COMMON PRE-BOARD EXAMINATION 2022-23

Subject: SCIENCE (086)

Class X

Max. Marks: 80 **Time Allowed: 3 hours**

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 in the range of 50 to 80 words

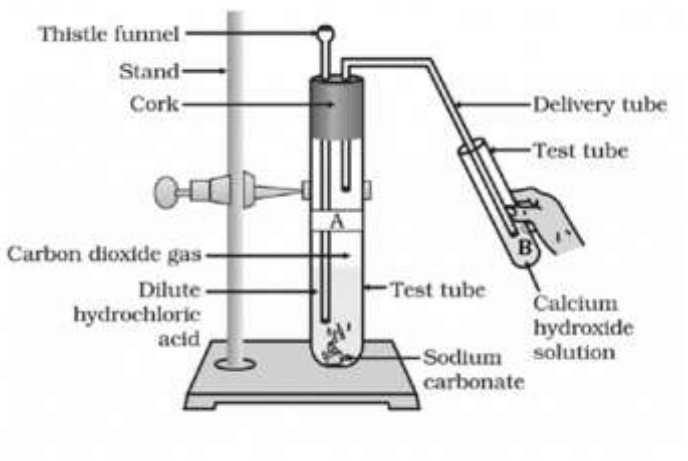
vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.

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

SECTION - A

Select and write one most appropriate option out of the four options given for each of the questions 1 – 20

1. **1**



Identify the solid chemical substance produced in test tube B in the above set up:

(a) Calcium oxide

(b) Calcium carbonate

(c) Calcium hydrogen carbonate

(d) Sodium hydrogen carbonate

2. Which of the statements about the reaction below is correct? **1**

$$2PbO(s) + C(s) \rightarrow 2Pb(s) + CO_2(g)$$

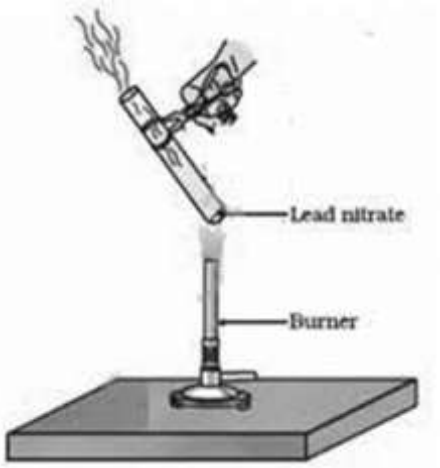
(a) Lead is getting oxidized.

(b) Carbon dioxide is getting oxidized.

(c) Carbon is getting oxidized.

(d) Carbon getting reduced.

3. **1**



Which of the following is the correct observation for the thermal decomposition reaction of lead nitrate as shown in the above set up?

(a) Brown powder is formed.

(b) Colourless gas which turns lime water milky is evolved.

(c) A white precipitate is formed.

(d) Brown fumes of nitrogen dioxide is evolved.

4. With the reference to four chemical compounds, $NaHCO_3$, $Na_2CO_3.10H_2O$, $CaOCl_2$ and $CaSO_4.\ ½\ H_2O$, which one of the options in the table is correct? **1**

Option	Used as an antacid	Used to remove permanent hardness of water	Disinfect drinking water	Used to support fractured bone
(a)	$NaHCO_3$	$Na_2CO_3.10H_2O$	$CaOCl_2$	$CaSO4.\ ½H_2O$
(b)	$Na_2CO_3.10H_2O$	$CaOCl_2$	$CaSO4.\ ½\ H_2O$	$NaHCO_3$
(c)	$CaOCl_2$	$CaSO4.\ ½H_2O$	$NaHCO_3$	$Na_2CO_3.10H_2O$
(d)	$CaSO4.\ ½\ H_2O$	$NaHCO_3$	$Na_2CO_3.10H_2O$	$CaOCl_2$

5. On adding zinc pellets to a solution of copper sulphate, which among the following is observed? **1**

(a) Copper gets deposited as a grey mass on zinc and the colour of the solution changes into blue to green.

(b) No change, zinc pellets remain the same in the blue coloured copper sulphate.

(c) Copper gets deposited on zinc as a reddish- brown mass and the colour of the solution changes from blue to colourless.

(d) Copper gets deposited as a reddish-brown mass on zinc and the colour of the solution remains blue.

6. Rekha was checking the pH of different solutions using a universal indicator. One of her conclusions was wrong. **1**

Which one of her conclusion went incorrect?

