINCIPLE OF INHERITANCE AND VARIATION

VERY SHORT ANSWER QUESTIONS (1 mark)

01. Define genetics. Who is Mendel?

02. Define the terms: Character, Trait, Alleles, and True breeding plants.

03. What is X-body and who named it so ?

04. Differentiate between Homozygous and Heterozygous.

05. What is F_1 and F_2 generation? How they are obtained?

06. Define point mutaion.Give an exmple of it .

07. Define aneuploidy and polyploidy.

08. What is Punnett square?

09. What is back cross and test cross?

10. How Law of segregation affects inheritance?

SHORT ANSWER TYPE QUESTIONS (2 marks)

11. Name the plant which Mendel took for his hybridization experiment and why he selected that plant.

12. Basing upon the experiment give the conclusion derived by Mendel.

13. How the inborn disorder phenylketonuria is inherited?.

14. Why law of independent assortment is important?

15. What is the genotypic and phenotypic ratio obtained in F_2 generation in a monohybrid cross?

16. Enlist any two reasons for mendel's failure.

17. Explain the sex-determination system in case of grasshopper.

18. State two points of differentiation between Mendelian disorder and chromosomal aberrations.

19. What is pleiotropy? Explain it with the help of an example.

20. State 2 points of difference between autosomal and sex linked disorder.

SHORT ANSWER TYPE QUESTIONS (3 marks)

21. How incomplete dominance is different from Mendelian inheritance?

22. What do you mean by co-dominance? With the help of an example explain the said inheritance.

23. Write the example of polygenic trait and explain it.

24. With the help of an example write down how non recombinants and recombinants are formed.

25. What do you mean by male and female heterogamety?Explain it by the help of examples.

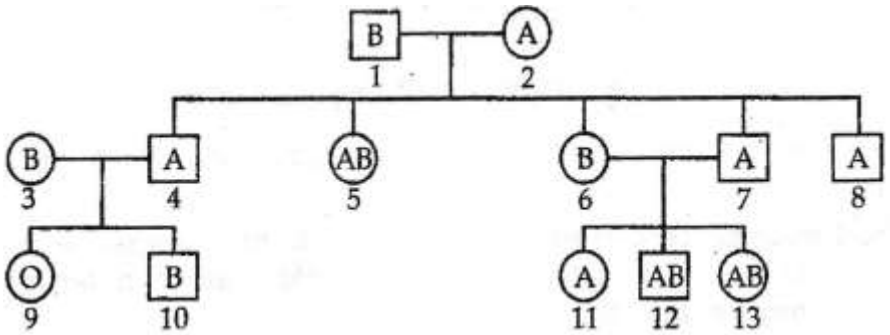
LONG ANSWER TYPE QUESTIONS (5 marks)

26. Study the pedigree chart given, showing the inheritance pattern of blood groups in a family and answer the following questions. (a) Explain how ABO blood group is determined in human.

(b) Give the possible genotypes of the individuals 1 and 2.

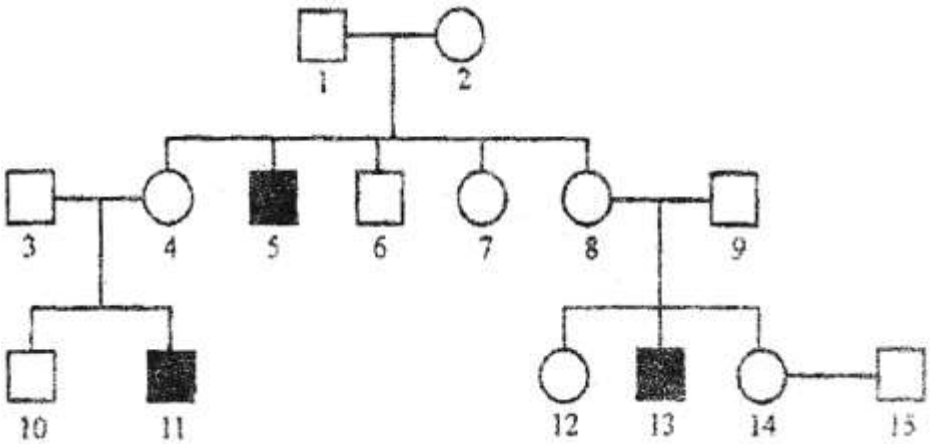
(c) Which antigen or antigens will be present on the plasma membranes of the RBC's of individuals 5 and 9.

(d) Give the genotypes of the individuals 3 and 4.



27. Haemophilia is a sex linked recessive disorder of humans. The pedigree chart given below shows the inheritance of haemophilia in one family Study the pattern of inheritance and answer the questions given.

(a) Give all the possible genotypes of the members 1,2,4, 5 , 6, 8 & 9 in the pedigree chart.
(b) A blood test shows that the individual 14 is a carrier of haemophilia. The member numbered 15 has recently married the member numbered 14. What is the probability that their first child will be a haemophilic male?



