PRE BOARD EXAMINATION, JANUARY-2020

SCIENCE

CLASS: X **Max. Marks:80**

Date: 19/01/2020 **Time: 3 Hrs**

(i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
(ii) All questions are compulsory.
(iii) Internal choice is given in each section.
(iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
(v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
(vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
(vii) This question paper consists of a total of 30 questions

SECTION – A

1) Define catenation. (1)
2) How does the tendency of the elements to lose electrons change in the Modern Periodic Table in (i)a group (ii) a period. (1)

3) The pancreas secretes a hormone that helps to regulate blood sugar levels in the body. If the sugar level in the blood rises, it is detected by the cells of the pancreas which respond by producing more hormone. As the blood sugar level falls, the hormone secretion is reduced.
3.1.Which hormone is secreted by the pancreas? (1)
3.2 Name the disorder that results, if this hormone is not secreted? (1)
3.3 People suffering from the above condition are advised to avoid food stuffs containing
a) Proteins (b) fats (c) carbohydrates (d) fiber (1)
3.4 The hormone action is regulated by
a) feed back mechanism b) nerve impulse c) time need mechanism
d) reflex mechanism. (1)

4) Electrical resistivities of some substances, in ohm-meter, at 20^0C are given as follows;

Table A

Silver	1.60×10^{-8}
Copper	1.62×10^{-8}
Aluminium	5.2×10^{-8}
Tungsten	2.63×10^{-8}
Mercury	94×10^{-8}
Nichrome	100×10^{-6}
Hard Rubber	1×10^{15}
Paper (dry)	1×10^{12}

Table B

Applications	Student X	Student Y
Cord of electric heater	Copper	Copper
Electrical transmission lines	Copper	Aluminium
Coil of Electric toaster	Tungsten	Nichrome
Covering of connecting wires	Hard Rubber	Hard Rubber

4.1. In the table B which student write the incorrect material . (1)

4.2. Which of the following characteristic is not suitable for a fuse wire?

(a) thin and short (b) thick and short

(c)low melting point (d)higher resistance than rest of wiring (1)

4.3 Nichrome and copper wires of same length and same radius are connected in series. Current I passes through them. Which wire will get heated first? Why? (1)

4.4.Two wires are of same material and same length have radii r_1 and r_2. Compare their resistances. (1)

5. Nishi added copper turnings and granulated zinc in two separate test tubes A and B respectively. She poured copper sulphate solution in test tube (B) and ferrous sulpahte solution in test tube (A). Correct observations made by her should be:
   (a) test tube A gets black deposits and test tube B gets reddish brown deposits
   (b) test tube A gets reddish brown deposits and test tube B gets black deposits
   (c) test tube A gets black deposits, while test tube B gets green deposits.
   (d) test tube A gets no deposits, while test tube B gets reddish brown deposits. (1)

6. Two students A and B are performing glass slab experiment. Student A uses a glass slab of thickness 5 cm and student B uses a glass slab of thickness 3 cm. Both take $\angle i = 30^0$. Which of the following results is incorrect for their experiment?
   (a) Both will get same $\angle r$
   (b) Both will get emergent ray parallel to incident ray
   (c) Both will get $\angle i = \angle e$
   (d) Both will get same lateral displacement (1)

7. Metals are refined by using different methods. Which of the following metals are refined by electrolytic refining?
   (i) Au (ii) Ni (iii) Na (iv) K
   (a) (i) and (ii) (b) (i) and (iii) (c) (ii) and (iii) (d) (iii) and (iv) (1)

8. The following reaction is an example of
   $4NH_3(g) + 5O_2(g) \longrightarrow 4NO(g) + 6H_2O(I)$
   (i)Displacement reaction (ii) combination reaction
   (iii) redox reaction (iv) neutralization reaction
   (a) (i) and (iv) (b) (ii) and (iii) (c) (i) and (iii) (d) (iii) and (iv) (1)

