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TEST SERIES (2019-20)
Std. : X (CBSE)
Subject : Science
MODEL ANSWER

C

Instruction : Model Answer sheet is for the reference kindly refer text book for detailed answer.

Section - A

1) Alkanes generally burn with blue or clean flame because the combustion is complete and no unburnt carbon particles are cleased. (1)

2) The properties that appear at regular intervals when the elements are arranged in the order of their increasing atomic number is called periodicity. (1)

3) (a) Chlorofluorocarbons (1)
(b) CFCs released in the atmosphere reacts with ozone gas in the ozone layer and destroy it gradually. (1)
(c) If the ozone layer disappears completely, then all extremely harmful UV rays will reach the earth's surface and cause skin cancer, cataracts, slow blindness, etc. in humans, destroy vegetation and crops etc. (1)
(d) The UNEP (United Nations Environment Programme) forged an agreement among its members to freeze CFC production at levels reached in the year 1986. (1)

4) (a) Rohan increased the number of turns in the coil and placed a soft iron core, resulting in decreased air gap in the coil. (1)
(b) When electric current flows through a conductor, a magnetic field is produced around it. This magnetic field is directly proportional to current and inversely proportional to distance from the wire. This is known as magnetic effect of electric current. (1)
(c) He increased the magnitude of current passing through the coil. (1)
(d) It states that, if the forefinger, thumb and middle finger of left hand are stretched mutually perpendicular to each other, so that the forefinger points along the direction of external magnetic field, middle finger indicates the direction of current, then the thumb points towards the direction force acting on the conductor. (1)

5) (c) 40 cm
OR (1)
(a) between second cocus F_2 and centre of curvature C_2.

6) (a) maximum (1)

7) (d) Vermiform appendix (1)

8) (a) Pepsin
OR (1)
(d) Ethanol + Carbon dioxide + Energy

9) (c) Both (a) and (b)
OR (1)
(d) All of these

10) (b) 4, 5, 4, 6 (1)

11) (b) Na_2CO_3 (1)
OR (1)
(d) acidic

12) (a) C_nH_{2n+2}
OR (1)

(d) Three

13) (c) The n-alkanes have larger surface area in comparison to branched chain isomers as the shape approaches that of a sphere in the branched cain isomers. Intermolecular forces are weaker in brtanched chain isomers. This means that as the molecules size decreases, boiling point also decreases. Therefore, they have lower boiling points in comparison to straight chain isomers. Hence, Assertion is true but Reason is false. (1)

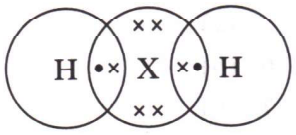
14) (a) Refractive index of material of prism is highest for violet colour (minimum wavelength) and lowest for red colour (maximum wavelength). As, refractive index $\propto \frac{1}{\text{wavelength}}$. (1)

Section - B

15) (a) Electronic configuration of X - 2, 8, 6 ; valence electrons - 6 ; Valency = 8 - 6 = 2 (1)

(b) Formula with hydrogen - H_2 or H_2S (1)

(c) The element is Sulphur and it is non - metal (1)



Electron dot structure of H_2X

16) Metal nitrate 'A' is $Pb(NO_3)_2$.

$$\underset{\text{Lead nitrate 'A'}}{2Pb(NO_3)_2(s)} \xrightarrow{\text{Heat}} \underset{\text{Lead (II) oxide (Yellowish brown)}}{2PbO(s)} + \underset{\text{Nitrogen dioxide (Brown) 'B'}}{4NO_2(g)} + \underset{\text{Oxygen (Colourless) 'C'}}{O_2(g)} \quad ...(i)$$

$$\underset{\text{'A'}}{Pb(NO_3)_2(aq)} + \underset{\text{Potassium iodide}}{2KI(aq)} \longrightarrow \underset{\text{Lead iodide (Yellow ppt.) 'D'}}{PbI_2(s)} + \underset{\text{Potassium nitrate}}{2KNO_3(aq)} \quad ...(ii)$$

'A' is lead nitrate, 'B' is nitrogen dioxide, 'C' is oxygen and 'D' is lead iodide.

