

**NORTH-EX PUBLIC SCHOOL**  
**(Senior Secondary, Affiliated To CBSE)**  
**School Block, Jain Nagar, Sector-38, Rohini, Delhi – 81**  
**HALF YEARLY EXAMINATION, 2023-24**  
**SUBJECT – SCIENCE**  
**CLASS - X**

**TIME: 3 hrs.**

**MM: 80**

**General Instructions**

- i. The question paper has five sections and 39 questions.
- ii. All questions are compulsory.
- iii. Section–A has 20 questions of 1 mark each; Section–B has 6 questions of 2 marks each; Section–C has 7 questions of 3 marks each; Section–D has 3 questions of 5 marks each and Section–E has 3 questions of 4 marks each.
- iv. There is no overall choice.

**SECTION- A**

1. A substance 'X' is used in white-washing and is obtained by heating limestone in the absence of air. Identify 'X.'
  - (a)  $\text{CaOCl}_2$
  - (b)  $\text{Ca}(\text{OH})_2$
  - (c)  $\text{CaO}$
  - (d)  $\text{CaCO}_3$
2. When we touch the leaves of "touch me not" plant, the begun to fold up and droop. How does the plant communicate the information of touch?
  - a) The plant uses electrical signals to transfer information from external environment to cells.
  - b) The plant uses electrical -chemical signals to transfer information from cell to cell.
  - c) The plant uses electrical- chemical signals to transfer information from tissue to specialised cells.
  - d) The plant uses electrical signals to transfer information from cell to specialized tissues.
3. The magnetic field lines in the middle of the current carrying solenoid are
  - (a) circles
  - (b) spirals
  - (c) parallel to the axis of the tube
  - (d) perpendicular to the axis of the tube
4. Posture and balance of the body is controlled by
  - a) Cerebrum
  - b) Cerebellum
  - c) Medulla
  - d) Pons
5. Which one of the following salts does not contain water of crystallization?
  - (a) Blue vitriol
  - (b) Baking soda
  - (c) Washing soda
  - (d) Gypsum
6. Upon receiving a signal, the dendritic tip of a nerve cell set off a chemical reaction that
  - a) Creating an electrical impulse in the dendrite.
  - b) Creates an electrical impulse in the next neuron
  - c) Releases some chemicals in the cell body of the neuron

- d) Creates a stimulus
7. Rate of heat generated by electric current in a resistive circuit is expressed in:
- (a) IR
  - (b)  $IR^2$
  - (c)  $I^2R$
  - (d)  $I^2 R^2$
8. Which of the following plays the important role of creating a suction force which pulls water upwards from the roots of a tree to its leaves?
- a) Gravitation
  - b) Respiration
  - c) Transpiration
  - d) Photosynthesis
9. Which of the following determines the direction of magnetic field due to a current carrying conductor?
- (a) Faraday's laws of electromagnetic induction
  - (b) Fleming's left-hand rule
  - (c) Lenz's rule
  - (d) Maxwell's cork screw rule
10. Brine is an
- (a) aqueous solution of sodium hydroxide
  - (b) aqueous solution of sodium carbonate
  - (c) aqueous solution of sodium chloride
  - (d) aqueous solution of sodium bicarbonate
11. Magnetic lines do not intersect on one-another because
- (a) they are at a distance
  - (b) they are in the same direction
  - (c) they are parallel to another
  - (d) at the point of intersection there will be two direction of the magnetic force which is impossible.
12. Which one of the following statements is correct about the human circulatory system?
- a) Blood transports only oxygen and not carbon dioxide.
  - b) Human heart has five chambers
  - c) Valves ensure that blood does not flow backwards
  - d) Both oxygen rich and oxygen deficient blood gets mixed in the heart.
13. Which of the following pairs will give displacement reactions?
- (a)  $FeSO_4$  solution and Copper metal
  - (b)  $AgNO_3$  solution and Copper metal
  - (c)  $CuSO_4$  solution and Silver metal
  - (d) NaCl solution and Copper metal
14. Most of the digestion and absorption of the food takes place in the
- a) Small intestine
  - b) Liver
  - c) Stomach
  - d) Large intestine
15. When a few drops of iodine solution are added to rice water, the solution turns blue- black in colour. This indicates that rice water contains:
- (a) fats
  - (b) complex proteins
  - (c) starch
  - (d) simple proteins
16. What type of chemical reactions take place when electricity is passed through water?
- (a) Displacement