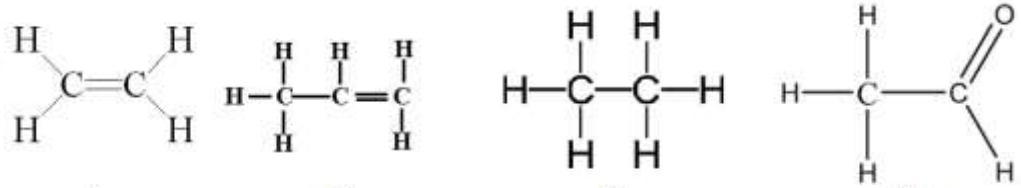
(a) pH of lemon juice is 2.2, so it is acidic in nature.

(b) pH of pure water is 7, so it is basic in nature.

(c) pH of milk of magnesia is 10, so it is basic in nature.

(d) pH of sodium hydroxide solution is 14, so it is basic in nature.

7. Which among the following undergoes addition reaction in the presence of Nickel or Palladium catalyst? **1**



A **B** **C** **D**

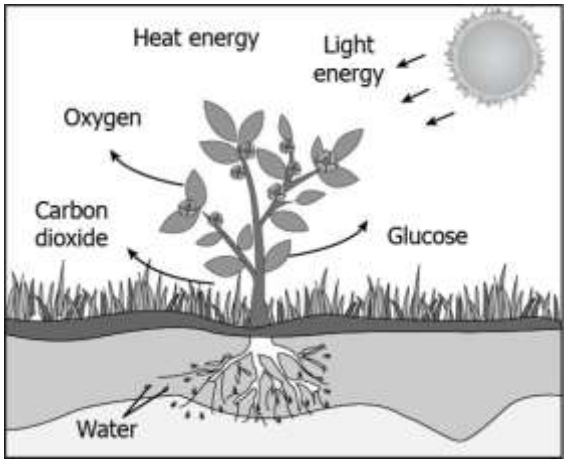
(a) Only A

(b) Both A and B

(c) Both C and D

(d) A, B and D

8. The image shows the process of making food by a plant. **1**



Which statement can be concluded from the image?

(a) Plants absorb CO_2 from air and H_2O from the soil as raw materials and convert them into glucose.

(b) Plants absorb CO_2 from the soil and H_2O from air as raw materials and convert them into glucose.

(c) Plants absorb O_2 from air and glucose from the soil as raw materials and convert them into light energy

(d) Plants absorb O_2 from air and minerals from the soil as raw materials and convert them into heat energy

9. Which is the correct sequence of air passage during inhalation? **1**

(a) Nostrils → larynx → pharynx → trachea → lungs

(b) Nasal passage → trachea → pharynx → larynx → alveoli

(c) Larynx → nostrils → pharynx → lungs

(d) Nostrils → pharynx → larynx → trachea → alveoli

10. A zygote which has an X-chromosome inherited from the father will develop into **1**

(a) Boy

(b) X-chromosome does not determine the sex of a child.

(c) Girl

(d) either boy or girl

11. Select the incorrect statement about insulin. **1**

(a) It is produced from pancreas

(b) It regulates growth and development of the body

(c) It regulates blood sugar level

(d) Insufficient secretion of insulin will cause diabetes.

12. During reproduction in Plasmodium, the ability of a cell to divide into several cells is called **1**

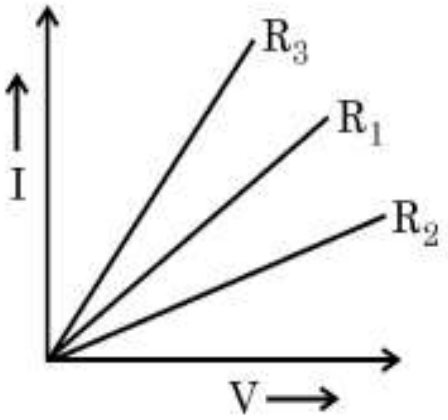
(a) Budding

(b) Regeneration

(c) Binary fission

(d) Multiple fission

13. A student plots V-I graphs for three samples of nichrome wire with resistances R_1, R_2 and R_3. Choose from the following statement that holds true for this graph. **1**



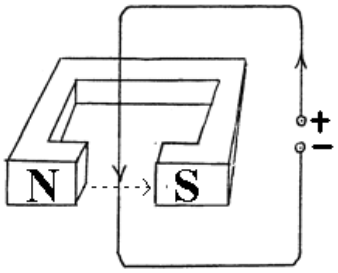
(a) $R_1 = R_2 = R_3$

(b) $R_1 > R_2 > R_3$

(c) $R_3 > R_2 > R_1$

(d) $R_2 > R_1 > R_3$

14. In the following diagram the current loop is in the plane of the paper and the magnet is perpendicular to the plane of the paper. The direction of force acting on the segment of the wire in between the poles of the magnet is **1**



