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

B

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

Section - A

1) The mechanism that controls the amount and time of hormones is called feedback mechanism of hormones. (1)

2) Lithium, Sodium, Potassium ; Ca,Sr,Ba etc. (refer teaxtbook for more egs.) (1)

3) (a) Water pollultion. (1)
(b) (i) Discharge of poisonous chemicals effluents by factories and industries into the river. (1)
(ii) Human activities like bathing, washing of clothes (iii) addition of carcasses remains to water. (1)
(c) Ganga Action Plan (GAP) (1)
(d) (ii) Wallowing of cattle. (1)

4) (a) CO_2 is not a pollutant when present in the atmosphere upto a certain percent. Rather, it helps to maintain the temperature of the Earth. Combustion of coke is harmful as it increases the concentration of CO_2 in the atmosphere which causes global warming (greenhouse effect). (1)
(b) Reaction of calcium with oxygen gives quicklime (CaO) which combines with water to form slaked lime, Ca $(OH)_2$ which after putting on the walls, combines with CO_2 of the air to form $CaCO_3$. (1)
(c) Tiffin boxes made up of steel are either tin plated or nickel plated to protebt them from rusting. However, tin-plating is preferred because tin is non-poisonous and hence, does not contaminate the food kept in them. (1)
(d) A photographic film used in black and white photography is coated with silver chloride. Its working is based on the decomposition of silver chloride in the presence of sunlight. (1)

5) (a) Iris (1)

OR

(a) virtual

6) (a) 30Ω (1)

7) (c) The brightness of the image is reduced (1)

8) **(d) Both (a) and (c).** In response to nervous electrical impulses, the special proteins found in muscle cells change their shape and their arrangement in the cell. New arrangement of these proteins contract of shorten the muscle cells. (1)

9) **(b) 10%** is the average value for the amount of organic matter is present at each level of trophic chain and reaches next trophic level. (1)

10) **(d) Na < Mg < Al < Si.** On moving from left to right across a period, the tendency to lose electrons decreases. Due to this, non-metallic character increases across a period. Therefore, the correct order of increasing non-metallic character is Na < Mg < Al < Si. (1)

11) **(d) All of the above.** Bio-gas is considered as an excellent fuel because it burns without smoke. It leaves no residues. Also, its heating capacity is high. (1)

12) **(c) Auxins and gibberellins** are plant hormones which help in the growth of the stem. Cytokinins promote cell division. Abscisic acid is a hormone which inhibits growth.

13) **(a) Both Assertion and Reason are true and Reason is correct explanation of the assertion.**
During the breathing cycle, when air is inhaled and exhaled, the lungs always contain a residual volume of air so as to ensure that there is sufficient time for the oxygen (O_2) to be absorbed and for the carbon dioxide (CO_2) to be relesed. (1)

14) (a) When a charged particle enters in the direction of magnetic field, then no magnetic force acts on charged particle, hence it moves on a straight path without deviation in uniform magnetic field. (1)

Section - B

15) (a) The yellow precipitate formed during reaction. (Precipitation or double displacement reaction). ($1^1/_2$)

(b) $Pb(NO_3)_{2(aq)} + 2KI_{(aq)} \rightarrow PbI_{2(ppt)} + 2KNO_{3(aq)}$ ($1^1/_2$)

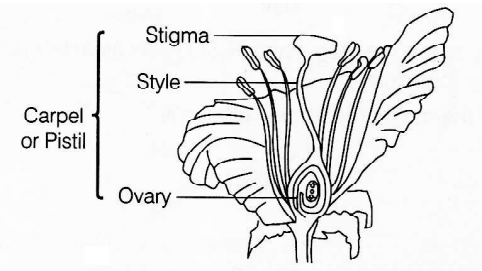
16) (a) $Mg + 2HCl \rightarrow MgCl_2 + H_2$ Hydrogen gas is produced. (1)
(b) $HCl + NaOH \rightarrow NaCl + H_2O$ Neutralisation reaction. (1)
(c) $2HCl(aq) + CaCO_3(s) \rightarrow CaCl_2(aq) + H_2O + CO_2$. Calcium chloride is formed. (1)