(i) Is decomposition reaction and (ii) Is double displacement reaction (Precipitation reaction)

OR

a) Calcium sulphate hemihydrate $CaSO_4.\frac{1}{2}H_2O$ is called plaster of Paris.

b) The reaction for the preparation of plaster of Paris by heating gypsum is shown below :

$$\underset{\text{Gypsum}}{CaSO_4.2H_2O} \xrightarrow{373K} \underset{\text{Plaster of Paris}}{CaSO_4.\frac{1}{2}H_2O} + 1\frac{1}{2}H_2O$$

c) Uses :-
- For making Toys, Cosmetics
- To repair fractured bones
- To seal air gaps of lab apparatus

17) a) Curd or sour substances have acids (lactic acid), which react with copper to form compounds which are poisonous. Therefore, such substances should not be kept in containers of brass and copper metal.

b) Aqueous solution of HCl can produce H^+ ions, but aqueous solution of glucose does not produce H^+ ions. Hence HCl (aq) shows acidic character while aqueous glucose fails to do so.

c) Copper oxide dissolves in dilute hydrochloric acid to give copper chloride which is blue-green in colour.

$$\underset{\text{Copper Oxide}}{CuO(s)} + 2HCl(dil) \longrightarrow \underset{\text{Copper Chloride (Blue-green)}}{CuCl_2(aq)} + H_2O(l)$$

18) a) The freshwater animals do not reabosorb water through their excretory system because in case of fresh water animals, large amount of water is taken up through their skin and mouth. The water content of the body is maintained by getting rid of excess water through excretory system. Marine animals need to conserve water that's why water is reabsorbed by excretory system in marine animals.

b) During summer season, we lose a good amount of water through perspiration to keep our body temperature normal. While in winter, there is no perspiration. That is why, in summer season we drink a lot of water and pass urine fewer times.

19) Environmental trigger such as water changes the directions in which plant parts grow. These directional or tropic movements can be either towards the stimulus or away from it. The roots of the plant always grow towards the water source, so as to obtain water from the soil and the involved phenomenon is called hydrotropism. Water in the porous pot diffuses into the soil and the growing root of pea seedling bends towards the source of water.

20) The fusion of germ cells forms zygote. The events that occur after fertilisation in plants are :
a) The zygote divides several times to form an embryo within the ovule.
b) The ovule develops a tough coat and is gradually converted into seed.
c) The ovary grows rapidly and ripens to form a fruit.
d) The sepal, petals, stamens and style may fall off.

OR

i) Barrier Method: It involves the usage of certain products or devices which prevent the meeting of gametes and help in birth control, e.g. Condom, diaphragm, IUCD

ii) Chemical Method: It involves usage of chemicals called spermicides, which are applied in vagina in order to kill sperms. It can only be used with condoms or diaphragm.

iii) Surgical Method: Birth control from this method involves vasectomy and tubectomy.

21) Differennce between biodegradable and non-biodegradable substances :

S. No.	Biodegradable Subtance	Non-biodegradable Substance
(i)	The substance which are broken down into simpler, harmless substance in nature in due course of time by the biological processes such as action of micro-organisms.	The substance which are not broken down into simpler, harmless substance in nature in due course of time by te biological processes such as action of micro-organisms.
(ii)	Eg. : Fruits peel, Chaff etc.	Examples - DDT and polythene bags.

Two methods of disposal of non-biodegradable waste are :

(i) Recycling : The wastes are treated and same value materials are extracted for reuse.

(ii) Incineration : Medical and toxic waste are burnt at high temperature in incineration. Incinerators transforms the waste into ashes.

22) a) Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

b) Methane, Carbon dioxide, Hydrogen Sulphide, Ammonia.

Advantages of using biogas: (i) Renewable and clean source of energy (ii) Curbs the greenhouse effects.

23) Total number of units consumed by heater for 5 hours each day in one month,

$$n_1 = \frac{\text{watt} \times \text{hour} \times \text{days in one month}}{1000}$$

$$= \frac{1000 \times 5 \times 30}{1000} = 150$$

Cost of electrical energy consumed by heater in month of April = 150 x 2.5 = ₹ 375

Total number of units consumed by 5 electric bulbs in one month,

$$n_2 = \frac{\text{watt} \times \text{hour} \times \text{number of bulbs} \times \text{days in one month}}{1000}$$

$$= \frac{100 \times 5 \times 5 \times 30}{1000} = 75$$

Cost of electricla energy consumed by 5 bulbs in one month = 75 x 2.5 = ₹ 187.5
Electricity bill for the month of April = ₹ 375 + ₹ 187.5 = ₹ 562.5 (2)

