No of Printed Pages-11

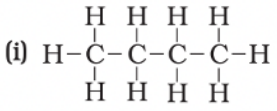
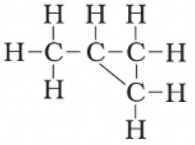
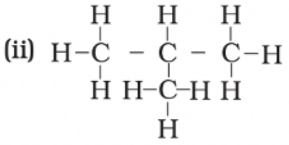
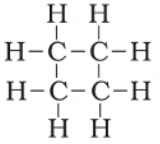
Class: X
Post Mid Term Examination (2024-25)
Science(Subject Code-086)
Set B1

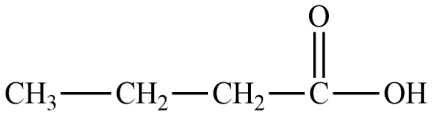
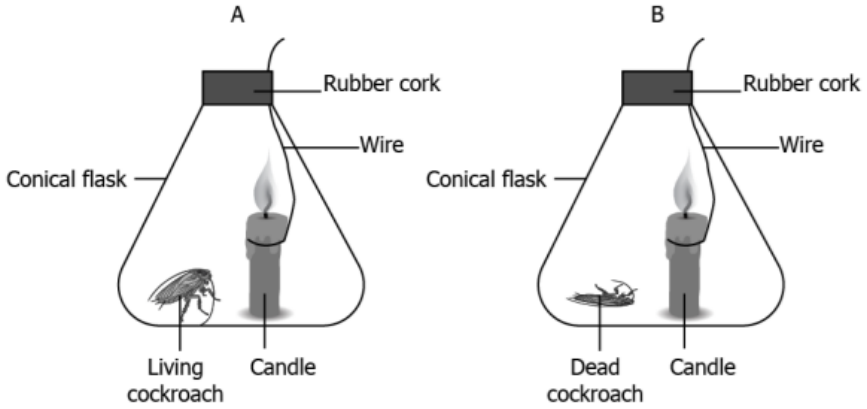
Time Allowed: 3hr. **MM:80**

General Instructions:
1. All questions would be compulsory. However, an internal choice of approximately 33% would be provided. 50% marks are to be allotted to competency-based questions.
2. Section A would have 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.
3. Section B would have 6 Short Answer (SA) type questions carrying 02 marks each.
4. Section C would have 7 Short Answer (SA) type questions carrying 03 marks each.
5. Section D would have 3 Long Answer (LA) type questions carrying 05 marks each.
6. Section E would have 3 source based/case based/passage based/integrated units of assessment (04 marks each) with sub-parts of the values of 1/2/3 marks.

Section A

Q.NO	Questions/ Expected Answers	Marks
1	Identify 'p', 'q' ,'r' and 's'in the following balanced reaction **p**H_2S + **q**O_2 → **r**SO_2 + **s**H_2O. a) 2,3,2,2 b) 3,2,2,2 c) 2,2,3,2 d) 3,2,3,2	**1**
2	Consider the pH value of the following acidic samples: **S.NO.** / **SAMPLE** / **pH VALUE** 1 / Lemon Juice / 2.2 2 / Gastric Juice / 1.2 3 / Vinegar / 3.76 4 / Dil. Acetic acid / 3.0 The decreasing order of their H+ ion concentration is: a) 3>4>1>2 b) 2>1>3>4 c) 2>1>4>3 d) 3>4>2>1	**1**

