BUDHA DAL PUBLIC SCHOOL PATIALA

Second Term Examination (10 December 2024)

CLASS X

PAPER- SCIENCE (SET-B)

Time:3 hr. **M.M. 80**

General Instructions:

i) This question paper consists of 39 questions in 5 sections.

ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

iii) Section A consists of 20 objective type questions carrying 1 mark each.

iv) Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.

v) Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.

vi) 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.

vii) Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Section – A

Q1. The composition of aqua regia is

a) Dil HCl : Conc HNO_3 b) Conc HCl : Dil HNO_3

3 : 1 3 : 1

c) Conc HCl : Conc HNO_3 d) Dil HCl : Dil HNO_3

3 : 1 3 : 1

Q2. Generally, non-metals are not lustrons. Which of the following non-metal is lustrons?

a) Sulphur b) Oxygen c) Nitrogen d) Iodine

Q3. Reaction between X and Y, forms compound Z, X loses electron and Y gains electron. Which of the following properties is not shown by Z?

a) Has high melting point
b) Has low melting point
c) Conduct electricity in moltenstate
d) Occurs as solid

Q4. Metal oxides generally react with acids, but few oxides of metal also react with bases. Such metallic oxides are: (I) MgO (II) ZnO (III) Al_2O_3 (IV) CaO

a) I and II b) II and III c) III & IV d) I & IV

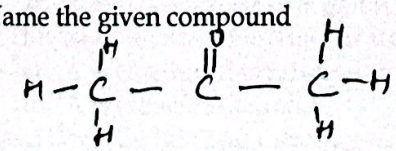
Q5. Which of the following will contain covalent double bond between its atom?

a) H_2 b) O_2 c) NaCl d) Cl_2

Q6. Which of the following hydrocarbons is different from others?

a) C_4H_{10} b) C_7H_{14} c) C_5H_{12} d) C_2H_6

Q7. Name the given compound (1)



b) Propanone b) Propanol c) Propane d) Propanoic acid

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Q8. The part of the flower that forms a seed is
a) ovule b) carpel c) ovary d) egg cell (1)

Q9. Fertilisation in human beings takes place in
a) uterus b) vagina c) fallopian tube d) vas deferens

Q10. Select the statements that describe characteristics of genes.
i) Genes are specific sequence of bases in a DNA molecule
ii) A gene does not code for proteins
iii) In individuals of a given species, a specific gene is located on a particular chromosome.
iv) Each chromosome has only one gene
a) (i) and (ii) b) (i) and (iii) c) (ii) & (iii) d) (ii) & (iv)

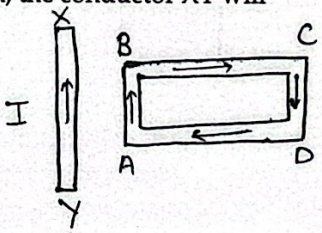
Q11. A zygote which has an X-chromosome inherited from the father will develop into a
a) boy b) girl c) X-chromosome does not determine the sex of a child
d) either boy or girl

Q12. In the following given food chain, suppose the amount of energy at fourth trophic level is 7kJ, what will be the energy available at the producer level?
Grass ⟶ Insect ⟶ Frog ⟶Snake ⟶Peacock
a) 70 kJ b) 700 kJ c) 7 kJ d) 7000 kJ

Q13. Two LED bulbs of 100W and 40W are connected in series. If the current flowing through 100W bulbs is 1A, the current that flows through 40W bulb will be (1)
a) 0.4 A b) 0.8 A c) 0.6 A d) 1A

Q14. A rectangular loop ABCD carrying a current I is situated near a straight conductor XY, such that the conductor is parallel to the side AB of the loop and is in the plane of loop. If a steady current I is established in the conductor as shown, the conductor XY will (1)

(a) Remain stationary
(b) Move towards the side AB of the loop
(c) Move away from the side AB of the loop
(d) Rotate about its axis



Q15. Draw the electron dot structure of ethanoic acid. (1)

Q16. Disposable plastic plates should not be used because (1)
a) they are made of materials with light weight
b) they are made of toxic materials
c) they are made of biodegradable materials
d) they are made of non-biodegradable materials

For the following questions, two statements are given - one labeled Assertion (A) and the other labeled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:
a) Both A and R are true and R is the correct explanation of the assertion.
b) Both A and R are true but Reason R is not a correct explanation of Assertion.
c) A is true but R is false.
d) A is false but R is true.

Q17. **Assertion :** Carbon has a strong tendency to either lose or gain electron to attain noble gas configuration. (1)
Reason: Carbon has four electrons in its outermost shell and has the tendency to share electrons with carbon or other elements.

Q18. **A** : ...etic variations occur due to inaccuracy in DNA replication. (1)
Reason : ...ions are essential for survival of an organism.

Assertion : Resistance of 50W bulb is greater than that of 100W. (1)

...son : Resistance of bulb is inversely proportional to rated power.