(a) normally into the plane of the paper

(b) normally out of the plane of the paper

(c) towards north pole of the magnet

(d) towards south pole of the magnet

15. A cylindrical conductor of length 'l' and uniform area of cross-section 'A' has resistance 'R'. Another conductor of length 2·5*l* and resistance 0·5 R of the same material has area of cross-section **1**

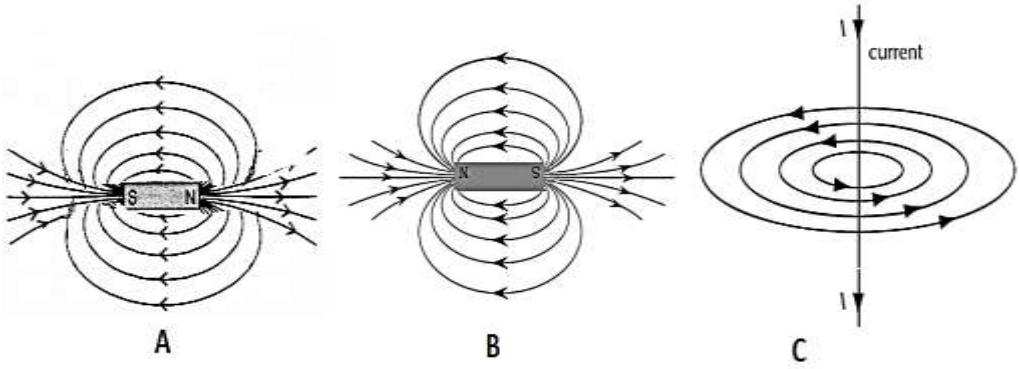
(a) 5 A

(b) 2·5 A

(c) 0·5 A

(d) 1/5 A

16. **1**



The correct diagram of magnetic field lines

(a) A

(b) B

(c) C

(d) None of these

Q. no 17 to 20 are Assertion - Reasoning based questions.

These 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 (A):** In a balanced chemical equation, total mass of the reactants is equal to the total mass of the products. **1**

Reason (R): Mass can neither be created nor destroyed during a chemical change.

18. **Assertion (A):** Ureters are the tubes which carry urine from kidneys to the bladder. **1**

Reason (R): Urine is stored in the urethra.

19. **Assertion (A):** To control the birth rate and prevent the increase in population contraceptive methods are used. **1**

Reason (R): Copper-T placed in the uterus to prevent pregnancy can cause side effects due to irritation of the Uterus

20. **Assertion (A):** A fuse wire is always connected in parallel with the mainline. **1**

Reason (R): If a current larger than the specified value flows through the circuit, fuse wire melts.

SECTION – B

Q. no. 21 to 26 are very short answer questions

21. A solution of sodium sulphate is mixed with barium chloride. Identify the type of chemical reaction and write the balanced chemical equation representing the chemical reaction. **2**

OR

Raju added water to different metals and recorded his observations as shown in the table below.

Option	Metal	Reacts with	Gas evolved
(a)	Sodium	Normal water	Yes
(b)	Magnesium	Hot water	No
(c)	Copper	Steam	Yes
(d)	Calcium	Normal water	Yes

Select the correct observation(s) and give the chemical equation(s) of the reaction involved.

22. Write one example each of the following tropic movements: **2**

(a) Chemotropism

(b) Geotropism

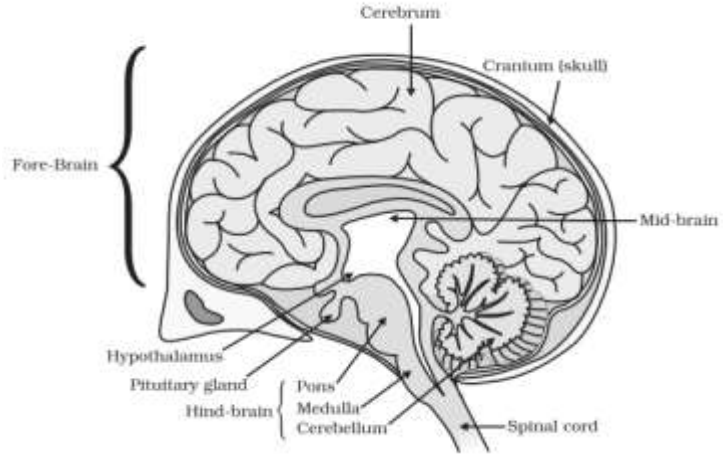
23. Consider the following food chains **2**

A. Plants → Mice →Snakes →Hawks

B. Plants → Mice → Hawks.

If energy available at the producer level in both the food chains is 100 J, in which case will Hawks get more energy as food and by how much? Justify your answer.

