Class-X
Science-086
SAMPLE QUESTION PAPER-19

TIME: 3 Hrs. **M.M.:80**

General Instructions:

(i) The question paper comprises of five sections – A, B, C, D and E. You are to attempt all the sections.
(ii) All questions are compulsory.
(iii) Internal choice is given in sections B, C, D and E.
(iv) Question numbers 1 and 2 in Section-A are one mark questions. They are to be answered in one word or in one sentence.
(v) Question numbers 3 to 5 in Section- B are two marks questions. These are to be answered in about 30 words each.
(vi) Question numbers 6 to 15 in Section-C are three marks questions. These are to be answered in about 50 words each.
(vii) Question numbers 16 to 21 in Section-D are 5 marks questions. These are to be answered in about 70 words each.
(viii) Question numbers 22 to 27 in Section- E are based on practical skills. Each question is a two marks question. These are to be answered in brief.

SECTION A

1. Name a common nutrient that is absorbed in the small intestine and reabsorbed by the kidney tubules. 1

2. The presence of a particular group of bacteria in water bodies indicates contamination. Identify the group. 1

SECTION B

3. How is Magnesium Chloride formed by the transfer of electrons? Why does the solution of Magnesium chloride conduct electricity? 2

4. In a flowering plant, summarize the events that take place after fertilization. 2

5. A ray of light enters into benzene from air. If the refractive index of benzene is 1.50, by what percent does the speed of light reduce on entering the benzene? 2

OR

For the same angle of incidence in media A,B and C, the angles of refraction are 20^0, 30^0 and 40^0 respectively. In which medium will the velocity of light be maximum? Give reason in support of your answer.

6. What happens when aqueous solutions of Sodium sulphate and Barium chloride are mixed? Give a balanced equation for the reaction with state symbols. Name and define the type of chemical reaction involved in the above change. 2

SECTION C

7. Identify the compound of calcium which is used for plastering of fractured bones. With the help of chemical equation show how is it prepared and what special precautions should be taken during the preparation of this compound. 3

OR

'Sweet tooth may lead to tooth decay'. Explain why? What is the role of tooth paste in preventing cavities?

8. The electronic configuration of an element 'X' is 2,8,6. To which group and period of the modern periodic table does 'X' belong .State it valency and justify your answer in each case. 3

9. Pertaining to endocrine system, what will you interpret if- 3

i) You observe swollen neck in people living in the hills
ii) Over secretion of Growth Hormone takes place during childhood
iii) Facial hair develops in boys aged 13.

10. A variegated leaf with green and yellow patches in used for an experiment to prove that chlorophyll is required for photosynthesis. Before the experiment the green portions (A), and the pale yellow portions (B), are observed. What will be the colour of 'A' just before and after the starch test? Also write the equation of photosynthesis and mark, as well as validate from which molecule the by-product is obtained. 3

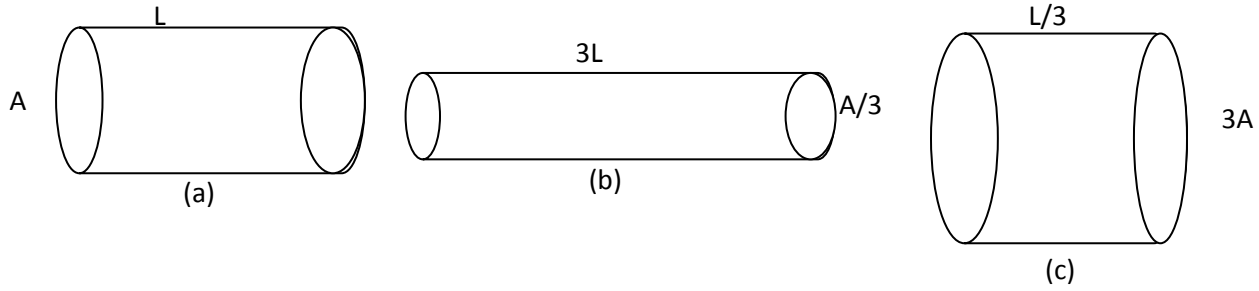
11. The image of an object formed by a mirror is real, inverted and is of magnification -1. If the image is at the distance of 30 cm from the mirror, where is the object placed? Find the position of the image if the object is now moved 20 cm towards the mirror. What is the nature of the image obtained? Justify your answer with the help of ray diagram. 3

OR

What is meant by power of a lens? You have three lenses L_1, L2 and L_3 of powers +10D, +5D and -10D respectively. State the nature and focal length of each lens. Explain which of the three lenses will form a virtual and magnified image of an object placed at 15 cm from the lens. Draw the ray diagram in support of your answer.

