PRE-BOARD EXAMINATION – 2020-21
SUBJECT – SCIENCE - STANDARD

Class: X (CBSE) **Total Marks: 80**
Date: …… **Time: 3 hours**

General Instructions:

- All Questions are compulsory.
- Marks are indicated against each question.
- Please check this question paper contains 13 printed pages only.

SECTION A

1. Balance the following chemical reaction:
   $MnO_2 + HCl \text{ --------} \rightarrow MnCl_2 + Cl_2 + H_2O$

   OR

   What is observed when a solution of potassium iodide is added to a solution of lead nitrate taken in a test tube? 1

2. Write the chemical equation for the reaction involved when sodium hydrogen carbonate is heated. 1

3. The solution of one of the following compounds will not conduct electricity. This compound is: 1
   a)NaCl b) CCl_4 c) $MgCl_2$ d) $CaCl_2$

4. What is the nature of image formed by a concave mirror if the magnification produced by the mirror is +3? 1

5. Why does sky look blue on a clear day? 1

6. When is the force experienced by a current carrying conductor placed in a magnetic field is the largest? 1

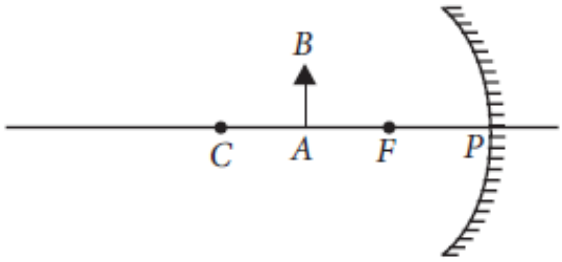
7. State the rule which gives direction of magnetic field associated with a current carrying conductor. 1

8. Two unequal resistances are connected in parallel. If you are not provided with any other parameters (eg: numerical values of I and R), what can be said about the voltage drop across the two resistors? 1

   OR

Some work is done to move a charge Q from infinity to point A in space. The potential at point A is given as V. What is the work done to move this charge from infinity in terms of Q and V.?

9. Draw the following diagram in your answer book and show the formation of image of the object AB with the help of suitable rays. 1



10. State the location and the function of gastric glands? 1

11. Mention the respiratory unit of lungs and excretory unit of kidneys. 1

OR

Name the tissues which:

a) Transport soluble products of photosynthesis in plants
b) Transport water and minerals in a plant.

12. Give the example of a natural and man-made ecosystem. 1

OR

Why is improper disposal of waste a curse to environment?

13. Mention the mode of reproduction used by: 1

a) Amoeba
b) Planaria

For question numbers **14, 15** and **16**, 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 correct explanation of the assertion.

b) Both A and R are true, but R is not the correct explanation of the assertion.

c) A is true, but R is false.

d) A is false, but R is true.

14. **Assertion**: After white washing the walls, a shiny white finish on walls is obtained after two to three days. 1

Reason: Calcium Oxide reacts with Carbon dioxide to form Calcium Hydrogen Carbonate which gives shiny white finish.

15. **Assertion:** Food chain is responsible for the entry of harmful chemicals in our bodies.
Reason: The length and complexity of food chains vary greatly. 1

OR

Assertion: Greater number of individuals are present in lower trophic levels.
Reason: The flow of energy is unidirectional.

16. **Assertion:** A geneticist crossed a pea plant having violet flowers with a pea plant with white flowers, he got all violet flowers in first generation. 1
Reason: White colour gene is not passed on to next generation.

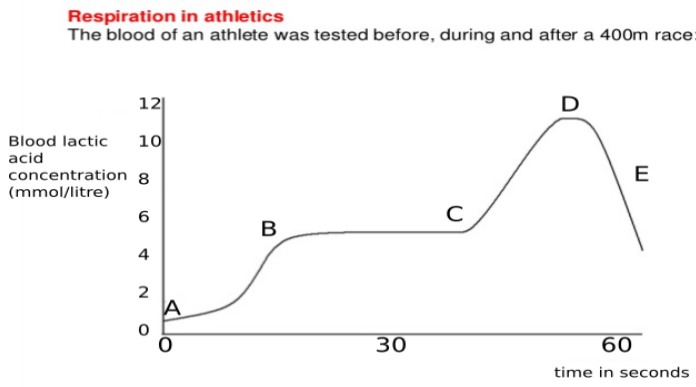
Answer Q. No 17 - 20 contain five sub-parts each. You are expected to answer <u>any four</u> sub- parts in these questions.

