 **SINDHI HIGH SCHOOL, BENGALURU**

**II PRE-BOARD EXAMINATION [2023-24]**

**SUBJECT: SCIENCE (086)**

**Class: X SET - I Max Marks: 80**

**Date: 13.12.2023 Reading Time: 8:30 to 8:45 am**

**No. of Sides: 08 Writing Time: 8:45 to 11:45 am**

**General Instructions:**

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. **Section A** consists of 20 objective type questions carrying 1 mark each.
4. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
5. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words
6. **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. **Section E** consists of 3 case-based units of assessment of 04 marks each with sub-parts.

**SECTION - A**

**Select and write one most appropriate option out of the four options given for each of the questions 1 – 20**

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| **Q. NO** | **QUESTIONS** | **MARKS** |
| 1. | An iron nail was kept immersed in an Aluminium Sulphate solution. After about an hour, It was observed that:  a) the colourless solution changes to light green  b) the solution becomes warm  c) the solution remains colourless and no deposition is observed on iron nail  d) grey -  metal is deposited on the iron nail | (1) |
| 2. | Two colourless solutions X and Y were mixed. On mixing, a yellow precipitate Z was formed. Which of the following statements is correct regarding X, Y and Z?  a) X and Y were potassium hydroxide solution and nitric acid respectively and  the yellow precipitate Z was potassium nitrate.  b) X and Y were sodium hydroxide solution and hydrochloric acid respectively  and the yellow precipitate Z was sodium chloride.  c) X and Y were potassium chloride solution and water respectively. The yellow  precipitate Z was of chloride ions.  d) X and Y were lead nitrate and potassium iodide solutions respectively. The  yellow precipitate Z was lead iodide | (1) |
| 3. | MnO + xHCl MnCl + yH O + z Cl In order to balance the above chemical equation, the values of x, y and z respectively are:  a) 4, 2, 1  b) 2, 2, 1  c) 6, 2, 2  d) 4, 1, 2 | (1) |
| 4. | What happens when a solution of an acid is mixed with a solution of a base in a test tube   1. The temperature of the solution increases 2. The temperature of the solution decreases 3. The temperature of the solution remains the same. 4. Salt formation takes place.   a) (ii) and (iii) b) (i) and (iii)  c) (i) only d) (i) and (iv) | (1) |
| 5. | Which among the following is not a base?  a) NaOH  b) C H OH  c) KOH  d) NH OH | (1) |
| 6. | Bleaching powder is treated with CO :  a) It absorbs the gas.  b) CaO is formed.  c) CaCl is formed.  d) CaCO and Cl are formed. | (1) |
| 7. | Ethane -  with the molecular formula C H has  a) 9 covalent bonds  b) 8 covalent bonds  c) 7 covalent bonds  d) 6 covalent bonds | (1) |
| 8. | The agreement of UNEP in the year 1987 has been successful in ------------   1. Reducing the ozone layer pollutants 2. Regulating the usage of pollutants like CFC 3. Making it mandatory to use CFC free electrical appliances 4. Decrease synthetic chemicals used in fire extinguishers | (1) |
| 9. | In a cross between F1 plants with red flowers (RR) with white flower (rr) bearing plant , the colour of the progeny will be -------   1. Red and white b) red or white c) red only not white d) all white not red | (1) |
| 10. | Choose the incorrect statement   1. All gametes are pure for its character 2. All gametes have only one set of chromosomes 3. Gametes are formed by reduction division in higher sexually reproducing organisms 4. Gametes are formed by equational division in higher sexually reproducing organisms | (1) |
| 11. | Identify the STD caused by virus   1. Gonorrhea b) Syphilis c) Warts d) Candidiasis | (1) |
| 12. | The rate of breathing in fish is higher than humans because –   1. They are aquatic and have gills for respiration 2. They are having 2 chambered heart 3. There is very less oxygen dissolved in water 4. They undergo single circulation and only deoxygenated blood   flows through the heart | (1) |
| 13. | Which among the following is *not* the unit of Electric Power?  a) watt b) kWh  c) Js-1 d) VA | (1) |