12. Two lamps, one rated 100 W at 220 V and the other 200 W at 220V are connected (i) in series and (ii) in parallel to electric main supply of 220V. Find the current drawn in each case. 3

13. The figure below shows three cylindrical copper conductors along with their face areas and lengths. Compare the resistance and the resistivity of the three conductors. Justify your answer. 3



3

14. What is biogas? Describe the steps involved in obtaining biogas. 3

15. How is ozone both beneficial and damaging? How can we prevent the damaging effect of ozone? 3

OR

The flow of energy between various components of the environment has been extensively studied. Give an outline of the findings.

SECTION D

16. a) How will you show experimentally that metals are good conductors of heat. 5
    b) Describe the extraction of Mercury metal from its ore Cinnabar (HgS).

17. A compound A ($C_2H_4O_2$) reacts with Na metal to form a compound 'B' and evolves a gas which burns with a pop sound. Compound 'A' on treatment with an alcohol 'C' in presence of an acid forms a Sweet smelling compound 'D' ($C_4H_8O_2$). On addition of NaOH to 'D' gives back B and C. Identify A, B, C and D write the reactions involved. 5

OR

a) Explain why carbon forms covalent bond? Give two reasons for carbon forming a large number of compounds.

b) Explain the formation of ammonia molecule.

18. a) Draw the diagram of female reproductive system and match and mark the part(s): 5
    i) Where block is created surgically to prevent fertilization.
    ii) Where CuT is inserted?
    iii) Inside which condom can be placed.

b) Why do more and more people prefer to use condoms? What is the principle behind use of condoms?

19. Name the phenomenon that governs the following: - 5

i) Green beetles living in green bushes are not eaten by the crows.

ii) Number of blue beetles in green bushes increases, only because the red beetles living there were trampled by a herd of elephants.

iii) No 'medium height plants' are obtained in F1 generation, upon crossing pure tall and dwarf pea plants.

iv) Tails of mice were surgically removed for several generations; still mice had tails in the following generations.

v) A migrant beetle reproduces with the local population; as a result genes of migrant beetle enter the new population.

OR

a) What are fossils and how is age of fossils determined?

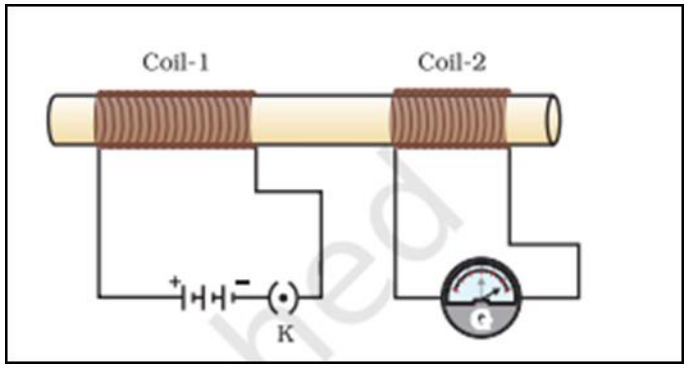
b) During artificial selection, which features of wild cabbage were selected to give rise to i) Cabbage ii) Cauliflower

20. (a)What is meant by the term 'power of accommodation'? Name the component of eye that is responsible for the power of accommodation. 5

(b) A student sitting at the back bench in a class has difficulty in reading. What could be his defect of vision? Draw ray diagrams to illustrate the image formation of the blackboard when he is seated at the (i) back seat (ii) front seat. State two possible causes of this defect. Explain the method of correcting this defect with the help of a ray diagram.

