BUDHA DAL PUBLIC SCHOOL PATIALA

Second Term Examination (19 December 2023)

CLASS X

PAPER- SCIENCE (SET-A)

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

1. Which one of the following four metals would be displaced from the solution of its salts by other 3 metals?

   a) Mg b) Ag c) Zn d) Cu

Q2. Oxides of sodium are reduced by

a) heat alone b) carbon c) aluminium d) electrolytic reduction

Q3. Complete the equation $Fe\ (s) + H_2O\ (g) \rightarrow$

Q4. Butanone is a four carbon compound with the functional group

a) carboxylic acid b) aldehyde c) ketone d) alchohol

Q5. While cooking, if the bottom of the vessel is getting blackened on the outside, it means that

a) the food is not cooked completely
b) the fuel is not burning completely
c) the fuel is wet
d) the fuel is burning completely

Q6. Number of covalent bonds present in N_2 molecule is

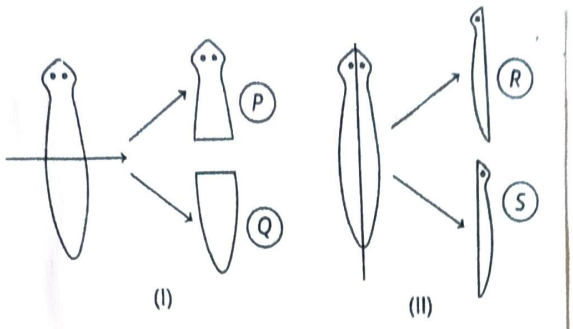
a) 2 – covalent bonds b) 3 – covalent bonds
c) 1 – covalent bond d) None of these

Q7. Which of the following helps in transport and nutrition of sperms? **(1)**

b) Mucus b) Urine c) Blood d) Glandular secretions

Q8. A planaria worm is cut hariszontally from the middle into the two halves P and Q. Another planaria worm is cut vertically into two halves R and S. Which of the cut pieces of the two planaria worms could regenerate to form the complete worm? **(1)**

A-1



(a) Only *P* (b) *R* and *S*
(c) *P* and *Q* (d) *P*, *Q*, *R* and *S*

Q9. If pea plant having round green seeds and wrinkled yellow seeds are crossed, what phenotypic ratio will be obtained in F_2 progeny plants?

a) 1 : 2 : 1 b) 3 : 1 c) 9 : 3 : 3 : 1 d) 9 : 3 : 4

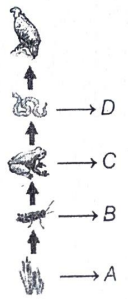
Q10. Which of the following characteristics of pea was not considered by Mendel for his experiment?

b) Colour of seed b) colour of flower c) plant height d) shape of leaves

Q11. Which of the following is not a functional component of an ecosystem?

a) ecological pyramids b) decomposers c) sunlight d) producers

Q12. In the following given food chain organisms are labelled as A to D. match the labeling referred in Column I with their most suitable feature in Column II.



Column I	Column II
A	1. Primary carnivore
B	2. Secondary carnivore
C	3. Autotrophs
D	4. Primary consumer

Codes

	A	B	C	D
(a)	3	4	1	2
(b)	4	3	2	1
(c)	3	1	4	2
(d)	3	2	1	4

Q13. The front face of a circular loop of a wire is the North Pole, the direction of current in this face of the loop will be: **(1)**

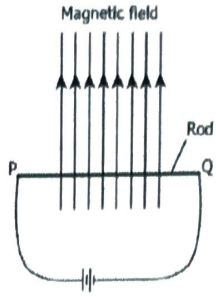
a) Clockwise b) Anticlockwise c) Towards North d) Towards South

Q14. The least resistance obtained by using 2 Ω, 4 Ω, 1 Ω and 100 Ω is **(1)**

(a) < 100 Ω (b) < 4 Ω (c) < 1 Ω (d) > 2 Ω

A - 2

A metal rod PQ is placed in the magnetic field. The ends of the rod are connected to a battery using wires. (1)



Where will the rod move?
(a) Upward (b) Downwards (c) Into the field (d) Out of the field

Q16. Which of the following correctly represent electric power? (1)

a) V^2R b) $\frac{I^2}{R}$ c) $\frac{V^2}{R}$ d) VR

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 :** Vegetable oils are unsaturated hydrocarbon react with hydrogen in presence of Ni to form vegetable ghee.
Reason: This reaction is called as hydrogenation.