Alternate solution

Total power consumed by electric appliances (heater and 5 bulbs) per day,

$$P = 1000 + 100 \times 5$$
$$= 1500 \text{ watt} \quad (½)$$

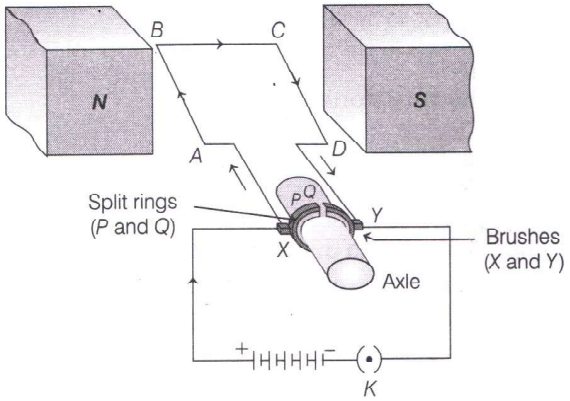
Total number of hours of operation of electric appliances in a month of April,

$$= 5 \times 30 = 150 \text{ hours} \quad (½)$$

$\therefore$ Total number of units $= \frac{\text{watt} \times \text{hour}}{1000} = \frac{1500 \times 150}{1000} = 225$ (1)

$\therefore$ Electricity bill for the month of April = 225 x 2.5 = ₹ 562.5 (1)

24) The labelled diagram of the electric motor is as shown below :



Electric motor

Working :- Consider at the beginning, the arms AB and CD are perpendicular to the direction of applied magnetic field.

(i) Initially, let the current in the coil flow along the path ABCD. Then, according to the Fleming's left hand rule, a downward force acting on the arm AB pushes it downward and an upward force acting on arm CD pushes it upward, while the forces on arms BC and AD are zero as they are parallel to magnetic field. These forces cause the coil to rotate in anti-clockwise direction about its own axis.

(ii) After completing half rotation, the position of split rings interchanges due to which direction of currentin the coil gets reversed and current flows along the path DCBA. Again, according to the Fleming's left hand rule, the force acting on the arms AB and CD also get reversed.
This makes the coil rotate and complete the next half-cycle of rotation in the same direction. Thus, the interchanging of split rings at each half-turn, makes the coil rotate continuously in the same direction als long as the current is passing through it.

OR

(i) Electric cell or battery is a device that helps to maintain a potential difference across a conductor.

(ii) Following are the advantages of connecting electrical appliances in parallel with the battery.
(a) Parallel circuits divide the current among the electrical appliances, so that they can have necessary amount of current to operate properly.
(b) If one of the devices in a parallel combination fuses or fails, then other devices keep working without being affected.

Section - C

25) (a) **Mineral :** Naturally-occurring compounds of metals mixed with earthly materials.
Ore : A mineral from which a metal can be extracted on a commercial scale economically and easily.
Gangue : Unwanted earthly materials present in an ore.

(b) **Carbon Reduction Process**

$$MO + C \rightarrow M + CO$$

Metal reduction process

$$Fe_2O_3 + 2Al \rightarrow 2Fe + Al_2O_3$$

[5]

OR (5)

(a) (i) Copper will not displace hydrogen from dil. HCl.

(ii) Iron will react only with steam to liberate $H_2(g)$.

$$3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$$

(iii) Manganese will react with 5%. HNO_3 to give hydrogen.

$$Mn(s) + 2HNO_3(5\%) \rightarrow Mg(NO_3)_2(aq) + H_2(g)$$

(b) (i) $Na^{\times} + Na^{\times} + \ddot{O}: \longrightarrow (Na)^{+}_{2}(\ddot{O}:)^{2-}$

(ii) It is due to strong force of attraction between oppositely charged ions.

26) (a) (i) $CH_4 + 2O_2 \rightarrow CO_2(g) + 2H_2O(l)$

(ii) $C_2H_5OH \xrightarrow{\text{Hot Conc. } H_2SO_4} CH_2 = CH_2 + H_2O$

(iii) $CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$

(b) (i) Ketone $(-\overset{O}{\overset{\|}{C}}-)$

(ii) Carboxylic acid (-COOH) (5)

27) (a) P - Hypothalamus
Q - Pituitary gland
R - Medulla
S - Cerebellum
T - Cerebrum

(b) P - Controls body temperature, Controls pitutary gland.
Q - Master gland hormone producer
R - Controls unconscious activities such as heartbeat
S - Helps to control balance and gives coordination
T - Memory storage and conscious behaviour

(c) Growth Hormone. (5)

28) (a) It is because a child who inherits an X chromosome from her father will be a girl and one who inherits a Y chromosome from his father will be a boy. But all children inherit a X chromosome from their mother regardless of whether they are boys or girls.