21. (i) With the help of an activity, explain the method of inducing electric current in a coil with a moving magnet. State the rule used to find the direction of electric current thus generated in the coil. 5

(ii) Two circular coils-1 and coil-2 are kept close to each other as shown in the diagram.Coil-1 is connected to a battery and key and coil-2with a galvanometer. State your observation in the galvanometer:



(a) When key k closed ; (b) when key k is opened;
Give reason for your observations.

OR

Name a device which converts mechanical energy into electrical energy. Explain the underlying principle and working of this device with the help of a labelled diagram.

SECTION E

22. When few drops of phenolphthalein are added to a dilute solution of sodium hydroxide a pink colour is produced. What will be the colour of the final mixture when excess of HCl is added to it? (justify your answer) 2

OR

Arrange the metals iron, magnesium, zinc and copper in the increasing order of their reactivity.

What will be the two observations made by the student when iron filings are added to copper sulphate solution? 2

23. from an experiment to study the properties of acetic acid. Answer the following questions: 2

a) Name the substances which on addition to acetic acid produce carbon dioxide gas. Give relevant chemical equation for the above?

b) How is CO_2 gas tested in the laboratory?

24. When observed under high power of the microscope, 'chain of buds' is visible in the2 microscopic view. In which organism can it be observed? Explain the process.

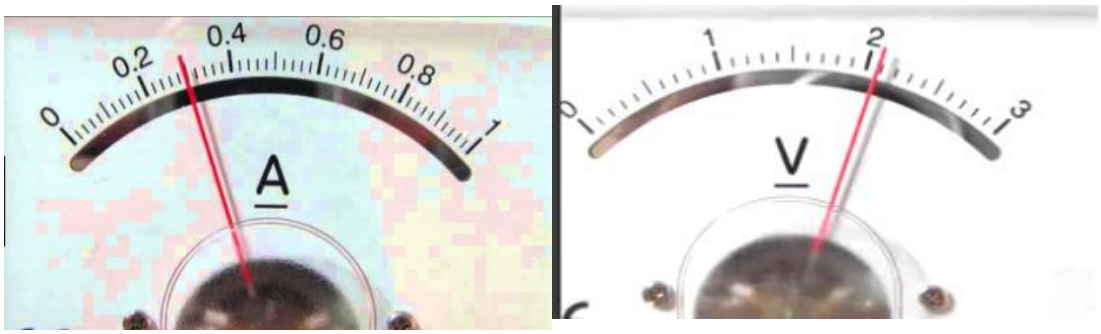
OR

In the experimental set up on 'CO2 is released during respiration,' if one forgets to keep the vial with KOH in the conical flask, how will the result vary? Give details. 2

25. You soak seeds of bean and observe them after 2-3 days. What will be your observations? 2

26. The current flowing through a resistor connected in an electrical circuit and the potential difference developed across its ends are shown in the given ammeter and voltmeter. Find the least count of the voltmeter and ammeter .What is the voltage and the current across the given resistor? 2

27. Consider the path of a ray of light passing through a rectangular glass slab for different angles of incidence. (i) Which one is greater: angle of incidence or angle of refraction? (ii) What happens to the emergent angle on increasing the incident angle at air-glass interface? (iii) State the conditions when no refraction occurs. 2



OR

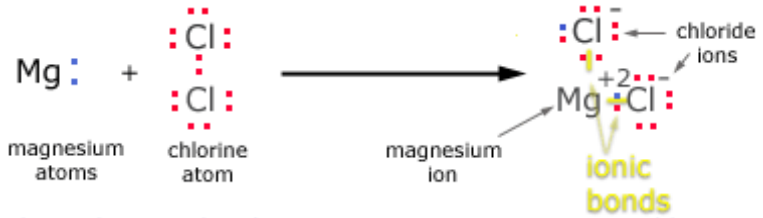
Sunita takes a mirror which is depressed at the centre and mounts it on a mirror stand. An erect and enlarged image of her face is formed. She places the mirror on a stand along a meter scale at 15 cm mark. In front of this mirror, she mounts a white screen and moves it back and forth along the meter scale till a sharp, well-defined inverted image of a distant tree is formed on the screen at 35 cm mark.

(i) Name the mirror and find its focal length.