OR

(a) Na, K, Li etc. are very reactive so these metals react vigorously with atmospheric oxygen to form oxides. Storing them in oil prevents their oxidation. (1)
(b) Platinum, gold and silver are least reactive, so they are not corroded by air and water easily. (1)
(c) Copper vessels get tarnished by reacting with air and water, due to which a layer is formed mainly contains black copper oxide and green copper hydroxide which is basic in nature. The citric acid in lemon dissolves this layer and washes off easily. (1)

17) (a) Ethyne (b) Propanol (c) Ethanal (1+1+1)

18) Carpel or Pistil is the female reproductive part and is present in the centre of a flower. It is made up of the following three parts :-
(a) Stigma is the sticky terminal part of the carpel which helps in receiving the pollen grains.
(b) Style is the middle elongated part of the carpel which helps in attachment of stigma to the ovary.
(c) Ovary is the swollen bottom part of the carpel which contains ovules having an egg cell.



19) (a) The labelled parts in the human respiratory system are A - Bronchiole B - Bronchus.
(b) Lungs are basically associated with breathing. During exhalation, CO_2 and water (i.e. waste products of respiration) are removed from the body. As a waste product (CO_2) of metabolic processes is removed by the lungs through breathing, the lungs are also considered as organs of excretion.

20) (a) Members of the same species are capable of interbreeding because of the similarity in their body design and genetical similarities. Thus, we can find out whether two different individuals belong to the same species or not. (1)
(b) As ovulation occurs on the 14th day of the menstrual cycle, sperms have greater chances during this period to fertilise the egg or ovum. After fertilisation, menstruation does not occur as during pregnancy the thick uterine wall, which would get sloughed off, is now being used for nourishment, growth and development of fertilised ovum. so, menstruation stops during pregnancy. (2)

21) (a) Solar cells cannot be used at night or in cloudy days for the production of electricity. (1)
(b) 15 km/h is the minimum wind velocity required to obtain useful energy from a windmill. (1)

(c) A reaction in which a heavy nucleus splits into two smaller nuclei along with the release of large amount of energy is called nuclear fission.

e.g. $_{92}U^{235} + {}_{0}n^{1} \rightarrow {}_{56}Ba^{139} + {}_{36}Kr^{94} + 3{}_{0}n^{1} + \text{Energy}$ (optional reaction) (1)

22) (a) i) Tungsten has a high resistivity
ii) Its melting point is very high (about 3380^0C)
iii) Due to this it gets heated strongly and does not melt while producing heat and light.
Hence, the reason.H = 100J, R = 4 Ω, t = 1 sec, V = ?
From Joules law, $H = I^2Rt$.

(b) $$I^2 = \frac{H}{Rt}$$

$$I = \sqrt{\frac{H}{Rt}}$$

$$= \sqrt{\frac{100}{4(1)}} = \sqrt{25} = 5 \text{ ampere.}$$

$\Rightarrow$ I = 5 ampere.
Thus the potential difference across the resistor is
$V = IR$
= 5A x 4 Ω
V = 20 Volts (1½ x 2 = 3)

23) (i) According to Fleming's left hand rule, if thumb, fore-finger and middle finger of left hand are stretched mutually perpendicular to each other, so that if fore-finger gives direction of magnetic field, and middle finger gives direction of current in conductor, then thumb points in the direction of force acting on the conductor. Hence, wire will tends to move vertically downward. (1)

(ii) When key is inserted, the magnetic field is produced due to current in the first coil. The emf is induced in the second coil due to change in magnetic lines of force passing through the second coil. Thus, there will be deflection in the galvanometer. However, when the key is removed again, the magnetic lines of force will decrease and the direction of induced current will be changed (reversed), so the galvanometer will show deflection in opposite directions. (2)

24) **Laws of Refraction**

(i) The incident ray, the refracted ray and the normal to the interface of the two transparent media at the point of incidence, all lie in the same plane.