24. Using the given diagram, answer the following questions: **2**



(a) Which part of the human brain is the main thinking region?

(b) Mention the function of cranium.

(c) Which part of the hindbrain regulates blood pressure?

(d) Name the part of the brain that maintains the posture and balance of the body.

25. (a) With the help of a labelled ray diagram show the path followed by a narrow beam of monochromatic light (light of single wavelength/colour) when it passes through a glass prism. **2**

(b) What would happen if this beam was replaced by a narrow beam of white light?

OR

(a) State the relation between colour of scattered light and size of the scattering particle.

(b) The apparent position of an object, when seen through the hot air, fluctuates or wavers. State the basic cause of this observation.

26. Raj performed an experiment to study the inheritance pattern of genes. He crossed tall pea plants (TT) with short pea plants (tt) and obtained all tall plants in F1 generation. **2**

(a) What will be the set of genes present in the F1 generation?

(b) Give reason why only tall plants are observed in F1 progeny?

SECTION - C

Q.no. 27 to 33 are short answer questions.

27. (a) Show the formation of magnesium chloride using electron- dot structure. **3**

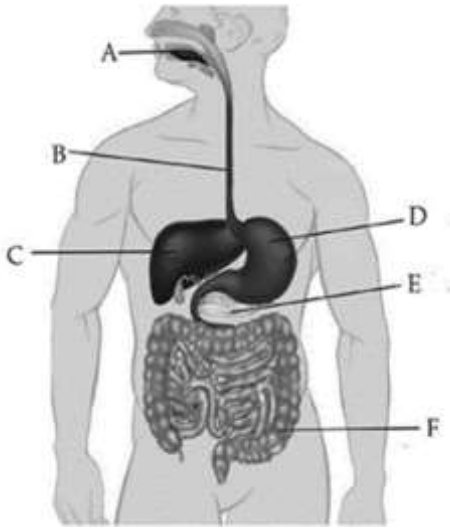
(b) Write the balanced chemical equation representing thermite reaction.

28. (a) Explain chlor-alkali process with a balanced chemical equation. **3**

(b) What are the products obtained at anode and cathode?

(c) What do you mean by water of crystallization?

29. Label the parts shown in the below diagram: **3**



OR

Give reasons for the following:

(a) During the daytime, water and minerals travel faster through xylem as compared to the night.

(b) Small intestine in herbivore is longer than in carnivore.

(c) The rate of breathing in aquatic organisms much faster than in terrestrial organisms.

30. A concave mirror is used for image formation for different positions of an object. What inferences (with necessary calculations) can be drawn about the following when an object is placed at a distance of 10 cm from the pole of a concave mirror of focal length 15 cm? **3**

(a) Position of the image

(b) Size of the image

(c) Nature of the image

Draw a labelled ray diagram to justify your inferences.

31. (a) A person is suffering from both myopia and hypermetropia. **3**

(i) What kind of lenses can correct this defect?

(ii) How are these lenses prepared to correct both the defects?

(b) A person needs a lens of power + 3D for correcting his near vision and –3D for correcting his distant vision. Calculate the focal lengths of the lenses required to correct these defects.

32. (a) State any two points to distinguish between AC and DC. **3**

(b) List three characteristic features (direction, frequency and voltage) of the electric current used in our homes.

(c) Why is it necessary to earth metallic electric appliances?

OR

(a) What is an electromagnet? Write any one use of electromagnet.

(b) Draw a labelled diagram to show how an electromagnet is made.

(c) List two ways of increasing the strength of an electromagnet if the core material of the electromagnet is fixed**.**

33. (a) Write the essential functions performed by ozone at higher levels of earth's atmosphere. **3**

(b) How is it produced?

(c) Name the synthetic chemicals mainly responsible for the drop of amount of ozone in the atmosphere

SECTION - D

Q.no. 34 to 36 are Long answer questions.

34. A carbon compound 'X' turns blue litmus red and has molecular formula $C_2H_4O_2$. When compound 'X' is reacted with sodium carbonate, carbon dioxide gas is released. **5**

(a) Identify 'X' and draw structure.

(b) Write the chemical equation when 'X' reacts with ethanol in presence of con.H_2SO_4 and name the product formed.

(c) What do you mean by saponification? Write the chemical equation.