(ii) Why does Sunita get sharp image of the distant building at 35 cm mark?

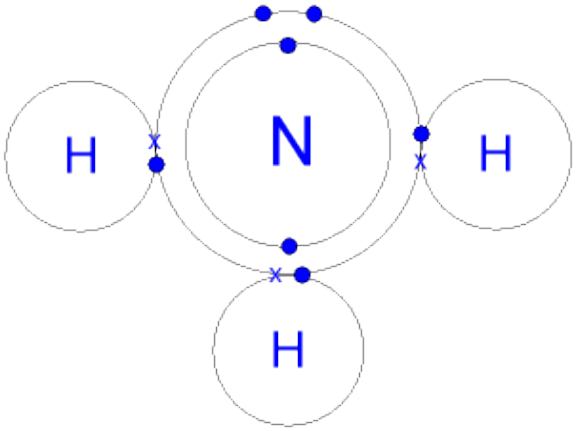
Class: X
Science (086)
Marking Scheme 2018-19

Time allowed: 3 Hours | Maximum Marks: 80

Q No	SECTION A	Marks
1.	Glucose/Amino acids	**1**
2.	Coliform bacteria	**1**
	SECTION B	
3.	Mg - 12 2, 8, 2 Cl - 17 2, 8, 7  The 2 electrons lost by a magnesium atom are gained by chlorine atoms to produce a magnesium ion and 2 chloride ions. $MgCl_2$ Solution of Magnesium Chloride conduct electricity because an ionic compound dissociates into ions when dissolved in water and hence conduct electricity.	**2**
4.	(Fertilization results in formation of zygote). Zygote divides several times, to form an embryo. The ovule develops a thick coat and is into seed. The ovary grows rapidly and ripens to form the fruit.	**2**
5.	We have n = $\frac{\text{speed of light in vaccum (c)}}{\text{speed of light in benzene (v)}}$ $\therefore$ v = $\frac{c}{v} = \frac{3 \times 10^8}{1.50}$ m/s = 2 x 108 m/s % decrease = $\frac{(3-1) \times 10^8}{3 \times 10^8}$ x 100% = 66.7% OR From Snell's law $n = \frac{\sin i}{\sin r} = \frac{c}{v}$ Since c and $\sin i$ are constant therefore $\sin r \propto v$ Therefore velocity of light is maximum in medium C.	**2**
6.	A white precipitate is formed. Na_2SO_4 (aq) + $BaCl_2$ (ag) → 2NaCl (aq) + $BaSO_4$ (↓) Doubled Displacement reaction It is a reaction in which there is an exchange of ions between the reactants.	**2**
	SECTION C	
7.	Plaster of Paris $CaSO_4 .½H_2O$ Calcium Sulphate Hemihydrate Preparation $CaSO_4.2H_2O \xrightarrow{373K} CaSO_4.½H_2O + 1½ H_2O$ (Gypsum)	**3**

	Precaution Gypsum should not be heated above 373 K otherwise it will form $CaSO_4$. OR Sweet tooth leads to tooth decay. Which is caused by the action of Bacteria on food particles remaining in the mouth and acid is formed. The pH of the mouth falls below 5.5 and the tooth enamel dissolves resulting in cavities Toothpastes are generally basic, they neutralise the excess acid produced in the mouth and prevent tooth decay.	
8.	X – 2, 8, 6 a) Since 'X' has three energy shells and period number of an element is equal to the number of energy shells, X belongs to 3rd period. b) X has 6 valence electrons it belongs to group 16. c) Valency will be 2. To acquire noble gas configuration it will gain 2 electrons.	**3**
9.	i) less intake of Iodine (in the diet) ii) will lead to gigantism iii) timely secretion of testosterone	**3**
10.	Just before Starch test – Pale yellow Just after Starch test – Blue black $6CO_2 + 6H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2$ O_2 is obtained from water (H_2O), as splitting of water results in formation of Hydrogen (used for making glucose) and oxygen (by-product).	**3**
11.	m = $-\frac{v}{u}$ $-1 = \frac{-(-30)}{u}$ ∴u = - 30 cm Using mirror formula: u = -30 cm, v = -30 cm $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{f} = \frac{1}{-30} + \frac{1}{-30}$ f = -15 cm Now u' = - 10 cm, f = - 15 cm Using mirror formula $\frac{1}{v'} = \frac{1}{f} - \frac{1}{u'}$ $v' = +30\ cm$ For ray diagram refer NCERT Page 166 Figure 10.7. OR Power of a lens is the degree of convergence of divergence of light rays achieved by a lens. Lens L_1 : $f_1 = \frac{100}{P_1} = \frac{100}{+10} = +10$ cm ; Convex lens Lens L_2 : $f_2 = \frac{100}{P_2} = \frac{100}{+5} = +20$ cm ; Convex lens Lens L_3 : $f_3 = \frac{100}{P_3} = \frac{100}{-10} = -10$ cm ; Concave lens Lens L_2 will form a virtual and magnified image of an object placed at 15 cm from the convex lens because concave lens can never form virtual and magnified image of an object and convex lens form such image only when the object is placed between the optical centre and principle focus of the convex lens. For diagram refer NCERT Page 181 figure 10.16 (f).	**3**