3	Match column I with column II and select the correct option using the given codes. **Column I** / **Column II** (a) A metal that forms amphoteric oxides — (i) Ga (b) A metal which melts when kept on our palm — (ii) Au (c) A metal that reacts with nitric acid. — (iii) Al (d) A metal which cannot displace hydrogen from acids — (iv) Mn (a) (a)-(ii), (b)- (i), (c)- (iii), (d)- (iv) (b) (a)-(iii), (b)- (i), (c)- (iv), (d)- (ii) (c) (a)-(iv), (b)- (ii), (c)- (iii), (d)- (i) (d) (a)-(iii), (b)- (ii), (c)- (i), (d)- (iv)	**1**
4	An aqueous solution 'A' turns the phenolphthalein solution pink. On addition of an aqueous solution 'B' to 'A' the pink colour disappears. Which of the following statements is true for the solutions 'A' and 'B'. (a) A is strongly basic and B is a weak base. (b) A is strongly acidic and B is a weak acid. (c) A has a pH greater than 7 and B has a pH less than 7. (d) A has a pH less than 7 and B has a pH greater than 7.	**1**
5	The electronic configuration of three elements X, Y and Z are X - 2,8,3; Y- 2,8,7 ; and Z- 2,8 (a) Y and Z are metals (b) Y and X are non metals (c) X is a non metal and Y is a metal (d) Y is a non metal and X is a metal	**1**
6	Which of the following are correct structural isomers of butane? (i)  (iii)  (ii)  (iv)  (a) (i) and (iii) (b) (ii) and (iv) (c) (i) and (ii) (d) (iii) and (iv)	**1**

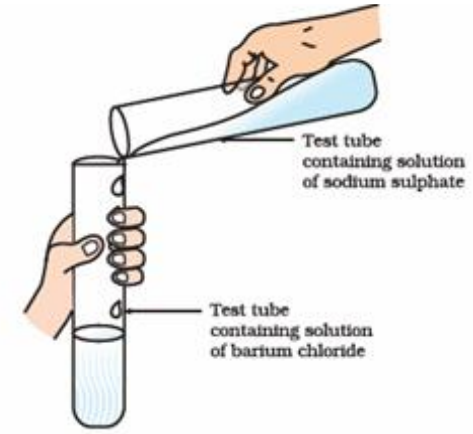
7	The IUPAC name of the following structure is  (a) Pentanone (b) Butanol (c) Butanoic acid (d) Butanone	**1**
8	A student sets up the following experiment- He places a living cockroach and a burning candle in flask A and a burning candle and a dead cockroach in flask B. After 10 minutes he observes that the candle in flask A extinguishes while the candle in flask B continues to burn for a substantially longer time.  The most appropriate conclusion is- a) A candle may produce a very high amount of carbon dioxide on combustion. b) The burning candle may reduce the lifespan of the cockroach. c) Water vapour produced by living beings prevents the burning of the candle. d) Both combustion and respiration make use of oxygen and release carbon dioxide and that is the reason for candle in flask A to extinguish earlier than candle in flask B.	**1**
9	The movement of sunflowers is in response to a stimulus such as : a) Gravity b) Chemicals c) Day or night d) Water	**1**
10	Mendel performed his famous hybridization experiments on: a) Garden pea b) Hibiscus c) Rose d) Cucurbita	**1**
11	Choose the waste management strategy that is matched with the correct example. a) Refuse — Choose products that use less packaging	**1**

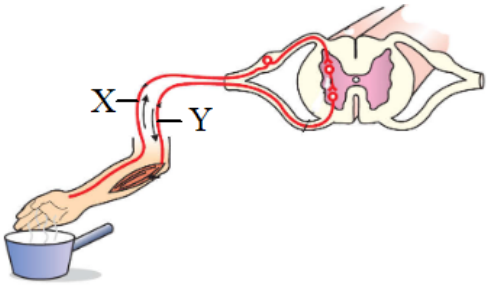
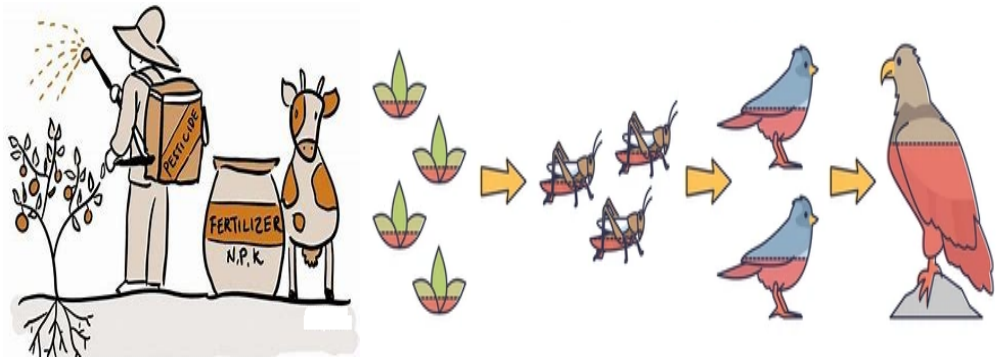
	b)	Reduce	Give unwanted toys and books to hospitals or schools
	c)	Reuse	Not using single use plastic
	d)	Repurpose	Making flower pot from used plastic bottle