(ii) The ratio of sine of angle of incidence to the sine of angle of refraction for light of given colour is constant for a given pair of media (Snell's law). It is expressed as (1½)

$$\frac{\sin i}{\sin r} = \mu(\text{constant})$$

where, μ (constant value) is called the refractive index of the second medium with respect to the first.

Absolute Refractive Index

If the refractive index of a medium is considered with respect to vacuum, then it is called absolute refractive index of the medium.

$$\text{Absolute refractive index} = \frac{\text{Speed of light in vacuum}}{\text{Speed of light in medium}} \text{ or } \mu = \frac{c}{v}$$

This is the required expression. (1½)

OR

Given, height of object, $h_0 = +6$ cm
Focal length of lens, f = + 25 cm
Distance of object, u = - 40 cm

(i) Using lens formula, $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

$$\frac{1}{v}=\frac{1}{f}+\frac{1}{u}=\frac{1}{25}+\frac{1}{(-40)}=\frac{8-5}{200}=\frac{3}{200}$$

$$v=\frac{+200\,\text{cm}}{3}=+66.67\,\text{cm} \qquad (2)$$

(ii) $\therefore$ Magnification, $m=\frac{h_i}{h_o}=\frac{v}{u}$

$$h_i=\frac{v}{u}\times h_o=\frac{200}{3\times(-40)}\times 6=-10\,\text{cm} \qquad (1)$$

Section - C

25) (a) Micelle formation will not take place because the hydrocarbon chains of soap molecules are soluble in organic solvents like ethanol.

(b) (i) The water that contains bicarbonates, chlorides and sulphates of calcium and magnesium is called hard water. It does not lather easily with soap.

(ii) The water that does not contain such salts is called soft water. It lathers easily with soap.

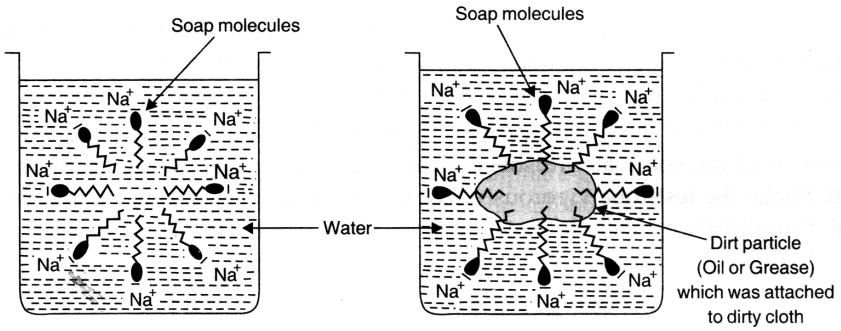
(c) (i) Most dirt is oily in nature and oil does not dissolve in water.

(ii) The molecules of soap are sodium or potassium salts of long - chain carboxylic acids.

(iii) The ionic end of soap which is hydrophilic dissolves in water while the carbon - chain which is hydrophobic dissolves in oil.

(iv) The soap molecules, thus form structures called micelles where one end of the molecules is towards the oil droplet while the ionic - end faces outside.

(v) This forms an emulsion in water which do not come together to precipitate because of ion-ion repulsion. Thus, the dirt suspended in the micelles is also easily rinsed away.



(*a*) Soap micelle (*b*) Soap micelle entraps the dirt particle

OR

(a) It states that, *"The chemical and physical properties of elements are a periodic function of their atomic numbers"*.

(b) **Valency :**

(i) Valency of an element may be defined as its combining capacity with another element.

(ii) In a group all the elements have same number of electrons in their valence shell, hence in a group all the elements have same valency.

(iii) For example : The elements of group VIIA, all elements have 7 electrons in the valence shell, hence shows valency 1.