12.	$R_1 = \frac{V^2}{P_1} = \frac{220\ X\ 220}{100} = 484\ \Omega$ $R_2 = \frac{V^2}{P_2} = \frac{220\ X\ 220}{200} = 242\ \Omega$ In series: $R_S = R_1 + R_2 = 484 + 242 = 726\ \Omega$ $\therefore I_S = \frac{V}{R_s} = \frac{220}{726} = \frac{10}{33}$ A = 0.30 A In parallel: $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$ $= \frac{1}{484} + \frac{1}{242}$ $R_p = \frac{484}{3}\Omega$ $I_P = \frac{V}{R_p} = \frac{220\ x\ 3}{484} = \frac{30}{22}$ A = 1.36 A	**3**
13.	$R_a = \rho \frac{l}{A}$ $R_b = \rho \left(\frac{3\ L}{A/3}\right) = 9\ \frac{\rho L}{A} = 9\ R_a$ $R_c = \rho \frac{L/3}{3\ A} = \frac{1}{9}\frac{\rho L}{A} = \frac{1}{9}R_a$ Hence $R_b > R_a > R_c$ $\rho_a = \rho_b = \rho_c$ because all the three conductors are of same material.	**3**
14.	Biogas is a mixture of methane, carbon dioxide, hydrogen, hydrogen sulphide. Following steps are involved in obtaining biogas: i) Mixing (Slurry of cattle-dung and water) ii) Digesting (decomposition of cattle-dung by anaerobic bacteria) iii) Formation of biogas iv) Residue left after the formation of biogas.	**3**
15.	Damaging as it is a deadly poison. Beneficial as it shields the surface of the earth from UV radiations of the Sun. By not using synthetic chemicals like CFCs, that deplete O_3 layer. OR • Flow of energy is unidirectional. • Terrestrial plants take about 1% of the Sun's energy and change it to chemical energy. • A great deal of energy is -lost as heat/ used for digestion/doing work/growth and reproduction. • Only 10% of organic matter present at each trophic level (and available to next trophic level). • Food chains are mainly of 3-4 trophic levels (because of 10% law) . • The number of producers are maximum (the number reduces in subsequent trophic levels). • Food webs are more common (as compared to isolated food chains). • Biological magnification can be observed. (Any three)	**3**
	SECTION-D	
16.	a) Diagrams (activity 3.5 fig. 3.1) Procedure Observation - Heat is transferred from one end of metal wire to the free end of wire which melts the wax and pin falls. Shows metals conduct heat.	**4**

