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# NEET PRINCIPLES OF INHERITANCE AND VARIATION — GENETIC DISORDERS: MENDELIAN (HAEMOPHILIA, COLOUR BLINDNESS, SICKLE CELL, PKU, THALASSEMIA) — PYQS

**Max. Marks:** 132 **Questions:** 33

## Section A (MCQ) — 33 questions

**Q.1** Which one of the following disorders is caused by the substitution of Glutamic acid (Glu) by Valine (Val) at the sixth position of the beta globin chain of the haemoglobin molecule ? [NEET (UG) 2026]

(1) Phenylketonuria (2) Haemophilia
(3) Sickle-cell anaemia (4) Thalassemia

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**Q.2** The sixth mutant codon of beta globin gene causing polymerization of Haemoglobin and change in RBC shape is _____. [NEET (UG) 2026]

(1) CAG (2) AUG (3) GUG (4) GAG

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**Q.3** Match **List I** with **List II** :

| List - I | | List - II | |
|---|---|---|---|
| A. | Down's syndrome | I. | 11th chromosome |
| B. | α-thalassemia | II. | 'X' chromosome |
| C. | β-thalassemia | III. | 21st chromosome |
| D. | Klinefelter's syndrome | IV. | 16th chromosome |

Choose the correct answer from the options given below : [NEET (UG) 2024]

(1) A-I, B-II, C-III, D-IV
(2) A-II, B-III, C-IV, D-I
(3) A-III, B-IV, C-I, D-II
(4) A-IV, B-I, C-II, D-III

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**Q.4** If a colour blind female marries a man whose mother was also colour blind, what are the chances of her progeny having colour blindness? [NEET (UG) 2022]

(1) 25% (2) 50% (3) 75% (4) 100%

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**Q.5** Given below are two statements:

**Statement-I:** Sickle cell anaemia and haemophilia are autosomal dominant traits.
**Statement-II:** Sickle cell anaemia and haemophilia are disorders of the blood.

In the light of the above statements, choose the correct answer from the options given below : [NEET (UG) 2022 (Phase 2)]

(1) Statement-I is incorrect but Statement-II is correct
(2) Both Statement-I and Statement-II are correct
(3) Both Statement-I and Statement-II are incorrect
(4) Statement-I is correct but Statement-II is incorrect

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**Q.6** A normal girl, whose mother is haemophilic marries a male with no ancestral history of haemophilia. What will be the possible phenotypes of the offspring?

A. Haemophilic son and haemophilic daughter.
B. Haemophilic son and carrier daughter.
C. Normal daughter and normal son.
D. Normal son and haemophilic daughter.

Choose the most appropriate answer from the options given below: [NEET (UG) 2022 (Phase 2)]

(1) B and D only (2) A and B only
(3) B and C only (4) A and D only

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**Q.7** In a cross between a male and female, both heterozygous for sickle cell anaemia gene, what percentage of the progeny will be diseased? [NEET (UG) 2021]

(1) 100% (2) 50% (3) 75% (4) 25%

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**Q.8** Select the correct match [NEET (UG) 2020]

(1) Thalassemia – X linked
(2) Sickle cell anaemia – Autosomal recessive trait, chromosome-11
(3) Phenylketonuria – Autosomal dominant trait
(4) Haemophilia – Y linked

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**Q.9** A woman has an X-linked condition on one of her X chromosomes. This chromosome can be inherited by [NEET 2018]
(1) only daughters
(2) only sons
(3) only grandchildren
(4) both sons and daughters

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**Q.10** Thalassemia and sickle cell anemia are caused due to a problem in globin molecule synthesis.
Select the correct statement. [NEET 2017]
(1) Both are due to a qualitative defect in globin chain synthesis
(2) Thalassemia is due to less synthesis of globin molecules
(3) Sickle cell anemia is due to a quantitative problem of globin molecules
(4) Both are due to a quantitative defect in globin chain synthesis

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**Q.11** Pick out the **correct** statements :
A. Haemophilia is a sex-linked recessive disease.
B. Down's syndrome is due to aneuploidy.
C. Phenylketonuria is an autosomal recessive gene disorder.
D. Sickle cell anaemia is an X-linked recessive gene disorder. [NEET 2016 (Phase 1)]
(1) A, B and C only (2) A, C and D only
(3) A and D only (4) B and D only

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**Q.12** Which of the following most appropriately describes haemophilia ? [NEET 2016 (Phase 1)]
(1) Chromosomal disorder
(2) X-linked recessive gene disorder
(3) Dominant gene disorder
(4) Recessive gene disorder

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**Q.13** If a colour-blind man marries a woman who is homozygous for normal colour vision, the probability of their son being colour-blind is [NEET 2016 (Phase 2)]
(1) 0.75 (2) 0.5 (3) 0 (4) 1

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**Q.14** Select the incorrect statement with regard to Haemophilia : [NEET 2013]
(1) It is a dominant disease
(2) A single protein involved in the clotting of blood is affected
(3) It is a recessive disease
(4) It is a sex-linked disease

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**Q.15** If both parents are carriers for thalassemia, which is an autosomal recessive disorder, what are the chances of pregnancy resulting in an affected child ? [NEET 2013]
(1) 100% (2) 25%
(3) no chance (4) 50%