...rtion : First filial (F_1) generation is the one that is formed by crossing two parents of ...erent traits of a character. (1)

Reason : The allele of recessive parent is extracted from the zygote so that allele of any dominant trait persists in the progeny.

Section - B

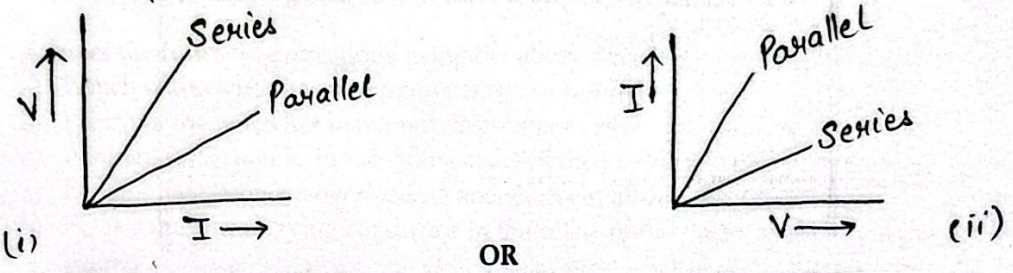
Q21. Give reasons (2)
a) Aluminum is highly reactive metal, yet it is used to make utensils for cooking.
b) Carbonate and sulphide ores are usually converted into oxides during the process of extraction.

Q22. Why does bread mould grow profusely on a moist slice of bread rather than on dry slice of bread? (2)

Q23. Why are some pea plants tall and others short in nature? Explain with reference to role of genes in controlling characteristics. (2)

Q24. What is the role of fuse used in series with any electrical appliance? Why should a fuse with defined rating not be replaced by one with a larger rating? (2)

Q25. Two students perform the experiment on series and parallel combinations of two given resistors R_1 and R_2 and plot the following V-I graphs (i) & (ii). Which of the graph is (are) correctly labelled in terms of the 'series' and 'parallel'? Justify your answer. (2)



OR

a) Why is an ammeter likely to be burnt out if it is connected in parallel in a circuit?
b) Should the resistance of a voltmeter be low or high? Give reason.

Q26. Why is damage to the ozone layer cause of concern? What are the causes for its depletion? (2)

Section - C

Q27. A compound 'X' on heating with excess conc. sulphuric acid at 443K gives an unsaturated compound 'Y'. 'X' also reacts with sodium metal to evolve a colourless gas 'Z'. Identify 'X', 'Y' & 'Z'. Write the equation of the chemical reaction of formation of (Y) and also write the role of sulphuric acid in the equation. (3)

Q28. An ore has a metal that exist as a liquid at room temperature treatment with dilute hydrochloric acid produce brisk effervescence. Name the type of ore with one example. What steps will be required to obtained metal from the enriched ore? Also write the chemical equation for the reactions involved in the process.

OR

a) Explain the formation of Calcium chloride with the help of electron dot structure (Atomic no. of Cu = 20 and Cl = 17)
b) Why do ionic compounds do not conduct electricity in solid state but conduct electricity in molten and aqueous state.
c) Write the chemical equation for the following reaction : Iron with steam

Q29. a) What is placenta? State its roles during pregnancy. (3)
b) Name a surgical method to create a block in the reproductive system for contraception purpose in female and also name the part where blocks are created.

Q30. In a cross between plants with purple flowers and plants with white flowers, the off springs of F_1 generation had all purple flowers. When F_1 generation individuals were self bred, the F_2 generation gave rise to 100 individuals, 75 of which had purple flowers. Make a cross and answer the following questions: (3)
a) What are the genotypes of F_2 individuals?
b) What is the ratio of purple to white flowered plant in F_2 generation?

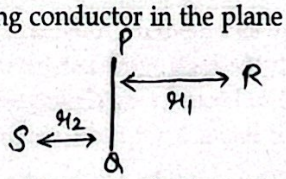
Q31. a) What is a solenoid? (3)
b) Draw the pattern of magnetic field lines of a current carrying solenoid.
c) Write one use of the strong magnetic field produced inside a current carrying solenoid.

Q32. Read the following information. (3)
I) Resistivity of copper is lower than that of aluminum which in turn is lower than that of constantan.
II) Six wires labelled A, B, C, D, E, F have been designed as per the following parameters:

Wire	Length	Diameter	Material	Resistance
A	l	2d	Aluminum	R_1
B	2l	d/2	Constantan	R_2
C	3l	d/2	Constantan	R_3
D	l/2	3d	Copper	R_4
E	2l	2d	Aluminum	R_5
F	l/2	4d	Copper	F_6

Answer the following questions using the above data:
a) Which of the wires has minimum resistance & why?
b) Which of the wires has maximum resistance & why?
c) Arrange R_1, R_3 and R_5 in ascending order of their values. Justify your answer.