	b) Ore HgS cinnabar Roasting $2HgS(s) + 3O_2(g) \rightarrow 2HgO(S) + 2SO_2(g)$ Reduction $2HgO(s) \xrightarrow{\Delta} 2Hg(l) + O_2(g)$	
17.	$2CH_3COOH + 2Na \rightarrow 2CH_3COONa + H_2O$ (A) (B) $CH_3COOH + C_2H_5OH \longrightarrow CH_3COOC_2H_5 + H_2O$ (C) (D) $CH_3COOC_2H_5 + NaOH \longrightarrow$ Acid $C_2H_5OH + CH_3COONa$ A - CH_3COOH B - CH_3COONa C - C_2H_5OH D - $CH_3COOC_2H_5$ OR a) Carbon has electronic configuration 2, 4. It could gain four electrons forming C^{-4} anion or lose 4 electrons to form C^{+4} cation . Both are not possible due to energy considerations. Carbon overcomes this problem by sharing electrons and forming covalent compounds. Two reasons for forming large number of compounds: 1) Catenation 2) Tetra valency b) Formation of NH_3 molecule N – 2, 5 H – 1 Three hydrogen atoms each share their 1 electron with nitrogen to form three covalent bonds and make an ammonia molecule (NH_3). ammonia molecule.  	**5**
18.	a) page 137, figure 8.11 Correct diagram with correct labelling , correctly matched with the following parts:- i) Fallopian Tube/Oviduct ii) Uterus iii) Vagina b) People prefer use of condoms as it prevents STDs/gives privacy to the user. Condoms help create a mechanical barrier preventing meeting of sperms and ovum.	**5**
19.	i) Natural selection ii) Genetic drift	**5**

	iii) Law of Dominance iv) Acquired characters are not inherited v) Gene flow OR a) Body or its parts that are not decomposed/preserved traces of organisms. (to begin with new line) • Upon digging the earth, the fossils that are found closer to the surface are more recent than the fossils in deeper layers. • By detecting the ratios of different isotopes of the same element in the fossil material. b) i) by selecting very short distances between leaves. ii) by selecting sterile flowers.	
20.	(a) Power of accommodation: It is the ability of the eye lens to adjust its focal length. Ciliary muscles of eye are responsible for change in its focal length. (b) Myopia Causes : i) excessive curvature of the eye lens ii) elongation of eyeball This defect can be corrected by using a concave lens of suitable power. For ray diagram refer NCERT Page 189 figure 11.2 (a), (b) and (c)	**5**
21.	(i) Refer NCERT Page 233, Activity 13.8 (ii) a) The galvanometer needle deflects momentary in one direction because when the key is closed ,magnetic field lines around coil-2 increases momentary that causes induced current in coil-2. b) The galvanometer needle deflects momentary but in opposite direction because when the key is opened ,magnetic field lines around coil-2 decreases momentary that causes induced current in coil-2. OR Electric generator for principle, diagram, working Refer NCERT page 236, point 13.6.	**5**
	SECTION E	
22.	The colour of dilute solution of Sodium hydroxide turns pink or adding Phenolphthalein as NaOH is a base .When excess of HCl is added the final mixture becomes colourless due to neutralisation of base with an acid. OR Metals in increasing order of reactivity - Copper, iron ,zinc and magnesium 1. Color of the solution changes from blue to green 2. Reddish brown deposits on iron filings.	**2**
23.	a) $NaHCO_3$ $CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + H_2O + CO_2$ (1) b) CO_2 on passing through lime water turns milky.	**2**
24.	Yeast Budding – The parent (yeast) cell produces a small protuberance that grows to form a bud. The nucleus of the parent (yeast) cell divides, such that the daughter nucleus moves into the daughter cell and the process continues to form a chain of buds. OR In absence of KOH- CO_2 released by germinating seeds is not absorbed, partial vacuum is not created in the conical flask, air pressure in the flask is <u>not</u> reduced, water level does not rise in the delivery tube.	**2**

25.	Soft/ruptured seed coat, radicle which emerges first (add comma) , leafy plumule, between the two cotyledons.	**2**
26.	LC of ammeter = $\frac{0.2}{10}$ A = 0.02 A LC of Voltmeter = $\frac{1}{10}$ = 0.1 V Current = 15 x 0.02 A = 0.3 A Potential difference = 21 x 0.1 V = 2.1 V	**2**
27.	(i) ∠i = ∠e. (ii) Angle of emergence also increases. (iii) The light ray falls along the normal or the refractive index of the two optical media are equal. OR (i) Concave mirror ; f = 35 - 15 = 20 cm (ii) Because the incident rays parallel to each other after reflection from concave mirror meets at focus and produce sharp image at focus.	**2**

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