| 14. | The circuit below consists of a variable resistor  connected in series with two 2000 Ω resistors.  variable resistor can be adjusted to any value  between 0 - 4000 Ω.  As the resistance of the variable resistor is  changed, what is the smallest possible reading  on the voltmeter?  a) 0 V b) 3V c) 4 V d) 6 V | (1) |
| 15. | Salivary Amylase : Salivary gland :: -----------------: gastric gland   1. Pepsin b) Insulin c) glucagon d) pancreatic juice | (1) |
| 16. | We do not feel the urge to urinate often because –   1. The process of urination is controlled by endocrine system 2. Urine is stored in the urinary bladder 3. Urinary bladder is muscular and controlled by nervous system 4. We do not drink water frequently |  |
|  | **Q. No 17 to 20 are Assertion - Reasoning based questions.**  **These consist of two statements – Assertion (A) and Reason (R).**  **Answer these questions selecting the appropriate option given below:**   1. **Both A and R are true and R is the correct explanation of A.** 2. **Both A and R are true and R is not the correct explanation of A.** 3. **A is true but R is false.** 4. **A is False but R is true.** |  |
| 17. | **Assertion (A)**: Iron is found in the free state in nature.  **Reason (R)**: Iron is a highly reactive element | (1) |
| 18. | **Assertion(A):** Animals purely cannot rely on electrical impulses to prepare the  body during emergency situations  **Reason (R):** Hormonal control is more efficient which ensures chemical signals  reach all the cells of the body . | (1) |
| 19. | **Assertion:** The tall trees are able to obtain water and minerals through the  xylem  **Reason:** Xylem is a vascular tissue made up of dead cells which uses energy to  transport water in both the directions | (1) |
| 20. | **Assertion (A):** Electric appliances with metallic bodies have three connections,  whereas an electric bulb has two pin connections  **Reason(R):** Three pin connections reduce heating of connecting wires. | (1) |
|  | **SECTION – B**  **Q. no. 21 to 26 are very short answer questions.** |  |
| 21. | A metal X combines with a non -  metal Y by the transfer of electrons to form a compound Z:   1. State the type of bond in compound Z. 2. Will this compound dissolve in kerosene or petrol? 3. Will this compound be a good conductor of electricity? Explain. | (2) |
| 22. | A person is diagnosed with a condition where the pancreas has to be surgically removed. What is the effect of this on the metabolic activity of the body? | (2) |
| 23. | Compare alveoli in the lungs and nephrons in the kidneys based on their structure and function. | (2) |
| 24. | (a)A lens forms a blurred image of an object on the screen as shown below:    What changes can you make to focal length of the lens to form a sharp and in-focus image on the screen?  (b) Sunita's ophthalmologist suggests her to use a lens of power D to correct  her vision.   1. Identify the defect Sunita is suffering from and the type of lens she   should use.   1. What should be the focal length of the lens? | (2) |
| 25. | a) A student boils water in an electric kettle for 20 minutes. Using the same mains supply he wants to reduce the boiling time of water. To do so should he increase or decrease the length of the heating element? Justify your answer.   1. State the law the electric kettle govern to boil the water.   **OR**  Calculate the resistance of a metal wire of length 2 m and area of cross-section 1.55 x10 - 6 m2 if its resistivity of the metal is 2.8 × 10-8 Ωm. | (2) |
| 26. | What are variations? Variations are beneficial to the species but not necessary for the individual. Explain with the help of an example.  **OR**  With an example, explain how are genes expressed. | (2) |
|  | **SECTION - C**  **Q.no. 27 to 33 are short answer questions.** |  |
| 27. | On heating blue coloured powder of copper (II) nitrate in a boiling tube, copper oxide (black), oxygen gas and a brown gas X is formed.   1. Write a balanced chemical equation of the reaction. 2. Identify the brown gas X evolved. 3. Identify the type of reaction. 4. What could be the pH range of the aqueous solution of the gas X? | (3) |