Q33. a) Differentiate between overloading and short circuiting. (3)
b) PQ is a current carrying conductor in the plane of the paper as shown in the figure below:



i) Find the directions of magnetic fields produced by it at point R & S?
ii) Given $r_1 > r_2$, where will be the strength of magnetic field be larger? Give reason.

Section - D

Q34. a) A compound 'X' is formed by the reaction of a carboxylic acid $C_2H_4O_2$ and an alcohol in presence of few drops of H_2SO_4. The alcohol on oxidation with alkaline $KMnO_4$ followed by acidification gives the same carboxylic acid as used in this reaction. Give the name and structure of (5)
(i) Carboxylic acid (ii) alcohol (iii) the compound 'X'. Also write the reactions involved
b) Draw the isomers of Pentane
c) Name the third homologue of (i) alcohol (ii) Aldehyde

OR

a) Explain the mechanism of cleaning action of soap.
b) Explain the formation of scum when hard water is treated with soap.

Q35. a) State the reason why testes are located outside the abdominal cavity. (5)
b) Name the hormone secreted by testes and write its two functions.
c) Write two glands found in male reproductive pathway and specify their roles.
d) Write function of vas deferens.

OR

Draw diagram of L.S./V.S. of flower. Label and name the parts asked.
(i) Where anthers are formed
(ii) Sticky part which receives pollen grains.
(iii) Contains ovule
(iv) Which develops into seed after fertilization.

Q36. a) Write the mathematical expression for Joule's law of heating. (5)
b) Compute the heat generated while transferring 96000 C of charge in two hours through a potential difference of 40 V.
c) The components of an electric circuit are 0.5m long nichrome wire XY, an ammeter, a voltmeter, four cells of 1.5V each, rheostat and a plug key. Draw a circuit diagram to study the relation between potential difference across the terminals X and Y of the wire and current flowing through it.

OR

a) Draw an appropriate schematic diagram showing common domestic circuits.
b) State the rule which gives the direction of force acting on the conductor.
c) List two characteristic features of the electric current used in our homes.

Section – E

Q37. **Read the above passage and answer the following questions :** (4)
On the basis of reactivity metals are grouped into three categories:
i) Metals of low reactivity
ii) Metals of medium reactivity
iii) Metals of high reactivity

Therefore metals are extracted in pure form from their ores on the basis of their chemical properties.
Metals of high reactivity are extracted from their ores by electrolysis of the molten ore.
Metals of low reactivity are extracted from their sulphide ores, which are converted into their oxides. The oxides of these metals are reduced to metals by simple heating.

a) Name the process of reduction used for a metal that gives vigorous reaction with air and water both.
b) Carbon cannot be used as a reducing agent to obtain aluminium from its oxide? Why?
c) Describe briefly the method to obtain mercury from cinnabar. Write the chemical equation for the reactions involved in the process.

OR

c) Differentiate between roasting and calcinations giving chemical equation for each.

Q38. Figures (a) to (d) given below represent the type of ear lobes present in a family consisting of 2 children – Rahul, Nisha and their parents. (4)


(a) Rahul's Father


(b) Rahul


(c) Rahul's Mother


(d) Rahul's sister Nisha

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(e) (f)

Type of ear lobes

Excited by his observation of different types of ear lobes present in his family, Rahul conducted a survey of the type of ear lobes found [Figure (e) and (f)] in his classmates. He found two types of ear lobes in his classmates as per the frequency given below:

Sex	Free	Attached
Male	36	14
Female	31	19

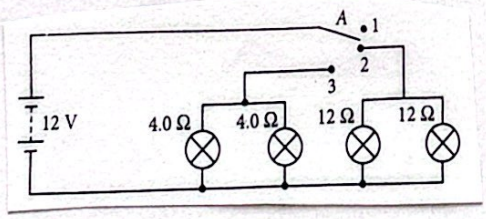
On the basis of the above data answer the following questions:

a) Which of the two characteristics – 'free ear lobe' or 'attached ear lobe' appears to be recessive in this case? Why?

b) Is the inheritance of the free ear lobe linked with sex of the individual? Give reason for your answer.

c) Gene for free ear lobe is represented by F and gene for attached ear lobe is represented by f for writing the genetic constitution.
Suresh's parents have attached ear lobes. What type of ear lobe can be seen in Suresh and his sister Siya? Explain by giving the genetic composition of all.

Q39. Vinita and Roshan Demonstrated a circuit that operates the two headlights and the two sidelights of a car, in their school exhibition. Based on their demonstrated circuit, answer the following questions: **(4)**



(a) State what happens when switch A is connected to (i) position 2 (ii) position 3?

(b) Find the potential difference across each lamp.

(c) Calculate the current (i) in each 12Ω lamp (ii) in each 4 Ω lamp

OR

(c) Show with calculations, which type of lamp, 4 Ω or 12 Ω has the higher power.