Class - 10 CBSE

MOCK TEST TERM - 2

SCIENCE

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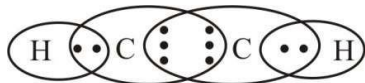
Time Allowed : 2 Hrs.   M.M.: 40

SOLUTION

1.   A = 35
        n = 18
        A = p + n $\Rightarrow$ p = A − n
                              = 35 − 18 = 17
        Atomic No. = 17
        Electric configuration = 2, 8, 7
   Group No. = 17 ; Period No. = 3rd

2.   Ethyne C_2H_2
   H — C≡ C — H

3.   (a) **Homologous Series :** The series of organic compound with same general formula and successive members differ by CH_2 group.

        (b) **Isomerism :** The phenomena when organic compounds have same molecular formula but different structural formula.

        (c) **Modern Period Law :** "The Physical and chemical properties of elements are Periodic function of their atomic Numbers".

4. $FeSO_4 \xrightarrow{\Delta} 2Fe_2O_3 + SO_2 + SO_3$
        (a) Element X is sulphur
        (b) Group No. = 16
            Period No. = 3
        (c) Acidic (Non-metal oxide)
        (d) Carbon
        (e) X = 2, 8, 6
            Or
        (a) C_3H_4 and C_4H_6 belong to homologous series as they differ by CH_2 group.
        (b) Butane C_4H_{10}
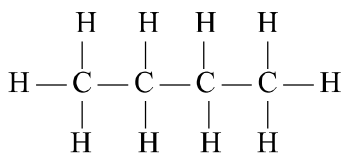
        n – butane
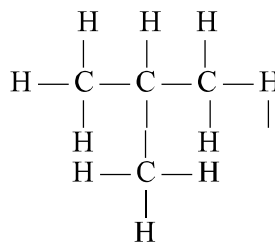
        2 – methyl propane

5.   In the given food chain, if the amount of energy at fourth trophic level in 6 kJ, then 6000 kJ will be the energy available at the producer level. It is because, according to 10% law, only 10% of energy is transferred to the next trophic level and remaining 90% energy is used in life processes by present trophic level.

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6.   7 contrasting characters are chosen by mendel in pea plant.

| Character	Dominant	Recessive
Height	Tall	dwarf
Seed shape	Round	wrinkled
Seed colour	Yellow	green
Pod shape	Inflated	constricted
Pod colour	Green	yellow
Flower colour	Purple	white

7.   In amoeba, splitting of the cell into two during cell division can take place in any plane. Leishmania has a whip like structure at one end of the cell, hence binary fission occurs in a definite orientation in relation to this structure.

Or

Trait Y which exists in 70% of the population, is likely to have arisen earlier because in asexual reproduction, identical copies of DNA are produced & variation do not occur.

New trait come in the population due to sudden mutation and then are inherited. 70% of the population with trait Y is likely to have been replicating that trait for a longer period than 10% of population with trait X.

8.   In human being, the sex of a child is determined depending upon which type of male gamete fertilizes with the female gamete. There are 23 pairs of chromosomes, 22 pairs are autosome (which are similar in both parents) & 23rd pair is called sex chromosome (which is XX in female & XY in male). At the time of fertilization, if the sperm carrying X-chromosome fertilize an ovum carrying an X chromosome, then the child born will be a girl. Similarly if sperm carrying Y-chromosome fertilize an ovum with X chromosome the child born will be a boy.
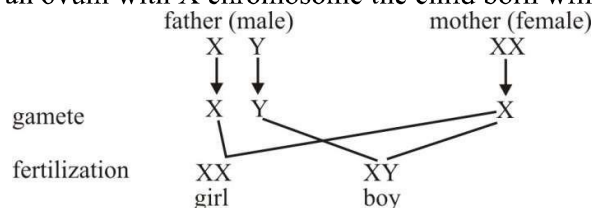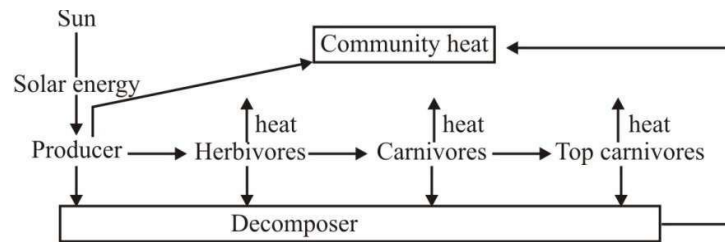