17. <u>Read the following and answer any **four** questions from 17 (i) to 17 (v)</u> (1x4)

All living cells require energy for various activities. This energy is available by the breakdown of simple carbohydrates either using oxygen or without using oxygen.

(i) Energy in the case of higher plants and animals is obtained by
a) Breathing
b) Tissue respiration
c) Organ respiration

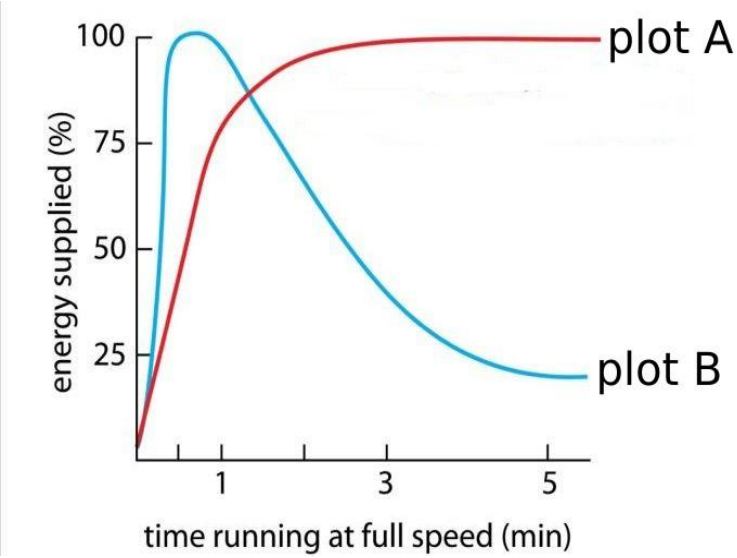
(ii) The graph below represents the blood lactic acid concentration of an athlete during a race of 400 m and shows a peak at point D.



Lactic acid production has occurred in the athlete while running in the 400 m race. Which of the following processes explains this event?
a) Aerobic respiration
b) Anaerobic respiration
c) Fermentation

d) Breathing

(iii) Study the graph below that represents the amount of energy supplied with respect to the time while an athlete is running at full speed.



Choose the correct combination of plots and justification provided in the following table.

	Plot A	Plot B	Justification
a)	Aerobic	Anaerobic	Amount of energy is low and inconsistent in aerobic and high in anaerobic
b)	Aerobic	Anaerobic	Amount of energy is high and consistent in aerobic and low in anaerobic
c)	Anaerobic	Aerobic	Amount of energy is high and consistent in aerobic and low in anaerobic
d)	Anaerobic	Aerobic	Amount of energy is high and inconsistent in anaerobic and low in aerobic

(iv) The characteristic processes observed in anaerobic respiration are

i) presence of oxygen
ii) release of carbon dioxide
iii) release of energy
iv) release of lactic acid

a) i) ,ii) only
b) i), ii), iii) only
c) ii), iii), iv) only
d) iv) only

(v) Study the table below and select the row that has the incorrect information.

		Aerobic	**Anaerobic**
a)	**Location**	Cytoplasm	Mitochondria
b)	**End Product**	CO_2 and H_20	Ethanol and CO_2
c)	**Amount of ATP**	High	Low
d)	**Oxygen**	Needed	Not needed

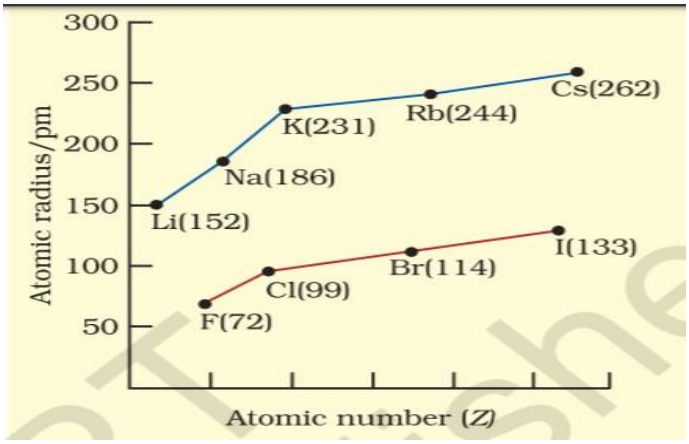
18. Read the following and answer any **four** questions from 18 (i) to 18 (v). (1x4)

