

- Which is not culturable in artificial/synthetic media
(A) TMV (B) *E. coli*
(C) HIV (D) Both A and C.
- Which is incorrect about colour-blindness
(A) This is due to defect in either red or green cone of eye resulting in failure to discriminate between red and green colour
(B) A daughter will not normally be colourblind, unless her mother is a carrier and her father is colourblind
(C) If female has $X^c X$ then it is called carrier but when male has then $X^c Y$ then it will be colourblind
(D) The son of a woman who carries the gene has 25 per cent chance of being colour blind.
- Meiosis II performs
(A) Separation of sex chromosomes
(B) Synthesis of DNA and centromere
(C) Separation of homologous chromosomes
(D) Separation of chromatids.
- Sahiwal cow in ...a... was developed by ...b...
(A) a-Punjab, b-Artificial Selection and Domestication
(B) a-Haryana, b-Natural Selection and Artificial Selection
(C) a-Haryana, b-Artificial Selection and Domestication
(D) a-Punjab, b-Natural Selection and Domestication.
- The tendency of the body to manifest a characteristic and unpleasant withdrawal syndrome if regular dose of drugs / alcohol is abruptly discontinued is
(A) Addiction (B) Dependence
(C) Adolescence (D) Vandalism.
- Cohen and Boyer isolated an antibiotic resistance gene by cutting out a piece of DNA from a plasmid having antibiotic resistance in the year
(A) 1963 (B) 1967
(C) 1972 (D) 1982.
- Identify the group, which includes animals all of which give birth to young ones directly
(A) Dolphin, kangaroo, bat, cat
(B) Platypus, penguin, bat, hippopotamus
(C) Shrew, bat, kiwi, cat
(D) Lion, whale, ostrich, bat.
- Match the columns I and II, and choose the correct combination from the options given

Crop variety	Resistant to
a. Himgiri	i. White rust
b. <i>Pusa Swarnim</i>	ii. Hill bunt
c. <i>Pusa Shubhra</i>	iii. Leaf curl
d. <i>Pusa Sadabahar</i>	iv. Black rot

(A) a-i, b-ii, c-iv, d-iii (B) a-i, b-ii, c-iii, d-iv
(C) a-ii, b-i, c-iii, d-iv (D) a-ii, b-i, c-iv, d-iii.
- The quaternary structure can be formed by only a
(A) Protein made up of a single polypeptide
(B) Protein made up of a minimum of two polypeptides
(C) Protein made up of a minimum of four polypeptides
(D) Glycoprotein.
- In *Drosophila melanogaster* the genes white and yellow showsa.....recombination and genes white and miniature wing showsb.....linkage
(A) a \rightarrow 1.3%, b \rightarrow 62.8%
(B) a \rightarrow 98.7%, b \rightarrow 62.8%
(C) a \rightarrow 1.3%, b \rightarrow 37.2%
(D) a \rightarrow 98.7%, b \rightarrow 37.2%.
- When a violet flower of unknown genotype is crossed with the white flower, the progenies are violet and white in equal proportion. Then read the following statements
(i) This is called test cross
(ii) Unknown flower is homozygous
(iii) Unknown flower is heterozygous
(iv) This test is used to determine the phenotype of the plant at F_2 .
(v) In test cross, violet or white flower is crossed with the recessive parent instead of self-crossing.
Select the incorrect statement
(A) iii, iv, v (B) ii, iv
(C) ii, iv, v (D) i, ii, v.
- Children in a family have blood types O, A, AB and B respectively. What are the genotypes of

their parents

- (A) $I^A i$ and $I^B i$ (B) $I^A I^B$ and ii
(C) $I^B I^B$ and $I^A I^A$ (D) $I^A I^A$ and $I^B i$.

13. Botanical name of Cauliflower is

- (A) *Brassica oleracea* var. *capitata*
(B) *Brassica campestris*
(C) *Brassica oleracea* var. *botrytis*
(D) *Brassica oleracea* var. *gemnifera*.

14. Read the following statements and find out the correct statement

- (a) The sex determination in honey bee is based on the number of sets of chromosomes an individual receives.
(b) An offspring formed from the union of a sperm and an egg develops as a female (queen or worker), and an unfertilized egg develops as a male (drone) by means of parthenogenesis.
(c) The males are diploid having 32 chromosomes and females are haploid, i.e., having 16 chromosomes.
(d) This is called as haplodiploid sex-determination system and has special characteristic features such as the males produce sperms by mitosis they do not have father and thus cannot have sons, but have a grandfather and can have grandsons.

- (A) a and b (B) b, c and d
(C) a, b and d (D) a, b, c and d.

15. A colour blind man ($X^c Y$) has a colour blind sister ($X^c X^c$) and a normal brother (XY). What is genotype of father and mother

- (A) $X^c Y$, $X^c X$ (B) $X^c Y$, $X^c X^c$
(C) XY , $X^c X^c$ (D) XY , $X^c X$.