Or

more complex multicellular cannot give rise to new individuals through regeneration because they have organization of their organ system at different levels. All these organ system are interconnected and work in full coordination. They can regenerate few of their lost body parts like. Skin, blood etc. but can't give rise to new individual.
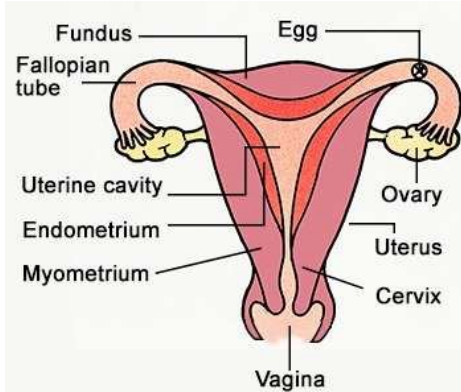
9.   (a) The uterus prepare itself every month to receive fertilized egg by making its inner lining/endometrium thick. This lining helps in supporting the zygote by providing nutrition fertilization is take place in the fallopian tube of female reproductive system.

      (b) The flow of energy in the ecosystem is unidirectional because this energy is then passed on from one organism to another in a food chain. The energy given out by the organism as heat is lost to the environment, it does not return to be used by the plants again. This makes the flow of energy in ecosystem unidirectional.

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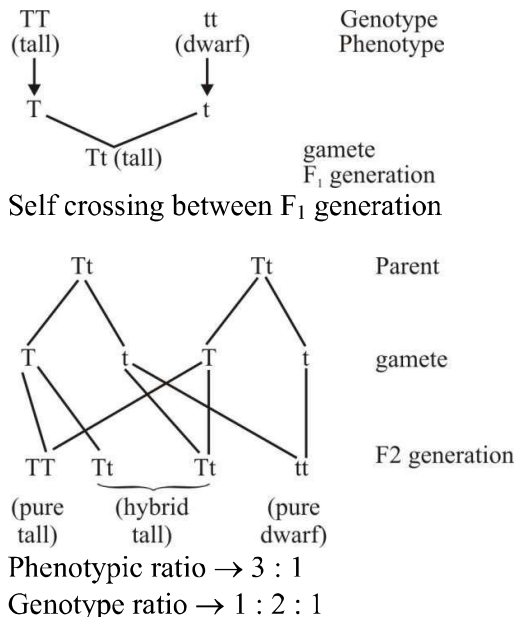**MOCK TEST TERM - 2**

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10.   Diagram of female reproductive system

11.

Self crossing between F₁ generation

Phenotypic ratio → 3 : 1
Genotype ratio → 1 : 2 : 1

(a) all are heterozygous tall in F1 generation.
(b) 3 : 1
      (tall) (dwarf)
(c) Dwarf type of plant not found in F1 regeneration but appeared in F2 generation because in F1 generation it gets masked by the dominant trait whereas in F2 generation there is a cross between two heterozygous parents due to which recessive trait gets a chance to appear

Or

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Phenotypic ratio of F2 generation $\Rightarrow$ 3 : 1
if total no. of plant in F2 generation is 1600, then the no. of tall plant

$\Rightarrow$ $1600 \times \dfrac{3}{4} = 1200$

no. of dwarf plant in F2 generation $\Rightarrow$ $1600 \times \dfrac{1}{4} = 400$

12. (a) Define $I = \dfrac{q}{t}$, $IA = \dfrac{IC}{IS}$ when one coulomb of charge is flowing through a conductor in one second then, the current flowing the conductor is said to be one ampere.