Metallic Character

The ability of an atom to donate electrons and form positive ion (cation) is known as electropositivity or metallic character. Down the group, metallic character increases due to increase in atomic size and across the period, from left to right electropositivity decreases due to decrease in atomic size.

Non-Metallic Character

The ability of an atom to accept electrons to form a negative ion (anion) is called non-metallic character or electronegativity. The elements having high electro-negativity have a higher tendency to gain electrons and form anion. Down the group, electronegativity decreases due to increase in atomic size and across the period, from left to right electronegativity increases due to decrease in atomic size



(i) Which of the following correctly represents the decreasing order of metallic character of Alkali metals plotted in the graph?

a) Cs>Rb>Li>Na>K
b) K>Rb>Li>Na>Cs
c) Cs>Rb>K>Na>Li
d) Cs>K>Rb>Na>Li

(ii) Hydrogen is placed along with Alkali metals in the modern periodic table though it shows non-metallic character

a) as Hydrogen has one electron & readily loses electron to form negative ion
b) as Hydrogen can easily lose one electron like alkali metals to form positive ion
c) as Hydrogen can gain one electron easily like Halogens to form negative ion
d) as Hydrogen shows the properties of non-metals

(iii) Which of the following has highest electronegativity?

a) F
b) Cl
c) Br
d) I

(iv) Identify the reason for the gradual change in electronegativity in halogens down the group.

a) Electronegativity increases down the group due to decrease in atomic size
b) Electronegativity decreases down the group due to decrease in tendency to lose electrons
c) Electronegativity decreases down the group due to increase in atomic radius/ tendency to gain electron decreases
d) Electronegativity increases down the group due to increase in forces of attractions between nucleus & valence electrons

(v) Which of the following reason correctly justifies that “Fluorine (72pm) has smaller

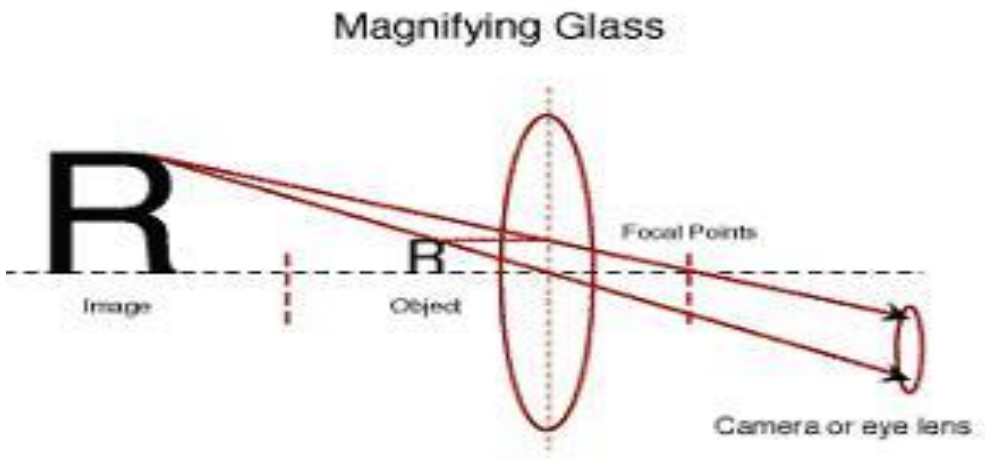
atomic radius than Lithium (152pm)"?

a) F and Li are in the same group. Atomic size increases down the group
b) F and Li are in the same period. Atomic size increases across the period due to increase in number of shells
c) F and Li are in the same group. Atomic size decreases down the group
d) F and Li are in the same period and across the period atomic size/radius decreases from left to right.