(iv) As we move from left to right along a period valency changes from 1 to 4 and 4 to zero. This happens because the number of valence electrons increase from 1 to 8.

Atomic size :

i) The term atomic size refers to the radius of an atom.
Radius is the distance between the centre of the nucleus and the outermost shell of an isolated

atom. It is measured in picometre (*pm*).
$1\ pm = 10^{-12}\ m$.

ii) The atomic size decreases as we move from left to right across a period.

iii) As we move from left to right across a period the nuclear charge increases and hence increases the force of attraction on the valence electrons. Therefore the outermost shell is pulled inwards leading to the decrease in size of atom.

iv) As we move from top to bottom across a group the atomic size increases.
This happens due to the addition of an extra shell successively. This increases the distance between the outermost shell and the nucleus.

Metallic character :

i) Metals show tendency to lose electrons therefore they are electropositive.

ii) Metallic character decreases as we move from left to right in a period.

iii) This is because atomic size decreases, therefore the electrons are not lost released.

iv) In a group, metallic characters increases as we move from top to bottom.

v) This is because atomic size increases and hence valence electrons can be easily removed.

Non - Metallic character :

i) Non-metals show tendency to accept electrons or share electrons with other atoms, therefore they are electronegative.

ii) Non-metallic characters increases from left to right in a period.

iii) As the effective nuclear charge acting on the valence shell electrons increases across a period, the tendency to lose electrons decreases.

iv) In a group, non-metallic characters decreases from top to bottom, .

v) This is because atomic size increases and hence the ability to gain electrons from other atoms decreases. (1 + 4 = 5)

26) (a) Electrolytic reduction. (1)

(b) Cinnabar (HgS)
By roasting and then self reduction (1)

$2HgS + 3O_2 \xrightarrow{Heat} 2HgO + 2SO_2,\ 2HgO \xrightarrow{Heat} 2Hg + O_2$ (1)

(c) Reaction of Fe_2O_3 with Al is used to join railway tracks and machine parts as it is exothermic. This reaction is known as thermite reaction. (1)

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

The amount of heat evolved is so large that the metal (Fe) is produced in the molten state. (1)

27) (a) **Variation** is the difference in the characters or traits among the individuals of species. Sexual reproduction of organisms produces variation. The variations produced in organisms during successive generations get accumulated in the organism. The significance of variations shows up only if it continues to be inherited by the offspring of an individual for several generations. (2)

(b) **Fossils** are dead remains of animals and plants that lived millions of years ago. By providing information about previous time, they help in tracing the process of evolution. The layers in which they are present in sedimentary rocks help to determine the complexity of organisms that existed in the past. They also help to establish the analogous and homologous characteristics among organisms. Hence, they help in reconstructing the patterns and trends that existed in the history of life on the Earth. Knowledge of connecting links and age of fossils are also provided. (3)

28) (a) Plants neither have complex body structures nor the ability to perform complex processes like animals do. Also, plants do not move like animals in search of food and shelter and contains more number of dead cells.hence, they have low energy need. (2)

(b) a) a large surface area for absorbing maximum light.
b) Numerous stomata.
c) Chloroplasts in mesophyll cells. (2)

(c) a) They protect the inner tissues from external factors, pathogenic attacks, etc.
b) They regulate the opening and closing of stomatal cells. (1)

29) (i) The name of the device which is connected in series in the circuit is ammeter. It measures the current

that is connectd in series in the circuit. Rheostat is the component of circuit which controls the amount of current in the circuit. (1)

(ii) According to this law, the electric current flowing through a conductor is directly proportional to the potential difference applied across its ends, providing the physical conditions (such as temperature) remain unchanged.

If V is the potential difference applied across the ends of a conductor through which current/flows, then according to Ohm's law.

or $V \propto I$ (at constant temperature)

$V = IR$

or $I = \frac{V}{R}$

where, R is the constant of proportionality called resistance of the conductor at a given temperature.