Q18. **Assertion :** DNA copying is necessary during reproduction. (1)
Reason: DNA copying leads to the transmission of characters from parents to offspring.

Q19. **Assertion :** Tungsten metal is used for making filaments of incandescent lamps. (1)

Reason : The melting point of tungsten is very low.

Q20. **Assertion :** Urethra in human male act as urinogenital canal. (1)
Reason : Urethra carries only urine, while sperms are carried by vas deferens only.

Section – B

Q21. Give reasons (2)
a) Why is most carbon compounds poor conductors of electricity?
b) Carboxylic acids are called weak acids.

Q22. a) Show the formation of $MgCl_2$ by the transfer of electrons. (2)
b) Name cation and anion in $MgCl_2$.

OR

What is Thermite reaction? Why is used to join broken railway tracks?

Q23. Make two food chain, belonging to two different habitats. (2)

OR

a) Why does bread mould grow profusely on a moist slice of bread rather than on a dry slice of bread?
b) Name the mode of asexual reproduction in (i) Plasmodium (ii) Spirogyra

Q24. Why parallel combination of resistors is preferred over series. Give two points. (3)

A - 3

OR

A bulb is rated at 200 V, 100 W. Calculate its resistance. Five such bulbs burn for 4 hours daily. Calculate the units of electrical energy consumed per day. What would be the cost of using these bulbs per day at the rate of ₹4.00 per unit?

Q25. Why two magnetic field lines never intersect each other? (2)

Q26. A boy of 15 years has a attached earlobe and weight of 65kg, which of these is an acquired character and which is inherited. Give reasons for your choice. (2)

Section - C

Q27. Account for following : (3)

a) H_2 gas is not evolved when zinc metal reacts with dil HNO_3.
b) Sodium, potassium and lithium are stored under oil.
c) Calcium starts floating when added to water.

Q28. Give chemical test to detect the presence of

a) Ethanol b) Ethanoic acid

Q29. a) A cross was carried out between a pure bred tall pea plant and a pure bred dwarf pea plant and F_1 progeny was obtained. Later the F_1 progeny was selfed to obtain F_2 progeny. Draw a cross. (3)

b) How can you say that in Mendel's monohybrid cross, the F_2 dominants are not all the same?

Q30. Does genetic combination of mother play a significant role in determining the sex of a newborn? (3)

Q31. State three factor on which magnetic field produced by a current carrying solenoid depends. (3)

Q32. An electric oven of 2 kW power rating is operated in a domestic electric circuit (220V) that has a current rating of 5.A. What result do you expect? Explain. (3)

Q33. Three resistors of 5 Ω, 10 Ω and 15 Ω are connected in series and the combination is connected to battery of 30 V. Ammeter and Voltmeter are connected in the circuit. Draw a circuit diagram to connect all the devices in proper correct order. What is the current flowing and potential difference across 10 Ω resistance? (3)

OR

a) Draw the nature of V – I graph for a nichrome wire. (V – Potential difference, I – Current)

(b) A metallic wire of 625 mm length offers a 4 Ω resistance. If the resistivity of the metal is 4.8×10^{-7} ohm-metre then calculate the area of cross-section of the wire.

Section - D

Q34. A carboxylic acid (molecular formula $C_2H_4O_2$) reacts with an alcohol in the presence of an acid catalyst to form compound 'X'. The alcohol on oxidation with alkaline $KMnO_4$ followed by acidification give same carboxylic acid $C_2H_4O_2$. Write the name and structures of (5)

a) Carboxylic acid
b) Alcohol
c) The compound 'X'

OR

a) Distinguish between Saturated and unsaturated hydrocarbons.
b) Define Isomerism, Draw isomers of Pentane.

