

ANSWER KEY

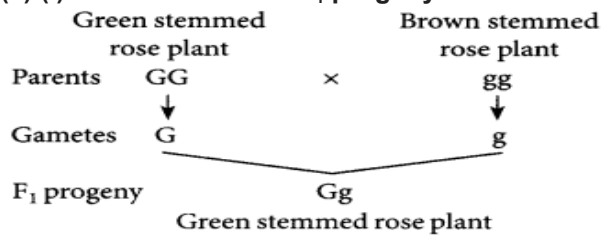
1. (b) 23
2. (c) 300%
3. (b)
4. (a)
5. Effective resistance of series combination  $R_s = nR$

$$\frac{R_s}{R_p} = \frac{nr}{\frac{R}{n}} = n^2$$

And in parallel  $R_p = \frac{R}{n}$

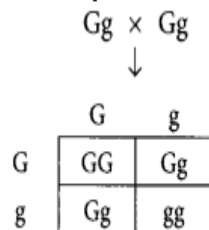
Or  $n^2:1$

6. (a) (i) Colour of stem in  $F_1$  progeny:



The colour in the  $F_1$  progeny is green stemmed as green stem colour is dominant.

- (ii)  $F_1$  progeny on self pollination:



$F_2$  generation Green stemmed : Brown stemmed

$F_2$  generation Green stemmed: Brown stemmed 1/4 or 25% of  $F_2$  progeny are brown stemmed rose plant.

- (iii) Ratio of GG and Gg in  $F_2$  progeny:

Genotype of  $F_2$  progeny – GG : Gg

1 : 2

(b) This is a monohybrid cross. This shows that out of two contrasting traits only one dominant trait appears in  $F_1$  generation and the trait which does not express is recessive. On selfing the  $F_1$  plants, both the traits appear in next generation but in a definite proportion.

7. (a)  $1/R = 1/6 + 1/4$

$$R=2.4\text{ohm}$$

$$\text{Net resistance} = 2.4+3.6+3=9\text{ohm}$$

$$\text{Net current } I = V/R$$

$$=4.5/9 = 0.5\text{A}$$

$$\text{(b) p.d across } 6\text{ohm} = 0.5 \times 2.4 = 1.2\text{V}$$

$$\text{(c) current through } 1\text{ohm resistor} = 0.3\text{A}$$

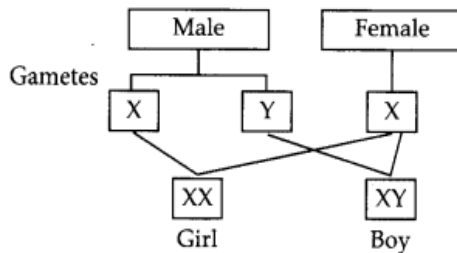
$$H=I^2Rt = (0.3)^2 \times 1 \times 120 = 10.8\text{J}$$

8. Sex is determined at the time of fertilisation when male and female gametes fuse. Male produces two types of gametes, i.e., having X or Y chromosome and female produces same type of gametes containing X chromosomes. The sex of the child is determined at the time of fertilisation when male and female gametes fuse to form zygote.

If a sperm (male gamete) carrying X chromosome fertilises an egg or ovum (female gamete) carrying X chromosome, then the offspring will be a girl (female). This is because the offspring will have XX combination of sex chromosomes.

If a sperm (male gamete) carrying Y chromosome fertilises an egg or ovum (female gamete) which has X chromosome, then the offspring will be a boy (male). This is because the offspring will have XY combination of sex chromosomes.

Therefore, there are 50% chance of a male child and 50% chance of a female child.



9. (a) In parallel combination because all electrical devices needed different values of current and all work at same voltage hence work efficiently.

(b) Current always flow from a higher potential to a lower potential end of the conductor. So end 'A' of the conductor is at a higher potential.

(c)As soon as the battery is connected to the circuit and circuit is closed, a potential difference is felt over the entire circuit. This causes the charges begin to flow.

(d) The resistivity of a metallic conductor does not depend on the length of the wire, so it will remain same.

10. a) The difference in the characteristics of individuals in a population is called variation.

b) Due to their inheritance.

c) Variations that provide survival advantage to an organism.

d) Learning a trick at the circus is not an inherited trait. It is an acquired trait which cannot be transferred into the progeny. So, his offspring's will not know the trick by birth.