| 28. | Sample pieces of five metals A, B, C, D and E were added to the tabulated solutions separately. The results observed are shown in the table: image  Based on the observations recorded in the table, answer the following:  (1) Which is the most reactive metal?  (2) Which is the least reactive metal?  (3) What would be observed if metal D were added to a solution of copper (II) sulphate?  (4) What would be observed if metal E were added to a solution of iron (II) sulphate?  (5) Arrange the metals A, B, C, D and E in decreasing order of their reactivity?  **OR**  Write the equation for the reaction of  (a) Iron with steam.  (b) Calcium with water.  (c) Potassium with water | (3) |
| 29. | Draw a neat diagram human female reproductive system and label the following parts   1. Site of fertilisation c) organ responsible for production of estrogen 2. Site of implantation . d) Birth canal | (3) |
| 30. | Roshan, a watch repairer examines the parts of a watch using a spherical lens of focal length 10 cm.   1. Specify the range of distance where the object can be placed in front of the lens. Justify your answer.   (b) Draw a ray diagram to show image formation in this case.  (c) Mention any two differences between the images obtained by a slide  projector different from the image obtained in the above Roshan’s case ? | (3) |
| 31. | A spherical mirror of focal length 15 cm forms an image of a 6cm long needle on a screen at a distance of 20 cm from its optical centre. Identify the nature of mirror. Determine the position and size of the image. | (3) |
| 32. | a) Observe, in the given diagram, AB is a current carrying  AB is a current carrying conductor in the plane of the paper as shown in  Figure 13.7. - Sarthaks eConnect | Largest Online Education Community conductor producing magnetic field around it. P  and Q are two points at a distance and from it.  If > , where is the magnetic strength greater?  Justify.  b) Suggest methods to double the magnetic field  around the conductor  c) State the law which helps in determining the  direction of the magnetic field. | (3) |
| 33. | i) Prove that the sex of the offspring is genetically determined in human beings  ii) What is the probability of getting a male child in every generation? | (3) |
|  | **SECTION – D**  **Q.no. 34 to 36 are long answer questions** |  |
| 34.A  34.B | 1. It is observed that covalent compounds are bad conductors of electricity. Give reason. 2. Carbon can neither form C cation nor C anion. Why? 3. Draw electron dot structure of Ethanol. 4. Identify hetero atom(s) in the following compounds:    1. CH CH Cl   **OR**  i). Compare soaps and detergents based on their composition and cleansing  action in hard water.   1. What happens when ethanol is treated with sodium metal? State the behaviour of ethanol in this reaction. 2. Draw the structure of cyclohexane. 3. Name the following compound shown beside | (5) |
| 35. | 1. What are reflex actions? How are reflex actions different from voluntary actions? 2. Draw a neat labelled diagram of a nerve cell and represent the flow of impulses from the nerve cell to muscle.   **OR**  i) With the help of a neat labelled diagram explain the tropic movements in the plant  ii) How is the movement in a touch-me-not plant different from the movement in a pea plant? | (5) |
| 36. | The diagram above is a schematic diagram of a household circuit. The house shown in the above diagram has 5 usable spaces where electrical connections are made. For this house, the mains have a voltage of 220 V and the net current coming from the mains is 22A.      (a) What is the mode of connection to all the spaces in the house from the  mains?  (b) The spaces 5 and 4 have the same resistance and spaces 3 and 2 have  respective resistances of 20Ω and 30Ω. Space 1 has a resistance double that  of space 5. What is the net resistance for space 5?  (c) What should be placed between the main connection and the rest of the  house’s electrical appliances to save them from accidental high electric  current?  **OR**  The diagram below shows three circuits. The resistors in the circuits are identical. Each of the cells has a potential difference of 1.5V. Observe the circuits and answer the questions that follow     1. State the law that the above circuits governs. 2. Compare the resistance of circuit 1 and resistance of circuit 3 3. Find the difference between V2 and V3 4. If V-I graph is plotted for circuit 1 and circuit 2, which among the two would have higher slope? Justify | (1)  (3)    (1) |
