Chapter - 9

Heredity and Evolution

(Assertion and Reasoning Questions)

Following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

Q.1. Assertion(A) : A geneticist crossed two pea plants and got 50% tall and 50% dwarf in the progeny.

Reason (R) : One plant was heterozygous tall and the other was dwarf.

Q.2. Assertion(A) : Variations are seen in offspring produced by sexual reproduction.

Reason (R) : DNA molecule generated by replication is not exactly identical to original DNA.

Q.3. Assertion(A) : Mutation is sudden change in the genetic material.

Reason (R) : Variation is useful for the survival of species over time.

Q.4. Assertion(A) : Mendel selected the pea plant for his experiments.

Reason (R) : Pea plant is cross-pollinating and has unisexual flowers.

Q.5. Assertion(A) : The sex of a child is determined by the mother.

Reason (R) : Humans have two types of sex chromosomes: XX and XY.

Q.6. Assertion(A) : Evolution is an extremely slow process.

Reason (R) : New characters are accumulated in an organism during its lifetime.

Q.7. Assertion(A) : According to Darwin, all organisms compete with each other for existence.

Reason (R) : During the struggle for existence there is survival of the fittest.

Q.8. Assertion(A) : Geographical isolation cannot be a major factor in speciation of an asexually reproducing organism.

Reason (R) : Asexually reproducing organisms do not require any other organism for reproduction.

Q.9. Assertion(A) : In humans, height is a trait which shows variation.

Reason (R) : Some humans are very tall, some have medium height whereas others are short heighted.

Q.10. Assertion(A) : Accumulation of variation in a species increases the chances of its survival in changing environment.

Reason (R) : Accumulation of heat resistance in some bacteria ensure their survival even when temperature in environment rises too much.

Q.11. Assertion(A) : Traits like tallness and dwarfness in pea plant are inherited independently.

Reason (R) : When a homozygous tall pea plant is crossed with dwarf pea plant, medium sized pea plant is obtained in F, generation.

Q.12. Assertion(A) : Pea plant is considered ideal for hybridisation experiments.

Reason (R) : Pea is self pollinating plant with short life cycle and bears visible contrasting traits.

Q.13. Assertion(A) : Monohybrid cross deals with inheritance of one pair of contrasting characters.

Reason (R) : Dihybrid cross deals with inheritance of two pairs of contrasting characters.

Q.14. Assertion(A) : When pea plants (pureline) having round yellow seeds are crossed with pureline plants having wrinkled green seeds, then all pea plants obtained in F, generation bear wrinkled green seeds.

Reason (R) : Round and yellow seeds are dominant to wrinkled and green seeds.

Q.15. Assertion(A) : If blood group of both mother and father is O then the blood group of children will also be O.

Reason (R) : Blood group in humans is determined by many alleles of a gene viz. IA, IB, I0.

Q.16. Assertion(A) : In some reptiles, the temperature at which fertilised egg is incubated before hatching plays a role in determining sex of offspring.

Reason (R) : In turtle, high incubation temperature above 33°C leads to development of female offspring whereas in lizards high incubation temperature results in male offspring.

Q.17. Assertion(A) : In humans, male (or father) is responsible for sex of the baby which is born.

Reason (R) : Y chromosomes are present in only male gametes or sperms.

Q.18. Assertion(A) : If mother is homozygous for black hair and father has red hair then their child can inherit black hair.

Reason (R) : Gene for black hair is recessive to gene for red hair in humans.

Q.19. Assertion(A) : Selfing of a plant for several generations helps plant breeders to obtain pure breeding varieties.

Reason (R) : Pure breeding plants are heterozygous for many traits.

Q.20. Assertion(A) : A tall plant which always produces tall offsprings is considered heterozygous for height and is represented by genotype (Tt).

Reason (R) : A tall plant which always produces tall offspring is homozygous dominant and will always produce only one type of gamete (T).

Q.21. Assertion(A) : A geneticist crossed two plants and got 50% tall and 50% dwarf progenies.

Reason (R) : This cross follows Mendelian law as one of the parent plant might be heterozygous.

Q.22. Assertion(A) : A heterozygous tall plant when crossed with homozygous dwarf plant will produce tall and dwarf plants in the ratio of 3:1.

Reason (R) : A heterozygous tall plant will produce two types of gametes, i.e., one with T and other with t whereas homozygous dwarf plant produce all gametes with t only.

Q.23. Assertion(A) : In human males all the chromosomes are perfectly paired except X and Y chromosomes.

Reason (R) : X and Y are sex chromosomes.

Q.24. Assertion(A) : A child which has inherited X chromosome from father will develop into a girl child.

Reason (R) : Girl child inherits X chromosome from father and Y chromosome from mother.

Q.25. Assertion(A) : Genes present in every cell of an organism control the traits of the organisms.

Reason (R) : Gene is specific segment of DNA occupying specific position on a chromosome.

Q.26. Assertion(A) : In grasshoppers, females are heterogametic and males are homogametic.

Reason (R) : In grasshoppers, male has only one sex chromosome (XO) whereas the female has sex chromosome (XX).

Q.27. Assertion(A) : Round green seeds in pea can be represented by RRyy of Rryy.

Reason (R) : Round yellow seeds and green wrinkled seeds are parental combinations whereas round green and wrinkled yellow are recombinants.

Q.28. Assertion(A) : If mother has two dominant alleles for black hair and father has two recessive alleles for blonde hair then their child will inherit one dominant allele from mother and one recessive allele from father and will have black hair.

Reason (R) : Progeny inherits one genes for each trait from its parents but the trait shown by progeny depends on inherited alleles

-x-x-x-

ANSWER KEY

Q.1 : (a)	**Q.2** : (a)	**Q.3** : (b)	**Q.4** : (a)
Q.5 : (d)	**Q.6** : (c)	**Q.7** : (b)	**Q.8** : (a)
Q.9 : (b)	**Q.10** : (b)		

Q.11 : (c) Traits like tallness and dwarfness in pea plant are inherited independently and when a homozygous tall pea plant is crossed with a dwarf pea plant, only tall pea plants are obtained in F1 generation.

Q.12 : (a) Mendel chose pea plants for studying inheritance because of number of reasons. Pea plants are self pollinating which enables them to produce next generation of plants easily, also purelines could be easily obtained. Due to short life cycle, many generations of pea plants can be produced in a comparatively short span of time. Also pea plants shows a number of clear cut visible contrasting traits like tall and dwarf height, round and winkled seeds, etc.

Q.13 : (b)	**Q.14** : (d)	**Q.15** : (b)	**Q.16** : (b)
Q.17 : (a)	**Q.18** : (c)	**Q.19** : (c)	**Q.20** : (d)
Q.21 : (b)	**Q.22 :** (d)	**Q.23 :** (a)	**Q.24 :** (c)
Q.25 : (b)	**Q.26 :** (d)	**Q.27 :** (b)	**Q.28 :** (a)