9. Which of the following will give CO_2 on reaction with dilute acid? (1)
   (i) Marble (ii) Limestone (iii) Baking soda (iv) Lime
   (a) (i), (ii) (b) (i), (ii), (iii) (c) (ii), (iii), (iv) (d) (i), (ii), (iv)

10. The reaction in which a more reactive metal displaces a less reactive metal is called:
(a) Decomposition Reaction (b) Double Displacement
(c) Displacement Reaction (d) Redox Reaction (1)

Or

When dilute hydrochloric acid is added to iron filings?
(a) Hydrogen gas and iron chloride are produced
(b) Chlorine gas and iron hydroxide are produced
(c) No reaction takes place
(d) Iron salt and water are produced.

11. Which of the following limits the number of tropic levels in a food chain?
a) decrease in energy at higher tropic level
b) insufficient food supply
c) polluted air
d) water (1)

OR

Which one of the following is an artificial ecosystem?
(a) Pond b) lake c) forest d) crop field

12. When we destroy a forest, we destroy....
a) the tree
b) population of wild life
c) the environment
d) food and shelter of wild life (1)

For question numbers 13 and 14, two statements are given-one labeled Assertion (A) and the other labeled Reason ®. Select the correct answer to these questions from the codes (a),(b), (c) and (d) as given below.
(a) Assertion is true and reason is correct explanation of assertion.
(b) Assertion is true but reason is false.
(c) Assertion is false but reason is true.
(d) Both are true but reason is not correct explanation of assertion

13. Assertion : When the direction of velocity of moving charge is perpendicular to the magnetic field, it experience a maximum force.
Reason : Force on the moving charge does not depends on the direction magnetic field in which it moves. (1)

14. Assertion : Fluorine is more reactive than chlorine.
Reason : Fluorine and chlorine belong to group17 called Halogen. (1)

SECTION – B

15. Sample pieces of 5 metals A,B,C,D and E were added to the tabulated solutions separately. (3)

Metal	Solution $FeSO_4$	$CuSO_4$	$ZnSO_4$	$AgNO_3$	$Al_2(SO_4)_3$
A	No change	No change	No change	A coating on the metal	No change
B	A grey deposit on the metal	A brown coating on the metal	No change	A coating on the metal	No change No change
C	No change	No change	No change	No change	No change
D	No change	A brown coating	No change	A coating on metal	No change
E		Brown coating	New coating	New coating	No change

Based on the observations recorded in the table answer the following
(i)Which is the most reactive metal?
(ii)Which is the least reactive metal?
(iii)What would be observed if metal E were added to a solution of iron (II) sulphate?
(iv) Arrange the metals A,B,C,D and E in order of decreasing activity.

16. Classify the following into substances having pH values above and below7. How do these affect litmus paper?
(i)Toothpaste
(ii)Vinegar
(iii)Solution of washing soda. (3)

OR

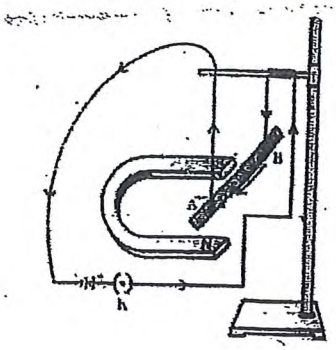
On World's Health Day, students of a school went to a hospital for free health check-up. One of the student saw that a compounder was mixing water to a substance 'A' which sets to hard mass substance 'B' which was along with surgical bandage used to set fractured bone of a patient
(i) Identify the substance A and B
(ii) Write balanced chemical reaction of formation of B from A
(iii) Mention any two other uses of A.

17. List any three parameters on the basis of which a source of energy can be categorized as a good source of energy? (3)

18. (a) State the meaning of 'frequency' of an alternating current. Mention its value in India.
(b) Compare the field of a bar magnet with that of a solenoid with the help of diagrams. (3)

OR

Shown below is the experimental set up to conduct the activity to show that a current carrying rod experiences a force when placed in a magnetic field.