19. Read the following and answer any four questions from 19 (i) to 19 (v) (1x4)

A magnifying glass (also called hand lens) is actually the simplest form of a basic microscope. It consists of a single lens that magnifies an object when the glass is held up to it. Historians believe a scientist named Alhazen created first magnifying glass in 1021. Since Alhazen's time, the principles of optical physics that make magnifying glasses work so well have been the foundation of great advancements in science, particularly biology and astronomy. Today, magnifying glasses can be used for simple tasks, such as making small magazine text easier to read.

Following ray diagram shows working of a magnifying glass:



(i) Based on the diagram shown, what type of lens is used to make magnifying glass

a) Concave lens b) Convex lens

c) Flat lens d) Bifocal lens

(ii) When this magnifying glass is held directly in front of sunlight and above a paper. A bright and dark spot of light is formed on the paper and exactly at that point paper started burning, because

a) The image of the sun was formed at 2F

b) The image of the sun was formed at F

c) The image of the sun was formed between F and 2F

d) The image of the sun was formed beyond 2F

(iii) What is the formula for magnification obtained with a lens?

a) Ratio of height of image to height of object

b) Double the focal length.

c) Inverse of the radius of curvature.

d) Inverse of the object distance.

(vi) Focal length of the lens used in magnifying glass is

a) Negative b) Positive

c) Depends on the position of object d) Depends on the position of image

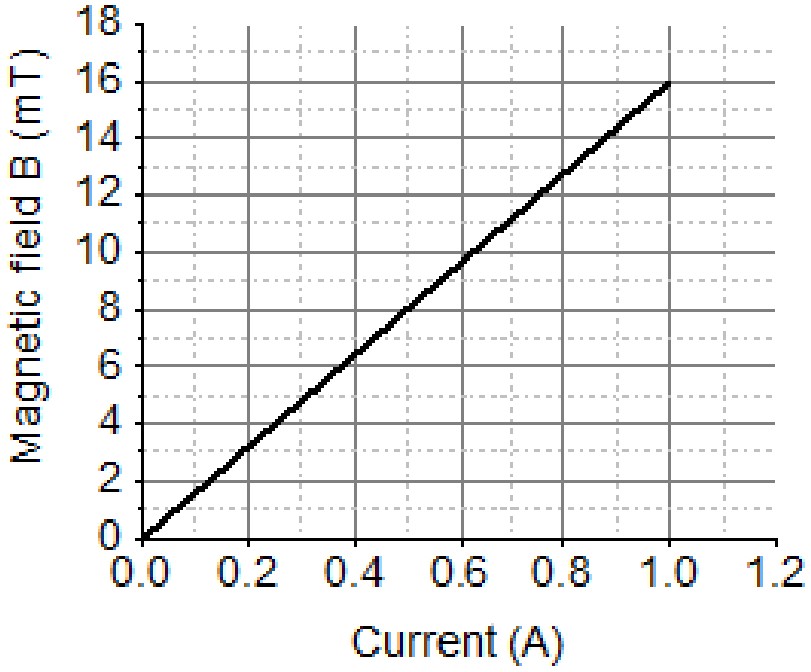
(v) A magnifying lens of focal length of 20 cm is held 10 cm away from the object which is 0.25 cm long. The position of the image formed by lens will be

a) 10 cm away from lens b) 30 cm away from lens

c) 20 cm away from lens d) 25 cm away from lens

20. Read the following and answer any 4 questions from 20 (i) to 20 (v). (1x4)

A solenoid is a long helical coil of wire through which a current is run in order to create a magnetic field. The magnetic field of the solenoid is the superposition of the fields due to the current through each coil. It is nearly uniform inside the solenoid and close to zero outside and is similar to the field of a bar magnet having a north pole at one end and a south pole at the other depending upon the direction of current flow. The magnetic field produced in the solenoid is dependent on a few factors such as, the current in the coil, number of turns per unit length etc. The following graph is obtained by a researcher while doing an experiment to see the variation of the magnetic field with respect to the current in the solenoid. The unit of magnetic field as given in the graph attached is in milli-Tesla (mT) and the current is given in Ampere.



(i) What type of energy conversion is observed in a linear solenoid?

a) Mechanical to Magnetic
b) Electrical to Magnetic
c) Electrical to Mechanical
d) Magnetic to Mechanical

(ii) What will happen if a soft iron bar is placed inside the solenoid?

a) The bar will be electrocuted resulting in short-circuit.
b) The bar will be magnetised as long as there is current in the circuit.
c) The bar will be magnetised permanently.
d) The bar will not be affected by any means.