- (b) Combination
- (c) Decomposition
- (d) Double displacement

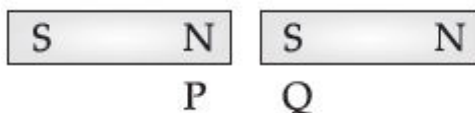
**Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R).**

**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: If a graph is plotted between the potential difference and the current flowing, the graph is a straight line passing through the origin.  
Reason: The current is directly proportional to the potential difference.
18. Assertion: The effect of auxin hormone on the growth of root is exactly opposite to that on a stem.  
Reason: Auxin hormone increases the rate of growth in root and decreases the rate of growth in stem.
19. Assertion: Alternating Current is used in household supply.  
Reason: AC electric power can be transmitted over long distances without much loss of energy.
20. Assertion: Hydrogen gas is not evolved when a metal reacts with nitric acid.  
Reason: Nitric acid is a strong oxidising agent.

#### SECTION- B

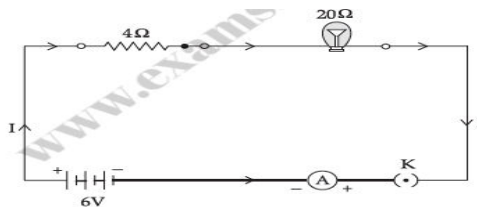
21. Priyanka arranged two magnets side by side as shown below.



- (a) Draw magnetic field line between poles P and Q.
  - (b) What does the degree of closeness of magnetic field lines near the poles signify?
22. What is a balanced chemical equation? Why should the chemical equations be balanced?
23. What is nerve impulse? state the direction followed by a nerve impulse while travelling in the body of an organism.
24. How are the alveoli designed to maximise the exchange of gases?
25. Compute the heat generated in joules while transferring 96000 coulombs of charge in one hour through a potential difference of 50 V.
26. How is tooth decay related to pH? How can it be prevented?

#### SECTION- C

27. An electric lamp whose resistance is  $20\ \Omega$  and a conductor of  $4\ \Omega$  resistances are connected to a 6 V battery as shown in the diagram below. Calculate the total resistance of the circuit, the current through the circuit and the potential difference across the electric lamp and the conductor.



28. State three ways to prevent the rusting of iron.
29. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light or electricity.
30. What are the major parts of the brain? mention the functions of different parts.

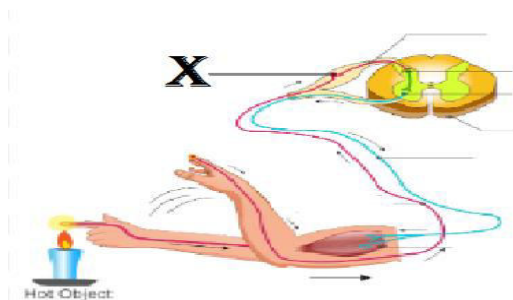
31. Several electric bulbs designed to be used on a 220 V electric supply line, are rated 10 W. How many lamps can be connected in parallel with each other across the two wires of 220 V line if the maximum allowable current is 5 A?
32. Describe the flow of blood through the heart of human beings. Why is it necessary to separate oxygenated and deoxygenated blood from mixing?
33. Give reason:
  - a) Circulation of blood in aquatic vertebrates differs from that in terrestrial vertebrates
  - b) Absorption of digested food occur mainly in the small intestine.
  - c) Veins have thin walls as compared to arteries.