16. Mutations are induced mostly by

- (A) UV radiations (B) Beta rays
(C) Alpha rays (D) Gamma rays.

17. Choose the wrong statement

- (A) In grasshoppers, besides autosomes, males have only one X-chromosome whereas females have a pair of X-chromosomes
(B) In *Drosophila*, males have one X-and one Y-chromosome whereas females have a pair of X-chromosomes besides autosomes

(C) In birds, females have one Z-and one W-chromosome, whereas males have a pair of Z-chromosomes besides autosomes

(D) In insects with XO type of sex determination, all sperms have X-chromosome besides autosomes.

18. Which ones are correct

- (a) Uneven thickening of cell wall is characteristic of sclerenchyma
(b) Periblem forms cortex of stem and root
(c) Tracheids are chief water conducting elements in angiosperms
(d) Companion cell is devoid of nucleus at maturity.
(e) Commercial cork is obtained from *Quercus suber*

- (A) b, c, e (B) a, d
(C) b, e (D) c, d.

19. Human skin colour is polygenic trait with each dominant determining a part of melanin deposition while the recessive are coding for no melanin. If a very dark skinned person marries a very light skinned women, the chances of a very dark skinned offspring are




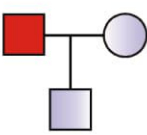

- (A) $1/64$ (B) $1/4$
(C) $5/8$ (D) $9/64$.

20. Match the columns I and II, and choose the correct combination from the options given

Column I	Column II
Organism	Shape of chloroplast
(a) <i>Ulothrix</i>	(i) Stellate
(b) <i>Chlamydomonas</i>	(ii) Ribbon shaped
(c) <i>Zygnema</i>	(iii) Girdle shaped
(d) <i>Spirogyra</i>	(iv) Cup shaped
(A) a-iv, b-iii, c-i, d-ii	(B) a-iv, b-iii, c-ii, d-i
(C) a-iii, b-iv, c-ii, d-i	(D) a-iii, b-iv, c-i, d-ii.

21. In which of the following examples CO_2 gas is produced

- a. Fermentation of dough
b. Cheese making
c. Production of beverages
d. Biogas production
e. Alcoholic fermentation
f. Lactic acid fermentation

- (A) a, b, c and e (B) a, b, c and d
(C) a, b, c, d and e (D) a, b, c, d, e and f.
22. Neuroglial cells make up more than
(A) One-third the volume of neural tissue in our body and form and protect the neurons
(B) One-half the volume of neural tissue in our body and, form and support the neurons
(C) One-half the volume of neural tissue in our body and, protect and support neurons
(D) One-third the volume of neural tissue in our body and, protect and support neurons.
23. Medicinal plant harvested from wild for anticancer compound is
(A) *Taxus baccata*
(B) *Datura stramonium*
(C) *Rauwolfia serpentina*
(D) *Ocimum sanctum*.
24. Blood grouping in human beings is controlled by
(A) 4 alleles in which A is dominant
(B) 3 alleles in which A & B codominant & *i* is recessive
(C) 3 alleles in which none is dominant
(D) 3 alleles in which A is dominant.
25. The offspring of AA bb × aa BB is crossed with, aabb. The genotypic ratio of progeny will be
(A) 9 : 3 : 3 : 1 (B) 1 : 2 : 1
(C) 1 : 1 : 1 : 1 (D) 3 : 1.
26. Read the following statements and find out the incorrect statement
a. Though the genotypic ratios can be calculated using mathematical probability, by simply looking at the phenotype of dominant trait, it is not possible to know the genotypic composition.
b. The 1/4 : 1/2 : 1/4 ratio of TT:Tt:tt is mathematically condensuable to form of the binomial expression (ax + by)², that has the gametes bearing genes T and t in equal frequency of 1/2.
c. Based on his observation on dihybrid crosses Mendel proposed two rules that are called Principles or laws of Inheritance : the First Law or Law of Dominance and the Second Law or Law of Segregation.
- d. If in test cross, all the progenies shows dominant trait then the unknown parent is heterozygous dominant.
e. ABO blood groups are controlled by three alleles I^A, I^B and *i*. I^A and I^B produce a slightly different type of the sugar while allele *i* doesn't produce any sugar.
(A) a and c only (B) b, d and e
(C) a, c and d (D) c and d only.
27. O group mother with O group child sues AB group man for fathership of child. What is true
(A) The claim is correct
(B) Father is true but mother is not
(C) Both parent are false
(D) Mother is true but father claimed is wrong.
28. Match the columns and choose the correct option
- | Column I | Column II |
|---|---|
| a.  | 1. Consanguineous mating |
| b.  | 2. Affected female |
| c.  | 3. Mating |
| d.  | 4. Unaffected female |
| e.  | 5. Parents with male child unaffected
6. sex unspecified |
- (A) a-3, b-1, c-6, d-5, e-4
(B) a-2, b-1, c-6, d-3, e-4
(C) a-3, b-4, c-1, d-5, e-2
(D) a-3, b-1, c-2, d-5, e-4.
29. The term genetics was proposed by
(A) Johannsen (B) Morgan
(C) Mendel (D) Bateson.
30. Shphaerosomes have
(A) Cellulose reserve
(B) Protein reserve
(C) Lipid reserve
(D) Both protein and lipid reserve.
31. In Mendelian dihybrid cross how many are recombinants