(iii) The magnetic field lines produced inside the solenoid are similar to that of …

a) A bar magnet
b) A straight current carrying conductor
c) A circular current carrying loop
d) Electromagnet of any shape

(iv) After analysing the graph a student writes the following statements.

I. The magnetic field produced by the solenoid is inversely proportional to the current.
II. The magnetic field produced by the solenoid is directly proportional to the current.
III. The magnetic field produced by the solenoid is directly proportional to square of the current.
IV. The magnetic field produced by the solenoid is independent of the current.

Choose from the following which of the following would be the correct statement(s).

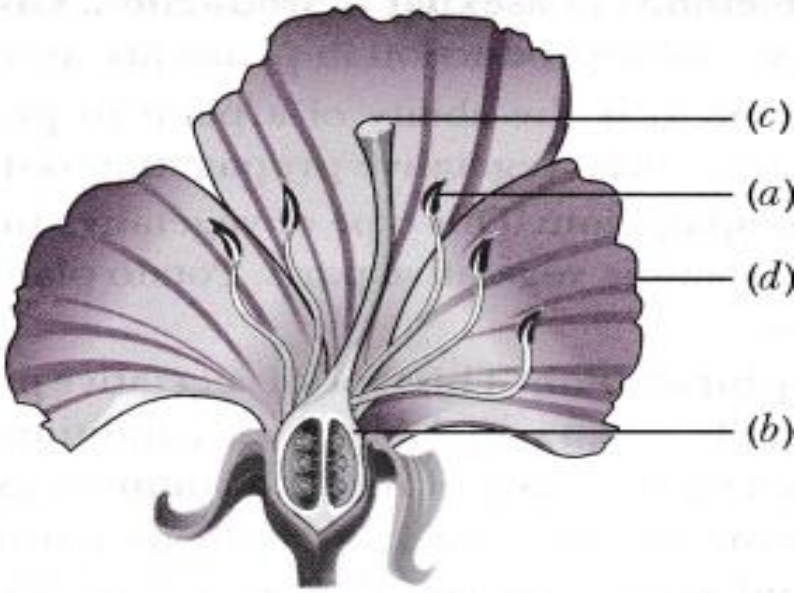
a) Only IV
b) I and III and IV

c) I and II d) Only II

(v) From the graph deduce which of the following statements is correct.
a) For a current of 0.8A the magnetic field is 13 mT
b) For larger currents, the magnetic field increases non-linearly.
c) For a current of 0.8A the magnetic field is 1.3 mT
d) There is not enough information to find the magnetic field corresponding to 0.8A current

SECTION B

21. Name the parts labelled a, b, c, d in the diagram given below. 2



22. Why are some substances biodegradable and some non-biodegradable? 2

OR

What is meant by biological magnification?

23. Name two metals which react violently with cold water. What do you observe when such a metal is dropped into water 2

24. Write the functional group present in (i) ethanol and (ii) ethanoic acid and also draw their structures. 2

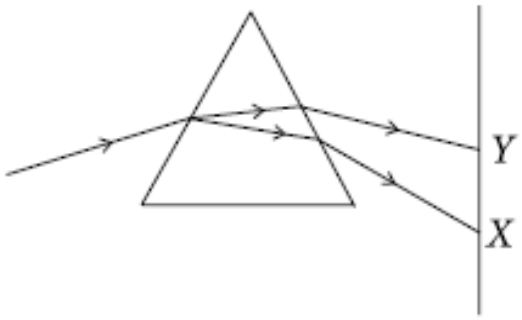
OR

Write the name and structure of an aldehyde with three carbon atoms in its molecule and a ketone with four carbon atoms in its molecule.