OR

(a)Write the structural formula of ethanol and list its two physical properties.

(b)What happens when ethanol is treated with excess of con.H_2SO_4? Write the chemical equation representing the reaction.

(c)What is the role of conc.H_2SO_4 in the above reaction?

35. (a) Draw a neat diagram showing L.S. of Flower and label the male parts in it. **5**

(b) Give any two points of differences between pollination and fertlisation.

(c) Name the parts of the seed which

i) Contains stored food ii) Grows in to shoot

OR

(a) Where does fertlisation take place in human females?

(b) What is placenta? Mention its role during pregnancy.

(c) Give two examples for sexually transmitted diseases.

(d) Prenatal sex determination has been prohibited by law. Why?

36. Draw a schematic diagram of a circuit consisting of a battery of 3 cells of 2 V each, a combination of three resistors of 10 Ω, 20 Ω and 30 Ω connected in parallel, a plug key and an ammeter, all connected in series. Use this circuit to find the value of the following: **5**

(a) Current through each resistor

(b) Total current in the circuit

(c) Total effective resistance of the circuit.

SECTION - E

Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.

37. Metallurgy is the process of extracting metals. Ores are those minerals which contain metals. Metals in the top of the reactivity level i.e. metals like sodium, magnesium, calcium, etc. are extracted by electrolytic reduction. **4**

Metals in the middle of the reactivity series i.e., metals like lead, zinc, copper, etc. are moderately reactive and are generally present as carbonates or sulphides. Carbonate ores are calcinated and sulphide ores are roasted to convert into metal oxides. Then they are reduced using carbon to get the metal.

Low reactive metals can be reduced to metals by heating alone. For example, Mercury is procured from its ore, cinnabar (HgS), by the process of heating. Copper can also be obtained from its sulphide ore (Cu_2S) by heating.

(a) Normally oxides of metals are converted into metal by reduction using carbon. Suggest any other method for converting a metal oxide to metal.

(b) In electrolytic refining of copper, name the electrodes used as anode and cathode.

(c) Write the chemical reactions representing extraction of mercury from its ore.

OR

(c) What is the difference between calcination and roasting?

38. Pooja has brown eyes while her husband Ravi has blue eyes. If **E** is the gene for the brown eye colour and **e** is the gene for blue eye colour. **4**

(a) Mention the recessive gene and dominant gene.

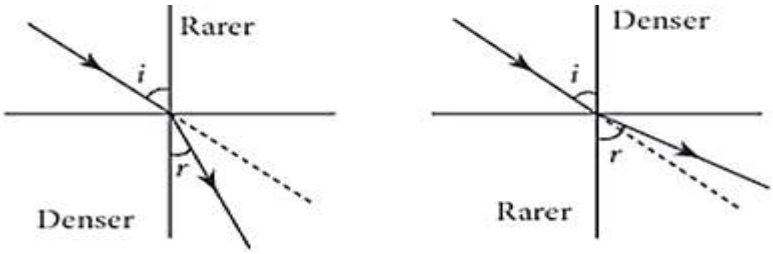
(b) If Both father and mother have genes **Ee** in their cells, then What colour are their eyes?

(c)Which combination of genes in the zygote will produce children with blue eyes?

OR

(c) 50% of the offspring of Pooja and Ravi are blue eyed. With help of cross show how this is possible?

39. When rays of light travel from one transparent medium to another, the path of the light is deviated. This phenomenon is called refraction of light. The bending of light depends on the optical density of the medium. **4**



The speed of light varies from medium to medium. A medium in which the speed of light is more is optically rarer whereas in which the speed of light is less is optically denser medium. Whenever light goes from one medium to another, the frequency of light does not change; however, speed and wavelength change. It is concluded that the change in speed of light is the basic cause of refraction.

(a) What happens to the speed of light when it travels from glass (refractive index = 3/2) to water (refractive index = 4/3)?

(b) A ray of light starting from air of refractive index 1, passes through medium A of refractive index 1.50, enters medium B of refractive index 1.33 and finally enters medium C of refractive index 2.42. If this ray emerges out in air from C, identify the pair of media, at which interface the bending of light is least in its path?

(c) The refractive index of medium A is 1.5 and that of medium B is 1.33. If the speed of light in air is 3×10^8 m/s, what is the speed of light in medium A and B respectively?

OR

(d) In the given diagram, n_1, n_2 and n_3 are the absolute refractive indices of the respective media and v_1, v_2 and v_3 are the velocities of light respectively. Arrange the refractive indices in the order of decreasing optical density and velocities in their decreasing magnitude. What is the magnitude of the product of refractive index and velocity in each medium?