#### **SECTION- D**

34. Elements can be classified as metals and non-metals based on their properties. Metals are electron donors while non-metals are electron acceptors.  
Answer the following
  - a) Platinum, gold, and silver are used to make jewellery.
  - b) Sodium, potassium, and lithium are stored under oil.
  - c) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.
  - d) Carbonate and sulphide ores are usually converted into oxides during the process of extraction.
  - e) Lemon or tamarind juice are effective in cleaning tarnished copper vessels.
35.
  - (i) Explain an activity to show that a current carrying conductor experiences a force when placed in a magnetic field.
  - (ii) When does an electric short circuit occur?
  - (iii) What is the function of an earth wire? Why is it necessary to earth metallic appliances?
36. Answer the following questions.
  - a) How is oxygen and carbon dioxide transported in human beings .
  - b) State the function of epiglottis .
  - c) Describe the process of anaerobic respiration .

#### **SECTION- E**

37. Reflex action is a rapid, automatic response to a stimulus which is not under the voluntary control of the brain. Thus, a reflex action is the one which we perform automatically. It is a comparatively simple form of behaviour in which the same stimulus produces the same response every time. If we unknowingly touch a hot plate, we immediately move our hand away from it. Moving our hand away on touching a hot plate is an example of reflex action. In a reflex action, we are unaware of what is going to happen to us and are done without thinking. How do we respond to it? We respond to it by the process of detecting the signal or the input and responding to it by an output action. Such connection is commonly called a reflex arc.
  - i. Reflex arc consists of
    - a) Motor nerve
    - b) Mixed nerve
    - c) Sensory nerve
    - d) Both motor and sensory nerve



- ii. The given figure represents the path of message from the receptor to the effector. In the given figure, identify “X” and its function.
- It is a sensory neuron that carries the message from the receptor to the CNS.
  - It is a motor neuron that carries the message from CNS to the effector.
  - It is a sensory neuron that carries the message from the CNS to the effector.
  - It is a neuron that carries the message from the receptor to the CNS.
- iii. The following stages occur in a reflex action:
- Receptor detects a stimulus
  - Sensory neuron sends impulses to relay neuron
  - Effector produces a response
  - Motor neuron sends impulses to effector
- The correct order of the stages is:
- 2,3,4,1
  - 2,1,4,3
  - 1,2,4,3
  - 3,4,1,2
- iv. Which of the given pair of activities doesn't come under reflex action?
- Salivation and blinking of eyes
  - Salivation and sweating
  - Sweating and breathing
  - Salivation and coughing
38. The current through a conductor depends upon its resistance and the potential difference across its ends. In various electrical gadgets, we often use resistors in various combinations. There are two methods of joining the resistors together. Electric circuit in which resistors are joined end to end are said to be connected in series and resistors connected between two ends are said to be in parallel combination.
- Answer the following.
- Derive an expression for the equivalent resistance of the three resistors  $R_1$ ,  $R_2$  and  $R_3$  when connected in series combination.
  - How can three resistors of resistance  $2\Omega$ ,  $3\Omega$  and  $6\Omega$  be connected to give a total resistance of
    - $4\Omega$ , and
    - $1\Omega$ .
39. Salts of a strong acid and a strong base are neutral with pH value of 7. On the other hand, salts of a strong acid and weak base are acidic with pH value less than 7 and those of a strong base and weak acid are basic in nature, with pH value more than 7.
- Answer the following
- Salt A commonly used in bakery products on heating gets converted into another salt B which itself is used for removal of hardness of water and a gas C is evolved. The gas C when passed through lime water, turns it milky. Identify A, B and C.
  - A gas X reacts with lime water and forms a compound Y which is used as a bleaching agent in chemical industry. Identify X and Y. Give the chemical equation of the reaction involved.