|  | **SECTION – E**  **Q.No’s. 37 to 39 are Case - Based questions with 2 to 3 short sub - parts.**  **Internal choice is provided in one of these sub-parts.** |  |
| 37. | Corrosion is a dangerous and extremely costly problem. Because of it, buildings and bridges can collapse, oil pipelines break, chemical plants leak, and bathrooms flood. The most common kinds of corrosion result from electrochemical reactions. General corrosion occurs when most or all of the atoms on the same metal surface are oxidized, damaging the entire surface. Most metals are easily oxidized: they tend to lose electrons to oxygen (and other substances) in the air or in water. As oxygen is reduced (gains electrons), it forms an oxide with the metal. Take a metal structure such as the Statue of Liberty. It looks strong and permanent. Like nearly all metal objects, however, it can become unstable as it reacts with substances in its environment and deteriorates. Sometimes this corrosion is harmless or even beneficial: the greenish patina that covers the statue’s copper skin protected the metal beneath from weather damage. Inside the statue, however, corrosion caused serious harm over the years     1. Name an alloy of copper. State its chemical composition. 2. Aluminium is a highly reactive metal; still, it is used to make utensils for   cooking. Why?   1. Explain why an aqueous solution of sodium chloride is not used for the electrolytic extraction of sodium metal. What else can be used for above mentioned extraction? **OR**   Explain why, when a copper object remains in damp air for a considerable  time, a green coating is formed on its surface. What is this process known as? | (1)  (2)  (1)  (1) |
| 38. | In a grass land ecosystem , we find populations of various organisms living together . Each organism has a specific role to play in the ecosystem. They interact with one another and maintain ecological balance. The ecosystem comprises all the biotic and abiotic factors interacting with one another in a given area. Biotic components include all living organisms such as plants, animals, microorganisms and humans, etc., and abiotic components include sunlight, temperature, air, wind, rainfall, soil and minerals, etc. E.g. pond ecosystem, grassland [ecosystem](https://byjus.com/biology/ecosystem/), etc.   1. Create a food web in the given ecosystem 2. Food webs are considered more efficient than food chains. Why? 3. What happens when all organisms in the second tropic level are   eliminated in the ecosystem?  **OR**  c) What is the role of a decomposer in an ecosystem? | (2)  (1)  (1)  (1) |
| 39. | When a ray of light moving in a medium enters obliquely into another medium, it bends from its path. This phenomenon is called refraction of light. The ability of a medium to refract light is also expressed in terms of optical density. It is not the same as mass density. We use the terms 'rarer medium' and 'denser medium' which actually means 'optically rarer medium' and 'optically denser medium' respectively. When we say that a medium 'A' is optically denser than the other medium 'B', we mean that the refractive index of medium A is more than the refractive index of medium 'B'. The speed of light is higher in a rarer medium than a denser medium. Thus a ray of light travelling from a rarer medium to a denser medium slows down and bends towards the normal.   1. A student dropped a test-tube containing oil into a glass trough containing   the oil. He was unable to locate the test-tube in the trough. Why? (b) Absolute refractive indices of water and glass are and respectively.  (i) In which one of the two media is the speed of light more?  (ii) If a ray of light enters obliquely from glass to water, will it bend towards  the normal or away from the normal?  (c) The absolute refractive indices of water and glass are and respectively. If  the speed of light in glass is 2 x 108 m/s, find the speed of light in  (i) water and (ii) vacuum.  **OR**  (c) "A ray of light incident on a rectangular glass slab immersed in any medium  emerges parallel to itself." Draw a labelled ray diagram to justify this  statement. | (1)  (1)  (2) |

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