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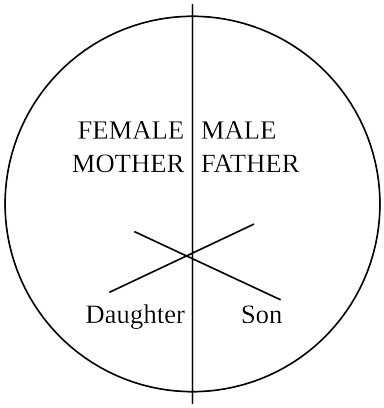
**Q.16** Represented below is the inheritance pattern of a certain type of traits in humans. Which one of the following conditions could be an example of this pattern ? [AIPMT 2012 (Mains)]




(1) Haemophilia (2) Sickle cell anaemia
(3) Thalassemia (4) Phenylketonuria

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**Q.17** A normal-visioned man whose father was colour-blind, marries a woman whose father was also colour-blind. They have their first child as a daughter. What are the chances that this child would be colour-blind ? [AIPMT 2012 (Prelims)]

(1) 50% (2) 25%
(3) 100% (4) Zero percent

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**Q.18** Select the incorrect statement from the following: [AIPMT 2009]

(1) Baldness is a sex limited trait
(2) Galactosemia is an inborn error of metabolism
(3) Linkage is an exception to the principle of independent assortment in heredity
(4) Small population size results in random genetic drift in a population

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**Q.19** Sickle-cell anaemia is: [AIPMT 2009]

(1) Caused by substitution of valine by glutamic acid in the beta globin chain of haemoglobin
(2) An autosomal linked dominant trait
(3) Caused by a change in a single base pair of DNA
(4) Characterised by elongated sickle like RBCs with a nucleus

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**Q.20** Both sickle cell anemia and Huntington's chorea are- [AIPMT 2006]

(1) Congenital disorders
(2) Bacteria-related diseases
(3) Virus-related diseases
(4) Pollutant-induced disorders

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**Q.21** If a colour blind woman marries a normal visioned man, their sons will be [AIPMT 2006]

(1) All normal visioned
(2) Three-fourths colourblind and one-fourth normal
(3) One-half colourblind and one-half normal
(4) All colourblind

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**Q.22** Sickle cell anaemia has not been eliminated from the African population because- [AIPMT 2006]

(1) It is not a fatal disease
(2) It is controlled by dominant genes
(3) It is controlled by recessive genes
(4) It provides immunity against malaria

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**Q.23** G-6-P dehydrogenase deficiency is associated with haemolysis of - [AIPMT 2005]

(1) RBCs (2) Lymphocytes
(3) Platelets (4) Leucocytes

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**Q.24** A man and a woman, who do not show any apparent signs of a certain inherited disease, have seven children (2 daughters and 5 sons). Three of the sons suffer from the given disease but none of the daughters are affected. Which of the following mode of inheritance do you suggest for this disease? [AIPMT 2005]

(1) Autosomal dominant
(2) Sex-linked recessive
(3) Sex-linked dominant
(4) Sex-limited recessive

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**Q.25** Haemophilia is more commonly seen in human males than in human females because - [AIPMT 2005]

(1) This disease is due to an X-linked dominant mutation
(2) This disease is due to a Y-linked recessive mutation
(3) This disease is due to an X-linked recessive mutation
(4) A greater proportion of girls die in infancy

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**Q.26** Which of the following is not a hereditary disease? [AIPMT 2005]

(1) Cretinism (2) Cystic fibrosis
(3) Haemophilia (4) Thalassemia

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**Q.27** A woman with normal vision, but whose father was colour blind, marries a colour blind man. Suppose that the fourth child of this couple was a boy. This boy - [AIPMT 2005]

(1) May be colour blind or may have normal vision
(2) Must have normal colour vision
(3) Must be colour blind
(4) Will be partially colour blind since he is heterozygous for the colour blind mutant allele.

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**Q.28** A male human is heterozygous for autosomal genes A and B and is also hemizygous for hemophilic gene h. What proportion of his sperms will be abh? [AIPMT 2004]

(1) 1/16 (2) 1/32 (3) 1/8 (4) 1/4

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**Q.29** A normal woman, whose father was colour-blind is married to a normal man. The sons would be :- [AIPMT 2004]

(1) All colour-blind (2) 75% colour-blind
(3) All normal (4) 50% colour-blind

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**Q.30** The recessive genes located on X-chromosomes in humans are always - [AIPMT 2004]

(1) Expressed in females
(2) Sub-lethal
(3) Expressed in males
(4) Lethal

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**Q.31** Which one of the following conditions though harmful in itself, is also a potential saviour from a mosquito borne infectious disease? [AIPMT 2003]

(1) Pernicious anaemia (2) Thalassaemia
(3) Leukemia (4) Sickle cell anaemia

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**Q.32** Christmas disease is another name for :- [AIPMT 2003]

(1) Hepatitis B (2) Sleeping sickness
(3) Haemophilia B (4) Down's syndrome

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**Q.33** Sickle cell anaemia is due to [AIPMT 2001]

(1) Change of amino acid in either α or β chain of haemoglobin
(2) Change of amino acid in α chain of haemoglobin
(3) Change of amino acid in both α and β chain of haemoglobin
(4) Change of amino acid in β chain of haemoglobin

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## ANSWER KEY

| Ques. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | **3** | **3** | **3** | **4** | **1** | **3** | **4** | **2** | **4** | **2** | **1** |
| Ques. | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| Ans. | **2** | **3** | **1** | **2** | **1** | **4** | **1** | **3** | **1** | **4** | **4** |
| Ques. | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
| Ans. | **1** | **2** | **3** | **1** | **1** | **3** | **4** | **3** | **4** | **3** | **4** |