(b) Charge of one electron (e^-) = 1.6×10^{-19} C
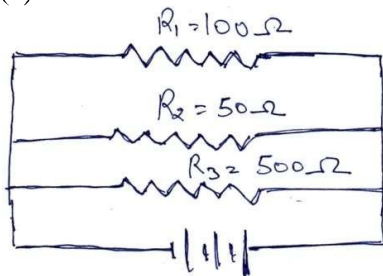no. of electrons (n) = ?
q = 1C
$\therefore$ q = ne
$\Rightarrow$ q = n × 1.6 × 10^{-19}
$\Rightarrow$ $n = \dfrac{1}{1.6 \times 10^{-18}}$
$\Rightarrow$ $n = \dfrac{1}{1.6} \times 10^{19}$
$\Rightarrow$ n = 6.25 × 10^{18} electrons

13. (a)

The equivalent Resistance is R
$\therefore \quad \dfrac{1}{R} = \dfrac{1}{R_1} + \dfrac{1}{R_2} + \dfrac{1}{R_3}$

$= \quad \dfrac{1}{100} + \dfrac{1}{50} + \dfrac{1}{500}$

$= \quad \dfrac{5 + 10 + 1}{500}$

$R = \dfrac{500}{16} \Omega$

Now, using ohm's law, the current flowing across the circuit is I.

$I = \dfrac{V}{R} = \dfrac{220}{\left(\dfrac{500}{16} \right)}$

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$$I = \frac{220 \times 16}{500}$$

I = 7.04 A

As, the appliances are connected in parallel. The current drawn across all them is 7.04 A. Hence, the current by the electric iron connected in parallel to the some source is 7.04 A we can find the resistance of the iron box

$$R = \frac{V}{I} = \frac{220}{7.04} = 31.25\Omega$$

R = 31.25 Ω

(b) A steel bar placed in a solenoid becomes a permanent magnet. A solenoid is a coil of wire designed to create a strong magnetic field inside the coil.

14.   (a) An electric fuse is a low melting point copper or other metal wire that breaks due to heat caused by overvoltage or high load to avoid short circuit or failure to the device.
  (b) The purpose of split ring is to reverse flow of current after every half rotation of the coil and make coil rotate in a single direction.
  (c) Hydroelectric power plants, thermal power generators and AC generators.

15.   (a) Sir is trying to demonstrate the principle of electromagnetic induction.
  (b) There will be induced current in the coil due relative motion between the magnet the coil. Changing the magnetic field around the coil generates induced current.
  (c) (i) Using a stronger magnet.
     (ii) Using a coil with more number turns.

Or

When the magnet moves into the coil, the ammeter shows a momentary deflection towards one side saying left. When the magnet moves out of the coil, the ammeter shows a momentary deflection now towards right.
This is due to changing magnetic field associated with the coil as the magnet moves in and out.

(a) The current drawn by the electric oven can be calculated by using

$$P = U \times I$$

$$I = \frac{P}{V}$$

$$= \frac{2220W}{220V} = 0.09A$$

The current drawn by the electric oven is 0.09 A which exceeds the safe limit of the circuit. This causes the fuse to melt and break the circuit.

(b) When the direction of the current is perpendicular to the direction of the magnetic field is when the force experienced is the largest.

(a) The melting point of an alloy is much higher than a pure metal because of it's high resistivity. At high temperatures, alloy do not men readily. Therefore, alloy are used in heating appliances such as toasters and electric irons.

(b) We, know that
H= RI^2t
H = ?, I = 5, t = 30 sec, R = 20W
H = I^2Rt

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$$= I^2Rt$$
$$= (5)^2 \times (20) \times (30)$$
$$= 25 \times 600$$
$$= 15000$$
$$H = 1.5 \times 10^4 \text{ J}$$

(c) Since, $R \propto \dfrac{1}{A}$ ($\because$ A = Area of cross section)

When the area of cross-section increases the resistance decreases and vice-versa.