- (A) 37.2 % (B) 62.8 %
(C) 37.5 % (D) 62.5 %.
32. Which of the following is not a correct dominant-recessive trait pairs of *Pisum sativum*
(A) Axial-terminal flower position, Tall-dwarf stem height
(B) Yellow-green pod colour, round-wrinkled seed shape
(C) Full-constricted pod shape, Yellow-green seed colour
(D) Violet-white flower colour, Inflated-constricted pod shape.
33. In incomplete dominance, the ratio which deviates from the mendelian monohybrid cross
(A) Genotypic ratio
(B) Phenotypic ratio
(C) Both
(D) Either A or B.
34. Read the following statements and find out the incorrect statement
a. Genetics deals with the inheritance, as well as variation of characters from parents to offspring.
b. Variation is the process by which characters are passed on from parent to progeny.
c. Inheritance is the basis of heredity.
d. Inheritance is the degree by which progeny differ from their parents.
e. Human knew from as early as 8000-10000 B.C. that one of the causes of variation was hidden in sexual reproduction
(A) b, d and e (B) a, c and e
(C) b and d only (D) e only.
35. Alleles are
(A) Similar forms of different gene
(B) Slightly different forms of the same gene
(C) Similar forms of the same gene
(D) Slightly different forms of the different gene.
36. "A disease which shows its transmission from unaffected carrier female to some of the male progeny". Find the nature of the trait
(A) Autosomal recessive
(B) Autosomal dominant
(C) Sex-linked recessive
(D) Sex-linked dominant.
37. Genes controlling seven traits in Pea studied by Mendel were actually located on
(A) Seven chromosomes
(B) Six chromosomes
(C) Five chromosomes
(D) Four chromosomes.
38. Match the following
- | Column I | Column II |
|------------------|--|
| a. Pectinases | i. Blood cholesterol lowering agents and Proteases |
| b. Streptokinase | ii. Immunosuppressive agents |
| c. Cyclosporin-A | iii. Clot-busters |
| d. Statin | iv. Clearifying agents |
- (A) a-iv, b-iii, c-i, d-ii (B) a-i, b-ii, c-iii, d-iv
(C) a-iv, b-iii, c-ii, d-i (D) a-iii, b-iv, c-ii, d-i.
39. Select the one word for the statement
a. If F_1 resembled both the parents
b. If F_1 did not resemble either of the two parents and was in between the two
c. If F_1 resembled either of the two parents
(A) c-dominance, a-co dominance, b-incomplete dominance
(B) a-dominance, c-co dominance, b-incomplete dominance
(C) b-dominance, a-co dominance, c-incomplete dominance
(D) c-dominance, b-co dominance, a-incomplete dominance.
40. In the case of *Antirrhinum* sp. the recessive trait is seen in progenies due to the
(i) The normal enzyme
(ii) Less-efficient enzyme
(iii) Non-functional enzyme
(iv) No enzyme at all.
Select the correct option among i-iv
(A) ii, iii (B) ii, iv
(C) i, iii (D) iii, iv.

Read the assertion and reason carefully to mark the correct option in question.

- (A) If both assertion and reason are true and the reason is the correct explanation of the assertion
- (B) If both assertion and reason are true but reason is not the correct explanation of the assertion
- (C) If assertion is true but reason is false.
- (D) If both assertion and reason are false.

41. Assertion : Morgan carried out several dihybrid crosses in *Drosophila* to study genes that were sex linked.

Reason : Morgan hybridised yellow bodied, white-eyed males to brown bodied, red eyed females and intercrossed their F_1 progeny.

42. Assertion : Transgenic mice are being developed for use in testing the safety of vaccines.

Reason : If successful and found reliable they could replace the use of monkeys to test the safety of batches of the vaccine.

43. Assertion : Colourblindness occurs in about 8 percent of male and only about 0.4 percent of females.

Reason : The genes that lead to red green colour blindness are on the X-chromosome.

44. Assertion : In plant cells, during S-phase, DNA replication begins in the nucleus, and the centriole duplicates in the cytoplasm

Reason : If the initial amount of DNA is denoted as $2n$ at G_1 , even after S-phase the amount of DNA remains the same i.e., $2n$.

45. Assertion : Ganga Action Plan and Yamuna Action Plan has initiated to save these major rivers from pollution.

Reason : These action plans has initiated by IARI and KVIC.