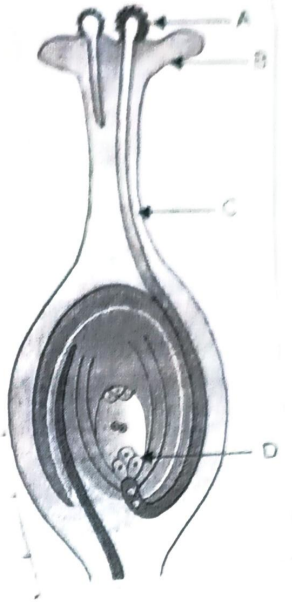
(a) List two reasons for the appearance of variations among the progency formed by sexual reproduction. (5)

(b) (i) Name the part marked 'A' in the diagram.

(ii) How does A reach part "B" ?

(iii) State the importance of part "C".

(iv) What happens to the part marked "D" after fertilization is over ?



Q36. Two wires A and B are of equal length, different cross sectional areas and made of same metal. (5)

(a)(i) Name the property which is same for both the wires,

(ii) Name the property which is different for both the wires.

(b)If the resistance of wire A is four times the resistance of wire B, calculate

(i) the ratio of the cross sectional areas of the wires and

(ii) The ratio of the radii of the wire.

OR

(a) What do you mean by short circuiting and overloading?

(b) Draw a diagram showing pattern of magnetic field lines due to a current carrying solenoid.

Section – E

Q37. **Read the above passage and answer the following questions :** (4)

Metals are widely used in our daily life for a large number of purposes. Some of the metals are used in making jewellery and coins; some are employed in making utensils and furniture, and some in the construction of heavy machinery, tools, transport vehicles and many in the manufacturing of other equipments. Metals often find applications as catalysts in various industrial processes such as hydrogenation of vegetable oils, manufacture of ammonia, sulphuric acid, nitric acid, dyes, drugs, etc. Metals, though in small quantities, have also been recognized as essentials for various biological processes. For example, iron is a constituent of blood pigment and magnesium of plant pigment.

a) Which property of metals is used for making bells and strings of musical instruments?

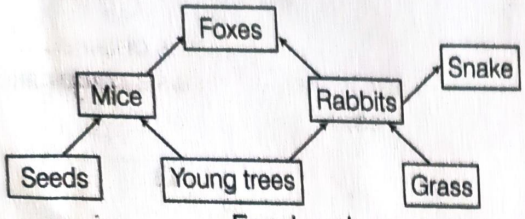
b) Name two metals which are found in nature in the free state.

c) Why gold and silver are used to make jewellery?

d) Why food cans are coated with tin not with zinc.

During an online biology lecture, Ms. Kavita demonstrated the topic food web on a power point presentation as given below.

Food web is the interconnection of different food chains, which correlate at various trophic levels operating in an ecosystem.



Food web

She further asked the following questions from the students

(a) How much percentage of energy is lost at each trophic level?

(b) Name the primary consumer in the given food web.

(c) How many food chains are present in the given food web?

(d) If all the foxes are killed due to a disease, what will be its impact on food web?

9. The heating effect of current is obtained by transformation of electrical energy in heat energy. Just as mechanical energy used to overcome friction is covered into heat, in the same way, electrical energy is converted into heat energy when an electric current flows through a resistance wire. The heat produced in a conductor, when a current flows through it is found to depend directly on (a) strength of current (b) resistance of the conductor (c) time for which the current flows. The mathematical expression is given by $H = I^2Rt$. The electrical fuse, electrical heater, electric iron, electric geyser etc. all are based on the heating effect of current. **(4)**

(i) What are the properties of heating element?
(a) High resistance, high melting point
(b) Low resistance, high melting point
(c) Low resistance, high melting point
(d) Low resistance, low melting point.

(ii) What are the properties of electric fuse?
(a) Low resistance, low melting point
(b) High resistance, high melting point.
(c) High resistance, low melting point
(d) Low resistance, high melting point

(iii) When the current is doubled in a heating device and time is halved, the heat energy produced is
(a) doubled (b) halved (c) four times (d) one fourth times

(iv) A fuse wire melts at 5 A. It is desired that the fuse wire of same material melt at 10 A. The new radius of the wire is
(a) 4 times (b) 2 times (c) 12 times (d) 14 times

OR

(v) When a current of 0.5 A passes through a conductor for 5 min and the resistance of conductor is 10 Ω, the amount of heat produced is
(a) 250 J b) 5000 J (c) 750 J (d) 1000J