(a)In the above figure discuss two methods to reverse the direction of force acting on the rod.

(b)With the help of a compass how will you identify the poles of a magnet.

19. Account for the following
    a) Colour of the clear sky is blue.
    b) The sun can be seen about two minutes before actual sun rise.
    c) We can not see an object clearly if it is placed very close to the eyes. (3)

20 .Draw a circuit diagram of an electric circuit containing a cell, a key, an ammeter ,a resistor of 4 Ω in series with a combination of two resistors (8 Ω each) in parallel and a voltmeter across parallel combination. Each of them dissipate maximum energy and can withstand a maximum power of 16 W without melting. Find the maximum current that can flow through the three resistors. (3)

21. Explain with an example, for each, how the following provides evidence in favour of evolution.
    a) Homologous organs b) analogous organs c) fossils

OR

In a cross between a plant with purple flowers and a plant with white flowers, the offspring of FI generation, all had white flowers. When the F1 generation was self crossed, it was observed in the F2 generation, that out of 100, 75 flowers were white.
Represent the cross and answer the question:
(i) What are the genotypes of the F2 progeny?
(ii) What is the ratio of white: purple flowers in the F2 generation? (3)

22. Give reason:
    i) Rate of breathing in aquatic organisms is much faster than terrestrial organisms.
    ii) Blood passes only once through the heart in fishes.
    iii) Ventricles have thicker walls than atria. (3)

23. i) What is lymph?
    ii) How is its composition different from blood?
    iii)List two functions of lymphatic system. (3)

24. Define reflex action, giving one example. Show with the help of a flow chart the path of reflex action. (3)

SECTION – C

25. (a) An alkane has a molecular mass of 72 u. Derive the molecular formula of this alkane. Write the structural formula of all possible isomers of this hydrocarbon and write their IUPAC names.
    (b)Differentiate between ethanol and ethanoic acid under the following heads in tabular form
    (i) Physical state (ii) Taste (iii) $NaHCO_3$ (5)

OR

(a)State any two differences between soaps and detergents. Why do soaps not form lather(foam) with hard water?
(b)Write the chemical equations for the following chemical reactions.
(i) Conversion of unsaturated hydrocarbon into saturated hydrocarbon
(ii)Combustion of ethanol
(iii)Ethanoic acid with a base.

26. Consider two elements 'A'(Atomic number 17) and 'B' (Atomic number 19):
(i) Write the positions of these elements in the Modern Periodic Table giving justification.
(ii) Write the formula of the compound formed when 'A' combines with 'B'
(iii)Draw the electron-dot structure of the compound and state the nature of the bond formed between the two elements. (5)

27. (a) Draw a schematic labelled diagram of a domestic wiring circuit which includes
(i) a main fuse (ii) a power meter (iii) one light point and (iv) a power plug.
(b) Compare the power used in the 2 Ω resistor in each of the following circuits:
(i) a 6V 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. (5)

OR

Obtain the expression for the heat developed in a resistor 'R' due to a current 'I' flowing for a time interval 't' having a potential difference 'V' across its ends..
200 J of heat is produced each second in a 8 Ω resistor. Find the potential difference across the resistor.

28. Study the following situation and answer the questions that follow:
A spherical mirror produces an image 48 cm in front of it, when an object is placed at a of 12 cm from its pole. Calculate the focal length of the mirror and answer the following:
(a) Identify the nature of mirror
(b) Will the image be magnified or diminished?
(c) State whether the image formed is real or virtual.
(d) Will the image formed be erect or inverted.
(e) Draw ray diagram, showing the formation of image un the above case.(not to scale) (5)

29. i) Mention any three methods of contraception. State the basic principle involved in each.
ii) Write the function of a) ovary b) oviduct (5)

30. i) What is meant by sustainable development? Why is it necessary?
ii) What is water harvesting? List its four benefits. (5)

OR

i) In the context of conservation of resources, explain the terms:
Reduce, recycle, reuse.
ii) State two benefits and two problems caused by constructing a dam.