

Principles of Inheritance and Variation

- Assertion (A):** Inheritance is the basis of heredity.
Reason (R): Inheritance is the process by which characters are passed on from parent to progeny.

 - (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
 - (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
 - (3) (A) is true but (R) is false
 - (4) Both (A) and (R) are false
- Assertion (A):** During Mandel's investigation into inheritance patterns, it was for the first time that statistical analysis & mathematical logics were applied to the problems in biology.
Reason (R): Mendel conducted hybridization experiments on garden pea for seven years & proposed laws of inheritance.

 - (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
 - (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
 - (3) (A) is true but (R) is false
 - (4) Both (A) and (R) are false
- Assertion (A):** Mendel conducted artificial pollination experiments using several true-breeding pea lines.
Reason (R): Mendel selected 14 true-breeding pea plant varieties.

 - (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
 - (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
 - (3) (A) is true but (R) is false
 - (4) Both (A) and (R) are false
- Assertion (A):** Mendel never supported blending inheritance.
Reason (R): He found that the F_1 always resembled either one of the parents.

 - (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
 - (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
 - (3) (A) is true but (R) is false
 - (4) Both (A) and (R) are false
- Assertion (A):** Genes are the units of inheritance.
Reason (R): They contain the information that is required to express a particular trait in an organism.

 - (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
 - (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
 - (3) (A) is true but (R) is false
 - (4) Both (A) and (R) are false
- Assertion (A):** Punnett square is a graphical representation to calculate the probability of all possible genotypes of offsprings in a genetic cross.
Reason (R): It was developed by a British geneticist, Reginald C. Punnett.

 - (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
 - (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
 - (3) (A) is true but (R) is false
 - (4) Both (A) and (R) are false
- Assertion (A):** Incomplete dominance made it possible to distinguish heterozygous from homozygous.
Reason (R): In incomplete dominance F_1 had a phenotype that did not resemble either of the two parents and was in between the two.

 - (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
 - (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
 - (3) (A) is true but (R) is false
 - (4) Both (A) and (R) are false
- Assertion (A):** There are six different combinations or genotypes of the human ABO blood types.
Reason (R): The gene (I) has three alleles I^A , I^B and I^O .

 - (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
 - (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
 - (3) (A) is true but (R) is false
 - (4) Both (A) and (R) are false



9. **Assertion (A):** In co-dominance and incomplete dominance, the genotypic & phenotypic ratios are same.

Reason (R): In case of co-dominance the F_1 generation resembles both parents.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

10. **Assertion (A):** Multiple alleles can be found only when population studies are made.

Reason (R): Occasionally, a single gene product may produce more than one effect.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

11. **Assertion (A):** According to Mendel, a dihybrid cross is the multiple of two monohybrid crosses.

Reason (R): When two pairs of traits are combined in a hybrid, segregation of one pair of characters is independent of the other pair of characters.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

12. **Assertion (A):** In ♂ grasshopper, some of the sperms bear X-chromosome whereas some do not.

Reason (R): Grasshopper is an example of XX-XY type of sex determination.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

13. **Assertion (A):** In birds, the females have one Z and one W chromosome, whereas male have a pair of Z-chromosomes besides autosomes.

Reason (R): In birds, sex of the offsprings is decided by the temperature of surroundings when they are released.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

14. **Assertion (A):** Mutation results in changes in the genotype and the phenotype of an organism.


Reason (R): Mutation is a phenomenon, which results in alternation of DNA sequences.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

15. **Assertion (A):** In human genetics, pedigree study provides a strong tool, which is utilized to trace the inheritance of a specific trait, abnormality or disease.

Reason (R): The controlled crosses that can be performed in pea plant or some other organisms, are not possible in case of human beings.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

16. **Assertion (A):**  symbol represents normal parents with affected male child.

Reason (R): It is an autosomal dominant disorder.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

17. **Assertion (A):** An X-linked recessive trait shows transmission from carrier male to female progeny.