(b) A zygote is formed by the fusion of germ cells, each germ cell from each parent is a haploid one, means they contain half the number of normal set of chromosomes, i.e. only 23 chromosomes. During formation of zygote, when sperm and egg cell fuses, they restore the number of chromosomes in the resulting zygote.

(c) It is observed that although fossils appeared different from the existing species, they may show certain features similar to the existing species thus providing linkages between pre-existing and existing forms. It also provides information about the extinct species which were different from existing species.

OR

(a) (i) Parental plant is F_1 heterozygous with genes Tt. Because on self-pollination, these tall plants have produced both tall and dwarf plants in 3 : 1 ratio.

(ii) Dwarf = (near to) 50 ; Tall = (near to) 150.

(iii) Genetic diagram :

	T	t
T	TT	Tt
t	Tt	tt

1. F_1 Heterozygous plants = Tt
2. Gametes produced of two types = T, t
3. Fusion of these gametes produces TT, Tt, tt, tT

(b) Cross it with recessive dwarf plant if all plants are tall then it heterozygous and if all plants are dwarf.

29) (i) (a) No, induced current will be produced in the loop as the constant current flowing in the straight wire produces a constant magnetic field.

(b) Since, current in the straight wire is increasing, the magnetic flux associated with the loop change and hence induced current will be produced in it. Applying Fleming's right hand rule, the current flowing in the loop will be in clockwise direction. (3)

(ii) (a) When South-pole is pushed into the coil, then a momentary deflection is observed in the galvanometer. This deflection indicates that a momentary deflection is observed in the galvanometer. This deflection

indicates that a momentary current is produced in the coil. The direction of current in the coil is clockwise.

(b) When the magnet is held at rest, then there is no deflection in the galvanometer. It indicates that no current is produced in the coil in this case. (2)

30) (i) (a) The third concave mirror will form an image of same size as that of object because in third concave mirror, f = 0.1 m, so radius of curvature R = 2f = 0.2 m and a same size image is formed when object is at the centre of curvature.

(b) Second mirror is being used as a make up mirror, because it will give erect and enlarged image which is required for the purpose, when object is between focus and optical centre. (2)

(ii) The mirror is convex mirror, because it always forms erect and diminished image irrespective of the position of the object. (1)

(iii) By observing the images produced by mirror for different positions of object, its nature can be identified as follows :

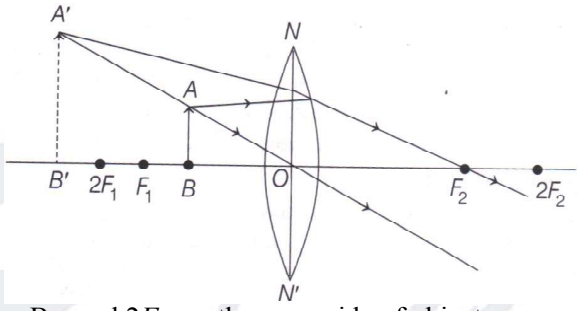
(a) If the image formed by the mirror is of same size as that of object for different positions of object, then the mirror is a plane mirror.

(b) If the image formed by the mirror is diminished for all positions of an object, then the mirror is a convex mirror.

(c) If the image is formed behind the mirror is longer than the object, then the mirror is a concave mirror.(2)

OR

(i) The formation of image A'B' of an object AB is shown in following ray diagram :



Position of image : Beyond $2F_1$, on the same side of object.

Natural of image : Virtual, erect and enlarged in size. (2)

(ii) Given, focal length, f = 9 cm, distance of image, v = $\pm$ 18 cm, distance of objec t, u = ?

Magnification, m = ?. By lens formula,

$$\frac{1}{f}=\frac{1}{v}-\frac{1}{u}\Rightarrow\frac{1}{u}=\frac{1}{v}-\frac{1}{f}=\frac{1}{\pm 18}-\frac{1}{9}=\frac{1}{18}-\frac{1}{9}\text{ or }\frac{1}{-18}-\frac{1}{9}$$

$$\Rightarrow\quad \frac{1}{u}=\frac{1-2}{18}\text{ or }\frac{-1-2}{18}\Rightarrow\frac{1}{u}=\frac{-1}{18}\text{ or }\frac{-3}{18}\Rightarrow u=-18\text{ cm or }-6\text{ cm}$$

If u = -18 cm and v = 18 cm, then $m=\frac{v}{u}=\frac{18}{-18}=-1$

So, image is real and inverted. If u = -6 and v = -18 cm, then $m=\frac{v}{u}=\frac{-18}{-6}=3$

So, image is virtual and erect. (3)

~0~0~0~0~0~0~0~0~