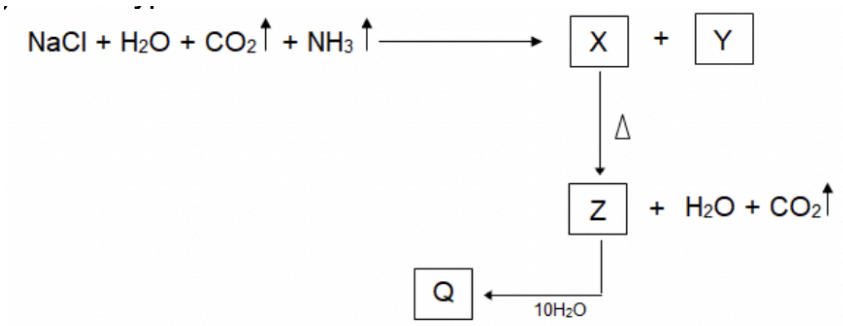
12	The main function of abscisic acid in plants is a) to promote cell division. b) to inhibit growth. c) to promote growth of the stem. d) to increase the length of cells.	**1**
13	A lens has a power of + 0.5D. It is: a) A concave lens of focal length 5 m b) A convex lens of focal length 2 m c) A convex lens of focal length 5 m d) A convex lens of focal length 2 cm	**1**
14	When white light enters obliquely in a glass prism from the air, which of the following is correct : a) the angle of deviation is minimum for blue light and maximum for red light b) the angle of deviation is minimum for yellow light and maximum for green light c) the angle of deviation is minimum for red light and maximum for violet light d) the angle of deviation is minimum for violet light and maximum for red light	**1**
15	Identify the correct path of urine in the human body. a) Kidney → urinary bladder → urethra → ureter b) Urinary bladder → ureter → kidney → urethra c) Kidney → ureter → urethra → urinary bladder d) Kidney → ureter → urinary bladder → urethra	**1**
16	Which of the following statements shows the interaction of an abiotic component with a biotic component in an ecosystem? a) A grasshopper feeding on a leaf b) Rainwater running down into the lake c) An earthworm making a burrow in the soil d) A mouse fighting with another mouse for food	**1**

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:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

17	Assertion (A) : Carbon dioxide gas turns moist blue litmus paper red. Reason (R) : Non metallic oxides are acidic in nature.	**1**