Reason (R): X-linked recessive trait shows non-criscross inheritance.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

18. **Assertion (A):** In sickle cell anaemia, the shape of RBC becomes elongated sickle like from biconcave disc.

Reason (R): The mutant haemoglobin molecule undergoes polymerization under low oxygen tension causing the change in shape.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

19. **Assertion (A):** Gynecomastia is observed in Turner's syndrome.

Reason (R): Such a disorder is caused due to the presence of extra copy of X-chromosome.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

20. **Assertion (A):** Trisomy or monosomy situation leads to a very serious consequences in the individual.

Reason (R): Down's syndrome is the trisomy of chromosome-21.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

21. **Assertion (A):** In a person with AB-blood group, the erythrocytes carry both A and B antigen on their surface.

Reason (R): The alleles I^A and I^B that produce AB blood group are codominant and both are expressed.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

22. **Assertion (A):** Male and female ratio is almost equal in this world.

Reason (R): Male and female genotype is XX and XY respectively.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

23. **Assertion (A):** Recessive characters are always pure.

Reason (R): Recessive genes always express itself in homozygous condition.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

24. Assertion (A): For recessive autosomal disease both parents are normal and their first son is diseased.

Reason (R): Both the parents are heterozygous

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

25. Assertion (A): Mendel gave postulates like “principles of segregation and principles of independent assortment” after studying seven pairs of contrasting traits in garden pea.

Reason (R): He was lucky in selecting seven characters in pea that were located on seven different chromosomes.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
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- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false



Directions: In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

- (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (c) If Assertion is true but Reason is false.
- (d) If both Assertion and Reason are false.

26. **Assertion:** A person should be considered reproductively healthy if they have healthy reproductive organs but are emotionally imbalanced.

Reason: This statement about reproductive health was given by WHO.

27. **Assertion:** Reproductive and Child Healthcare Programmes is for reproduction related areas.

Reason: It deals with creating awareness among various reproduction related aspects.

28. **Assertion:** Natality increases both population density and population size.

Reason: Natality increases the number of individuals in an area by births.

29. **Assertion:** Saheli, the new oral contraceptive for the females, contains a steroidal preparation.

Reason: It is "once in a day" pill with very few side effects.

30. **Assertion:** Periodic abstinence is a method in which couples avoid from coitus from day 17 to 27 of menstrual cycle.

Reason: It is a very effective method and 100% sure of birth control.

31. **Assertion:** There is chance of fertilisation during 10 -17 days menstrual cycle. **Reason:** Ovulation occurs during these days.

32. **Assertion:** Reusable contraceptives are not full proof method of contraceptions.

Reason: Diaphragms, cervical caps and vaults are barrier methods which prevent conceptions by blocking entry of sperms through cervix. They are reusable.

33. **Assertion :** Copper-T is an effective contraceptive device in human females.

Reason : Copper-T prevents passage of sperms from vagina upwards into fallopian tubes.

34. **Assertion:** Cu-T and Cu-7 do not suppresses sperm-motility.

Reason : Hormones released by them do not affect sperm motility.

35. **Assertion :** HIV infection can be avoided by use of condoms.

Reason: Condoms secrete anti-viral interferons.

36. **Assertion:** In zygote intra fallopian transfer the zygote is transferred to the fallopian tubes of the female.

Reason: ZIFT is a in vivo fertilisation method.

37. **Assertion:** Artificial insemination is method of introduction of semen inside the female.

Reason: This technique is used in those cases where males have low sperm count.

38. **Assertion:** Sterilization is a terminal method used only for males.

Reason: These techniques are highly effective and their reversibility is very good.

39. **Assertion:** A surgical method of contraception is sterilisation.

Reason: It blocks gamete transport and thereby prevents conception.



ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	1	2	2	1	1	2	1	1	2	2	1	3	3	1	1	3	4	1	4	2
Que.	21	22	23	24	25															
Ans.	1	1	1	1	1															

26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.	39.			
D	A	A	D	D	A	B	C	D	C	C	A	D	a			