HANSRAJ PUBLIC SCHOOL, PANCHKULA

Class: X Subject: SCIENCE

Half Yearly Examination (Session 2025-26)

Date: 15.09.2025 **Roll No: _____**

Time : 3 hrs **Max Marks: 80**

General Instructions:

(i) This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.

(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) Draw labelled diagrams wherever necessary.

(iv) Marks for each question are indicated against it.

Section A – Biology

Q.1. Select the group in which all organisms have the same mode of nutrition:

A. Cuscuta, ticks, lice, leeches, tapeworm

B. Cow, grass, deer, tiger, snake

C. Yeast, mushroom, bread mould, rhizopus, cuscuta

D. Amoeba, paramecium, hydra, earthworm, frog (1)

Q.2. Which of the following options shows the correct sequence of events in human digestion?

A. Ingestion → Absorption → Digestion → Assimilation → Egestion

B. Ingestion → Digestion → Absorption → Assimilation → Egestion

C. Digestion → Ingestion → Assimilation → Absorption → Egestion

D. Ingestion → Digestion → Assimilation → Absorption → Egestion (1)

Q.3. Which of the following is a correct combination of function and part of the human brain?

A. Posture and balance – Cerebellum B. Salivation – Pons

C. Hunger – Medulla D. Vision – Cerebellum (1)

Q.4. In humans, the hormone that controls the amount of sugar in the blood is secreted by:

A. Pituitary gland B. Adrenal gland C. Pancreas D. Thyroid gland (1)

Q.5. Sexual reproduction results in

A. Variation B. Evolution

C. Mutation D. All of the above (1)

Q.6. Which of the following reproductive processes results in offspring that are genetically identical to the parent?

A. Binary fission in Amoeba B. Sexual reproduction in plants

C. Cross-pollination in maize D. Fertilisation in humans (1)

Q7. During HIV/AIDS, a) _____ are damaged formed by b) _____ gland which release c) _____hormone.

A.	a) Goblet cells	b) Pituitary gland	c) Insulin
B.	a) T-lymphocyte	b) Thymus	c) Thymosin
C.	a) B-lymphocyte	b) Thymus	c) Thymosin
D.	a) mucus	b) Pancreas	c) Glucogen

(1)

For Questions 8 & 9, use the following options:

1. Both A and R are true, and R is the correct explanation of A.
2. Both A and R are true, but R is not the correct explanation of A.
3. A is true, but R is false.
4. A is false, but R is true.

Q.8.Assertion (A): In reflex action, the brain is not involved in the primary response.
Reason (R): Reflex arcs are controlled by the spinal cord. (1)

Q.9.Assertion (A): In humans, testes are located outside the abdominal cavity.
Reason (R): Lower temperature in the scrotum is essential for the production of healthy sperms. (1)

Q.10. Unlike animals, plants do not have specialised excretory organs. Comment with justification. (2)

Q.11. Attempt **either** A **or** B:

A. How many chambers are there in the heart of the following organisms? How is mixing of oxygenated and deoxygenated blood prevented in their body?
(i) Fishes (ii) Humans

OR

B. Explain the process by which water is transported in plants against gravity. (2)

Q.12. Draw and explain how the nerve cells help in transmission of impulses. (2)

Q.13. A gardener grew rose plants using stem cuttings.
(i) What type of reproduction is this?
(ii) State two advantages and one disadvantage of this method. (3)

Q.14. Draw diagram of Male reproductive system. (3)

Q.15. Neha consumed boiled sweet potatoes and boiled eggs for breakfast. Answer the following:

A. Which of these food items is rich in proteins? In which part of the alimentary canal is the digestion of this component initiated? Name the enzymes, conditions required, and the glands associated.

OR

B. Which of these food items contains fats? How is it digested? (4)

Q.16. Attempt **either** A **or** B:

A. Puneet wanted to grow banana plants.
(i) Based on your knowledge of plant reproduction, should he opt for seeds or any alternate method of reproduction? Justify.
(ii) Offspring of a banana plant usually show very little variation. What causes variation and are variations good or bad? Justify.