18	Assertion (A) : Chemical coordination is seen in both plants and animals. Reason (R) : Plant hormones and animal hormones are responsible for showing uncontrolled growth.	**1**
19	**Assertion (A):** Concave mirrors are used as make-up mirrors. **Reason (R):** When the face is held between the pole and focus of a concave mirror, then a diminished image of the face is seen in the concave mirror.	**1**
20	Assertion (A) : Ozone is a molecule formed by three atoms of oxygen. Reason (R) : Ozone shields the surface of the Earth from the harmful ultraviolet radiation of the Sun.	**1**
	SECTION – B **Q No. 21 to 26 are very short answer questions.**	
21	Figure given below represents a reaction between aqueous solutions of two compounds- namely Sodium sulphate and Barium chloride.  a) Write the balanced chemical equation for the reaction shown. b) What type of reaction is it?	**2**
22	The sex of a newborn individual is determined differently in different species. Some rely entirely on environmental cues. In other animals, individuals can change sex, indicating that sex is not genetically determined. However, in human beings, the sex of the individual is largely determined genetically. a) What is the statistical probability of giving birth to a male child or a female child in humans? b) How many pairs of sex chromosomes do humans have? c) In which one of the parents, a perfect pair of sex chromosomes in present? d) State the mismatched pair of sex chromosomes in humans.	**2**
23	Attempt either option A or B A.Name the parts of the nervous system which are involved in the following activities : i) Maintaining body posture ii) Salivation iii) Hunger iv) Answering a question **OR** B.In the diagram given below, name the labelled parts X and Y and mention one	**2**

	function for each.  	
24	The refractive indices of water and glass with respect to air are 4/3 and 3/2 respectively. If the speed of light in glass is 2 X 10^{8} m/s, find the speed of light in (i) air (ii) water.	**2**
25	***Attempt either option A or B*.** **A**. 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 the electric main supply of 220V. Find the current drawn in each case. **OR** **B**. Find the ratio of the power used in the 2 Ω resistor in each of the following circuits: (i) a 6 V battery in series with 1 Ω and 2 Ω resistors, and (ii) a 4 V battery in parallel with 12 Ω and 2 Ω resistors.	**2**
26	Identify the phenomenon being depicted in the image given below.What impact will it have on humans if they occupy the last trophic level? Explain briefly.  	**2**
SECTION - C **QNo. 27 to 33 are short answer questions.**		
27	(a) In the given series of reactions, name the compounds X and Z. (formulae required)	**3**



(b) List any one use of Q.
(c) Comment upon the nature of substance X.

28 **Attempt either option A or B.** **3**

A. Samples of four metals A, B, C and D were taken and added to the following solution one by one. The results obtained have been tabulated as follows:

Metal	Iron(II) sulphate	Copper (II) sulphate	Zinc sulphate	Silver nitrate
A	No reaction	Displacement	-	-
B	Displacement	-	No reaction	-
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Use the table above to answer the following questions about metals A, B, C and D.

1. Which is the most reactive metal? Why?
2. What would you observe if B is added to a solution of Copper (II) sulphate?
3. Arrange the metals A, B, C and D in the order of decreasing reactivity.

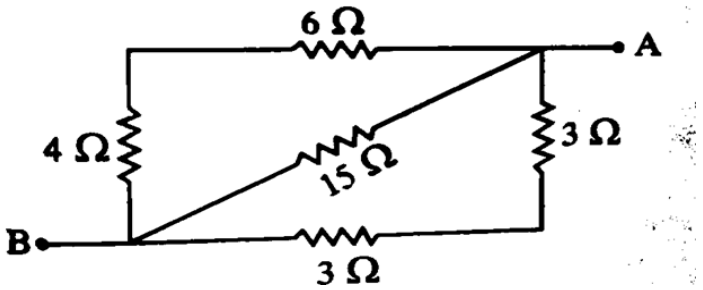
OR

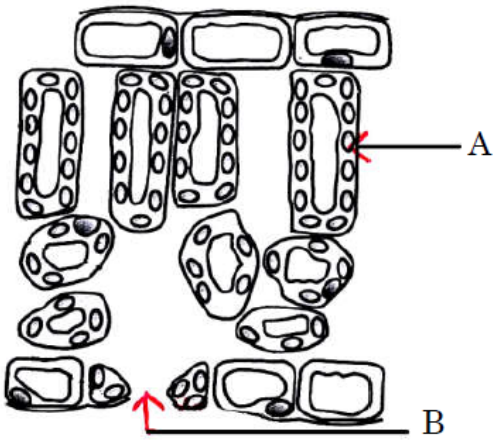
B. The metals produced by various reduction processes are not very pure. They contain impurities, which must be removed to obtain pure metals. The most widely used method for refining impure metals is electrolytic refining.

