

PRINCIPLES OF INHERITANCE AND VARIATION

Q.No	Question	Marks
Free Response Questions/Subjective Questions		
Q.73	<p>Sex determination in cockroaches is the same as that seen in some other insects like grasshoppers.</p> <p>(a) Illustrate a cross between a female (XX) cockroach and a male (XO) cockroach.</p> <p>(b) What will be the chromosome number of the off springs formed, if the number of autosomes is 22?</p>	3
Q.74	<p>(a) State ONE point of difference between a monohybrid cross and a test cross.</p> <p>(b) What is/are the possible genotypic ratio/s in a test cross?</p>	2
Q.75	<p>ACHOO syndrome is characterized by uncontrollable sneezing in response to the sudden exposure to bright light, typically intense sunlight. It is inherited as an autosomal dominant condition.</p> <p>(a) Draw a Punnett grid to determine the probability of producing an unaffected child by a heterozygous father and an unaffected mother.</p> <p>(b) Depict the inheritance using a pedigree.</p>	3



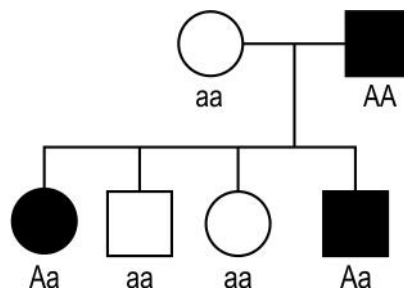
Answer key and Marking Scheme

Q.No	Answers	Marks
Q.73	<p>(a)</p> <p style="text-align: center;"> $\text{♀ } xx$ $\text{♂ } xO$ Parents X x X O Gametes XX xO xX xO Offsprings </p> <p><i>[1 for gamete formation and 1 for offsprings]</i></p> <p>(b) 0.5 marks each for the following:</p> <ul style="list-style-type: none"> - XO - 23 chromosomes - XX - 24 chromosomes 	3
Q.74	<p>(a) 1 mark for any one correct point of difference:</p> <ul style="list-style-type: none"> - Monohybrid cross takes place between two parents of any genotype whereas in a test cross one parent is necessarily homozygous recessive for a/multiple trait/s. - Monohybrid cross between known parents is done to determine the pattern of inheritance of one single gene whereas a test cross is done to determine the unknown genotype of one individual/parent of the cross. <p><i>[Accept any other valid answer]</i></p> <p>(b) 0.5 marks for each of the following:</p> <ul style="list-style-type: none"> - all heterozygous dominant, if the unknown genotype is homozygous dominant - 1:1 (heterozygous dominant: homozygous recessive) if the unknown genotype is heterozygous dominant. <p><i>[Award marks if only the text in bold is written]</i></p>	2
Q.75	<p>(a) 1 mark for the Punnett grid and 1 mark for determining the possibility:</p>	3

	A	a
a	Aa	aa
a	Aa	aa

Possibility of producing an unaffected child is 50%

(b)



[Marks to be awarded for any gender combination of affected offsprings]