28. Study the following carefully and explain why mutation (A)did not cause any sickle cell anemia inspite of change in the molecular structure of the gene which codes for

Haemoglobin,When as a similar mutation(B) did. Codons For Hb: C_1-C_2-C_3-C_4-C_5- GAA - GAA - C_8.....(Normal Haemoglobin) Amino acids in Hb : a_1-a_2-a_3-a_4-a_5-Glutamic acid - Glutamic acid-a_8.....(Normal Haemoglobin) **Mutation(A):** C_1-C_2-C_3-C_4-C_5- GAG - GAA - C_8.....a_1-a_2-a_3-a_4-a_5-Glutamic acid-Glutamic acid-a_8.....(Normal Haemoglobin). **Mutation(B):** C_1-C_2-C_3-C_4-C_5- GUG - GAA - C_8..... a_1-a_2-a_3-a_4-a_5-Valine -Glutamic acid- a_8 ..... (Sickle cell Haemoglobin)

Write down the genotypes of a normal, defective and carrier individual for the above said disorder.

29. What is the inheritance pattern observed in the size of starch grain and seed shape in *Pisum sativum*? Work out the monohybrid cross showing the above traits. How does this pattern of inheritance deviate from that of Mendel's law of dominance?

30. (a) Explain Mendel's law of independent assortment by taking a suitable example.

(b) How did Morgan show the deviation in inheritance pattern in Drosophila with respect to this law?

HOTS/MODEL QUESTIONS:

01. What do you mean by genotype and phenotypes?

02. Genotypically represent a normal man, a carrier and a sickle cell anemia affected individual. Justify how a normal gene deviates from its function.

03. Give the significance of frequency of recombination

04. Who verified chromosomal theory of inheritance?

05. What is Downs syndrome ? Enlist its effect and karyotype.

06. Write the karyotype and characteristics of following diseases.

(a) **Down's syndrome** (b) **Klinefelter's syndrome** (c)**Turner's syndrome**

07. Give the role of genetic map in HGP.

08. Differentiate between dominant and recessive factor.

09. What is **gynecomastia** condition?

10. Write the percentage of F_2homozygous and heterozygous population in a typical monohybrid cross.

11. Describe the dihybrid crocs carried on Drosophila by morgan and his group? **[CBSE-2017]**

12. (a) State the cause and symptom of colour blindness in humans.

(b) Statistical date has shown that 8% of human males are colourblind where as only 0.4% of females are colourblind why? **[CBSE-2016]**

13. (a)Explain polygenic Inheritance and multiple allelism with the help of suitable examples

(b) "Phenylketonuria"is a good example that explains pleiotropy .Justify **[CBSE-2017]**

14. How would you find genotype of a tall peaplant bearing white flowers? Explain with the help of cross. Name the type of cross you would use? **[CBSE-2016]**

15. One of the twins born to parents having normal colour vision was colourblind where as the other twin had normal vision.work out the cross .Give two reasons how it is possible.**[CBSE-2017]**

16. Explain co-dominance with the help of an example. **[CBSE-2017]**

17. State the fate of a pair of autosomes during gamete formation. **[CBSE-2017]**

18. Name the type of cross that would help to find the genotype of a pea plant bearing violet flowers.

[CBSE-2017]

SHORT ANSWER TYPE QUESTIONS (2 marks)

11. Expand - (i) OAA (ii) PGA (iii) NADP (iv) ADP

12. State Blackman's law of limiting factor.

13. Diagrammatically represent chloroplast.

14. Write any four differences between cyclic and non-cyclic photophosphorylation.

15. (a) Name the two plants showing Kranz anatomy. (b) Mention the importance of Kranz anatomy in C_4 plant.

16. What do you mean by photolysis of water. Give the reaction.

17. What do you mean by biosynthetic phase. Name the end product.

SHORT ANSWER TYPE QUESTIONS (3 marks)

18. How photochemical phase is different from biosynthetic phase.
19. Describe the light harvesting complexes of photosynthesis
20. Name the accessory pigments of photosynthesis. Mention their role.
21. Give any six point of difference between C_3 and C_4 plants.
22. What do you mean by photorespiration? Why photorespiration is a wasteful process?
23. Describe cyclic phosphorylation with diagram.
24. Graphically represent pigments showing absorption spectrum.

LONG ANSWER TYPE QUESTIONS (5 marks)

25. Diagrammatically represent Hatch and Slack pathway. Expand PEP. What is its role in the bisoynthetic process?
26. Describe and draw Z-scheme.
27. Schematically represent the process of ATP synthesis through chemosmosis in chloroplast. Explain how ATP synthase is activated.

HOTS/ MODEL QUESTIONS:

01. Name the reaction centre of PS - I and PS - II
02. Give the name of CO_2 concentration at which saturation of photosynthesis occures in C_3 and C_4 plants. Explain how light affects photosynthesis.
03. Why is the C_3 pathway of photosynthesis also known as Calvin cycle?
04. Name all the electron carries involved in non-cyclic photophosphorylation.
05. Write the simple equation of photosynthesis as given by Van Niel.
06. Why is the lumen of thylakoid acidic while stroma is alkaline?
07. Explain “There is no oxygen evolution in bacterial photosynthesis”.
08. Why did Melvin Calvin used Chlorella for his experiment?
09. Mention the steps common to C_3 and C_4 photosynthesis.
10. Why is it an advantage that bundle sheath chloroplast lack grana?
11. Suggest some habitats in which light intensity, CO_2 concentration and temperature might be a limiting factor in photosynthesis.
12. In C_4 plants which type of chloroplast is specialized for light reaction and which for dark reaction.

13. Dark reactions are temperature controlled. Why?

14. Explain Blackmann's Law of limuting factors.

15. Name the hormones which increase and decrease the rate of photosynthesis.

16. Why is photorespiration also called C_2 cycle?

17. How many ATP molecules are required for synthesies of one molecule of Glucose in C_4 plant?