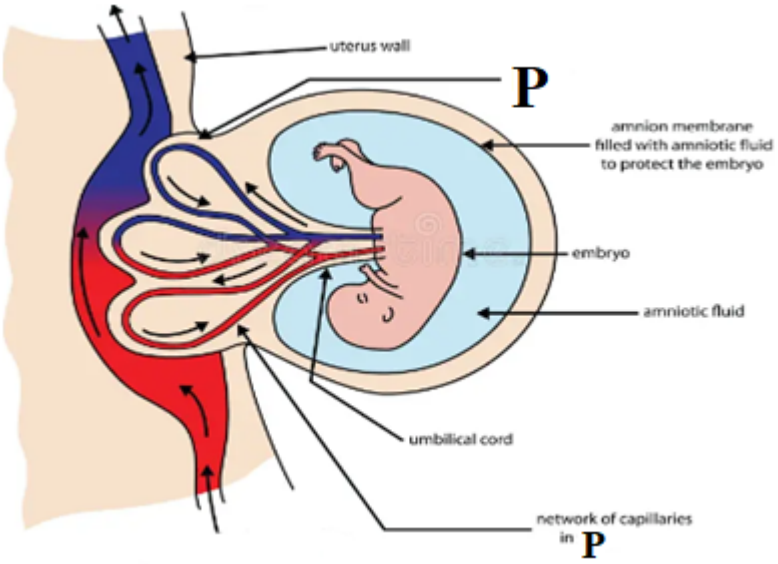
a) What is the cathode and anode made of in the refining of copper by this process?
b) Draw a neat labeled diagram of the above mentioned process.
c) Write the ionic equations at anode and cathode during the refining of copper metal.

29 a)Name the part of the flower which **3**
i) persists even after a fruit is formed
ii) attracts insects for pollination
iii) produces pollen grains
iv) changes into seed after fertilisation
b) After pollination, how does a male germ cell reach the ovary ? Mention the significance of this event.

30 A plant having blue coloured flowers (BB) is crossed with a plant having white **3**

	coloured flowers (bb) : a) Name the term used for the trait, which is observed in F1 generation. Give its gene combination. b) If the plants obtained in F1 generation are self-pollinated, write the percentage of (i) plants with flowers of blue colour, and (ii) plants with flowers of white colour in the F2 generation. c)What did the reappearance of plants with white coloured flowers in F2 generation indicate ?	
31	a) List two disadvantages of using a series circuit in homes. b) Calculate the effective resistance between A and B in the following circuit: 	**1+2 = 3**
32	"Rainbow is an example of dispersion of sunlight." Justify this statement by explaining the formation of a rainbow in the sky. Also mention the physical situation when it occurs.	**3**
33	Where is the magnetic field strength maximum,when current passes through a solenoid? List two factors on which the strength of the magnetic field produced depends? Write one use of a solenoid.	**3**
	SECTION - D **QNo. 34 to 36 are Long answer questions**	
34	**<u>Attempt either option A or B</u>.** **A.** A carboxylic acid 'X' which is an important constituent of vinegar has molecular formula $C_2H_4O_2$. It reacts with Ethanol in the presence of a few drops of conc. sulphuric acid to produce a sweet smelling compound Y. When Y is heated with Sodium hydroxide it gives back Ethanol with another compound 'Z'. a) Identify X and Y. b) State any one application of compound Y. c) Write the chemical equation(s) of the reactions involved. d) Pure ethanoic acid freezes in winters in cold countries. State the physical property related to this information. **OR** **B.** (a) Carry out the following conversions: (i) Ethene to Ethane (ii) Ethanol to Ethene (b) Elaborate on the process of cleansing action of soap. Illustrate micelle with the help of a neat labelled diagram.	**5**