(iii) The potential difference acros a conductor is measured by means of an instrument called voltmeter. (1)

(iv) The electric power P is given by

$P = I^2 R$

where, I is the current in the circuit and R is the resistance of heating element. (1)

The resistance of the heating element is very high, thus large amount of heat is generated in the heating element due to which it glows. (1)

On the other hand connecting cord or wires are usually made up of metals like copper, silver or aluminium. Hence, the resistance of connecting cord is very low. Thus negligible heat is generated in it and it does not glow. (1)

30) (i) The far point and near point of the human eye with normal vision are infinity and least distance of distinct vision, i.e. 25 cm, respectively. (1)

(ii) Sense of vision is carried by optic nerves from eye to the brain. (1)

(iii) The defect in which a person can see nearby objects clearly but cannot see distance objects clearly, is called myopia or short-sightedness. (½)

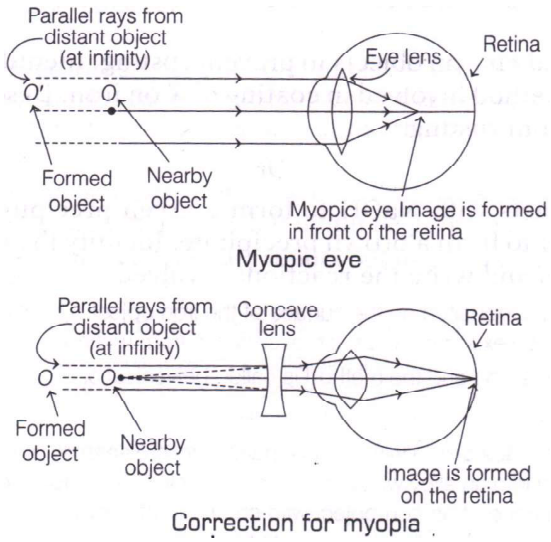
The causes and remedy of this defects are given below

Causes A person with this defect has the far point nearer than infinity. This defect arises due to the decrease in focal length of the eye lens because of

* excessive * elongation of the eyeball.

As a result, the image is formed before retina.

Remedy This defect can be corrected by using concave lens of appropriate power. A concave lens of suitable power will bring the image on the retina, by diverging light rays initially, thus the defect is corrected a shown below. (1½)



[7]

OR

(i) The two positions in which a concave mirror produces a magnified image are as follows :
(a) Between centre of curvature and focus of the mirror (real image)
(b) Between pole and focus of the mirror (virtual image).
Differences between rel and virtual images are as follows : (2)

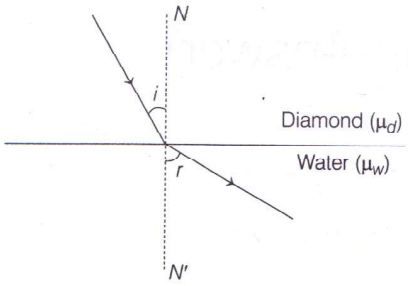
Real Image	Virtual Image
1. Real image can be obtained on the screen.	1. Virtual image cannot be obtained on the screen.
2. Real images are always inverted and are formed when light rays after reflection or refraction converge to a point.	2. Virtual images are erect w.r.t. object and are formed when rays after reflection apear to be coming from a point

(ii) Differences between reflection and refraction are as follows : (2)

Reflection	Refraction
1. is the phenomena of bouncing back of light rays in the same medium on striking a smooth surface. e.g. Mirror	1. It is the phenomena of change in path of a lightas it passes from one medium to another medium. e.g. Glass slab
2. In this, the angle of incidence is equal to angle of reflection, i.e. $\angle i = \angle r$.	2. In this, the ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for a light of given colour and for the given pair of media, i.e. $\frac{\sin i}{\sin r} = \text{constant}$.

(iii) Given, $\mu_d = 2.42$ and $\mu_w = 1.33$

As, $\mu_d > \mu_w$, this means light would travel from denser to rarer medium, Thus, it will bend away from normal (NN') as shown in the figure below : (1)



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