25. In the figure given below a narrow beam of white light is shown to pass through a triangular glass prism. After passing through prism, it produces a spectrum XY on the screen

(a) State the colour seen at X and Y

(b) Why do different colours of white light bend through different angles with respect to the incident beam of light? 2



26. Two resistors with resistance 5 ohm and 10 ohm respectively are to be connected to a battery of 6V so as to obtain:

(a) Minimum current flowing

(b) Maximum current flowing

How will you connect the resistors in each case and Calculate total resistance in each case? 2

SECTION C

27. Once, in a college a blood donation camp was organized. Some of the students donated blood in the blood donation camp.
    a) What are the different components of blood? Give function of each of them.
    b) What values did students show by donating the blood? 3

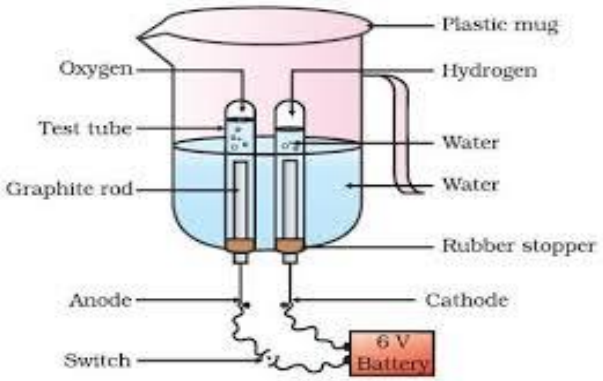
28. List any three methods of contraception used by humans. How does their use have a direct effect on the health prosperity of a family?

OR

What is asexual reproduction? Write the process of budding in Hydra. 3

29. How is the sex of the child determined in human beings? 3

30. Study the figure given below and answer the following questions:



a) Name the process depicted in the diagram.
b) Write the composition of the anode and cathode.
c) Write the balanced chemical equation of the reaction taking place in this case.
d) The reaction doesn't take place if a few drops of dilute sulphuric acid are not added to the water. Why? 3

31. The following table shows the position of five elements A, B, C, D, E, F and G in the modern periodic table.

Group→ Period ↓	1	2	3 to 12	13	14	15	16	17	18
2	A			B		C			D
3	E				F				G

Answer the following giving reasons:
a) Name the element which forms only covalent compounds and why?
b) Out of A and C whose atomic radius is bigger and why?
c) Name the element which is a non-metal with valency three. 3

32. a) Explain the formation of ionic compound, Al_2O_3 with electron-dot structure:
(Given: Atomic no. of Al and O are 13 and 8 respectively)
b) Solid ionic compounds do not conduct electricity. Give reason. 3

33. a) Draw a diagram to show the refraction of light through a glass slab and mark angle of refraction and the lateral shift suffered by a ray of light while passing through the slab.
b) If the refractive index of glass for light going from air to glass is 3/2, find the refractive index of air for light going from glass to air. 3

SECTION D

34. How do Mendel's experiments show that traits may be dominant or recessive? 5

OR

How do Mendel's experiments show that traits are inherited independently?

35. a) Five solutions A, B, C, D and E when tested with universal indicator showed pH as 4, 1, 11, 7 and 9 respectively. Which solution is:

(i) Neutral (ii) Strongly alkaline

(iii) Strongly acidic (iv) Weakly acidic (v) Weakly alkaline

Arrange the pH in increasing order of hydrogen ion concentration.

b) What is an olfactory indicator? Name two olfactory indicators. 5

OR

a) For word equations and then balanced equations for the reactions taking place when:

(i) Dilute sulphuric acid reacts with zinc granules.
(ii) Dilute hydrochloric acid reacts with magnesium ribbon.
(iii) Dilute sulphuric acid reacts with aluminium powder.
(iv) Dilute hydrochloric acid reacts with iron fillings.
(v) Sodium hydroxide reacts with hydrochloric acid.

36. a) Two lamps rated 100 W, 220 V and 10 W, 220 V are connected in parallel to 220 V supply. Calculate total current through the circuit.

b) Two resistors X and Y of resistances 2 Ω and 3 Ω respectively are first joined in parallel and then is series. In each case the voltage supplied in 5 V.

(i) Draw circuit diagrams to show the combination of resistors in each case.
(ii) Calculate the voltage across the 3 Ω resistor in the series combination of resistors.

OR

a) Name and state the rule to determine the direction of force experienced by a current carrying straight conductor placed in a uniform magnetic field, which is perpendicular to it.

b) Draw a labelled diagram of an electric motor. 5