35	Attempt either option A or B A.i) Given below is a diagram showing a cross-section of a leaf. Name the cell organelle marked A and the opening in between guard cells marked B and write one specific function of each.  ii) Name the two tissues present in a vascular bundle. In what way does each of them help a plant ? iii) In the experiment "Light is essential for photosynthesis", why does the uncovered part of the leaf turn blue-black after putting iodine solution on it ? **OR** B.i) Schematically represent the various ways by which glucose can be broken down. ii) How is the separation of the right and left side of the heart useful for birds?	**5**
36	***Attempt either option A or B***. **A.** a) List two factors on which the resistance of a metallic conductor in the shape of a straight cylinder depends. Write the relation between resistance (R) and the resistivity (ρ) of the material of the conductor. Use this relation to obtain the SI unit of resistivity. b) Resistance of a metal wire of length 1 m is 40 Ω. If the area of cross-section of the wire is $6{\cdot}5 \times 10^{-8}$ m^2, find the resistivity of the material of the wire. **OR** **B.** a) State Joule's law of heating. Derive an expression for the heat produced by current through a metallic conductor. Name one device in which the heating effect of current is desirable and one in which it is undesirable. b) Which uses more energy- a 250 W TV set in 1 h or a 1200 W air purifier in 10 minutes? Show all mathematical steps.	**3+2 = 5**
SECTION - E **Q No. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.**		
37	The presence of a functional group such as alcohol decides the properties of the carbon compound, regardless of the length of the carbon chain. Such a series of compounds in which the same functional group substitutes for hydrogen in a carbon chain is called a homologous series. Such series can be created in a specific	**4**

	functional group like alcohol, ketone, aldehyde etc. CH_4 and C_2H_6 — these differ by a $–CH_2$ - unit C_2H_6 and C_3H_8 — these differ by a $–CH_2$ - unit As the molecular mass increases in any homologous series, a gradation in physical properties is seen. But the chemical properties remain similar in a homologous series. **A.** i) The chemical properties of CH_3OH, C_2H_5OH, C_3H_7OH are very much similar. Why? ii) Draw the bonded structure and electron dot structure of the predecessor of Butanone in a homologous series. **<u>Attempt either subpart B or C.</u>** **B**. Define homologous series. **OR** **C**. As we proceed ahead in homologous series, why does the melting point and boiling point of hydrocarbons increase?	
38	The image below shows a developing foetus in the mother's womb. The developing foetus is connected by means of umbilical cord to a special, disc-like tissue, **P.**  <u>Attempt either subpart A or B</u> A) Name the region where the foetus develops inside the female body. Explain how the wall of this region is adapted for nourishing the baby. **OR** B) Identify the structure marked **P**. If **P** has less villi, how will it affect the baby's growth? C) What is a foetus? D) List any two substances that move through the mother's blood to the developing foetus .	**4**
39	In our laboratories we use compound microscopes to see the magnified image of a microscopic object. A compound microscope is made up of two lenses. The lens nearest to the object to be viewed, called objective lens, forms a real, inverted and magnified image of the object. This image serves as an object for the second lens	**1+1+2 = 4**

	called eyepiece. The eyepiece forms a virtual, erect and magnified image of its object. Thus, the resultant image formed by a microscope is virtual, inverted and magnified with respect to the microscopic object viewed. **A.** The image of an object formed by a convex lens of focal length 2 cm is real, inverted and magnified. What is the range of object distance in this case? **B**. The image of an object formed by a convex lens of focal length 6 cm is virtual, erect and magnified. What is the range of object distance in this case? ***Attempt either subpart C or D***. **C.** An object is placed at a distance of 12 cm from the optical center of a convex lens of focal length 18 cm. Draw a labelled ray diagram to show the formation of image in this case **OR** **D.** The image formed by a convex lens is real, inverted and of the same size as the object. If the distance between the objects and the image is 60 cm, determine the focal length of the lens. Also find the position of the image.	