OR

B. Annie conducted research on fruit production in watermelon under two different conditions — one with pollinators, one without.
(i) What difference will she observe in the number of fruits produced? Explain with reason.
(ii) List three changes that will occur in a flower once it gets fertilised. (5)

SECTION-B

Q17. The electronic configuration of three elements X , Y , Z are :
X 2,8
Y 2,8,7
Z 2,8,2
Which of the following is correct?

A. X is a metal
B. Y is a metal
C. Z is a non -metal
D. Y is a non -metal and Z is a metal (1)

Q18. The salt that gives a neutral solution when dissolved in water is :
A. Na_2SO_4 B. NH_4Cl C. CH_3COONa D. Na_2CO_3 (1)

Q19. Which of the following **does /do not** happen when water is added to quick lime?

A. Hissing sound is produced
B. A precipitate is formed
C. There is a change in temperature
D. There is a change in colour of the product (1)

Q20. Methyl orange is added to dilute hydrochloric acid and to aqueous sodium hydroxide. What is the colour of the methyl orange in each solution?

Sample	colour in dilute hydrochloric acid	colour in aqueous sodium hydroxide	
a	Orange	Red	
b	Red	Yellow	
c	Red	Orange	
d	Yellow	Red	

A. a B. d C. b D. c (1)

Q21 Bronze is an alloy of

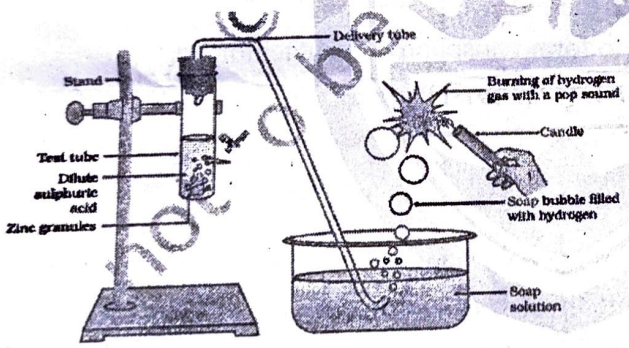
A. Copper and zinc
B. Aluminium and tin
C. Copper, tin and zinc
D. Copper and tin (1)

Q22. $MnO_2 + x\,HCl \longrightarrow MnCl_2 + y\,H_2O + z\,Cl_2$

In order to balance the above chemical equation, the value of x ,y ,z are :

A. 6,2,2 B. 4,1,2 C. 4,2,1 D. 2,2,1 (1)

Q23. Study the diagram given below and identify the gas formed in the reaction:



(A) Carbon dioxide which extinguishes the flame
(B) Oxygen due to which a candle burns more brightly
(C) Sulphur dioxide which produces a suffocating smell
(D) Hydrogen which while burning produces a pop sound. (1)

Q.24.There are two statements given, One is Assertion A and other is Reason R, to answer the questions by selecting the appropriate option given below.

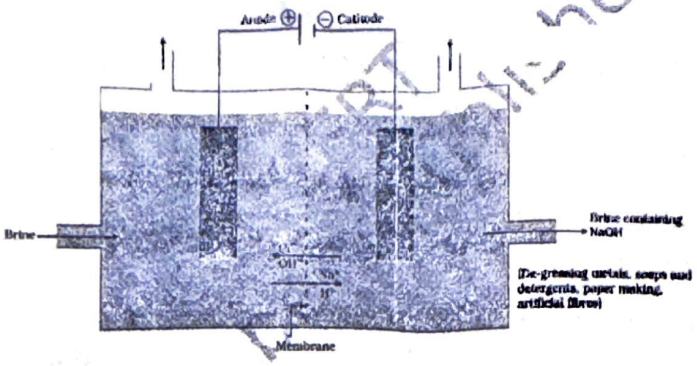
Both A and R are true, and R is the correct explanation of A.

1. Both A and R are true, but R is not the correct explanation of A.
2. A is true, but R is false.
3. A is false, but R is true.

Assertion: Sodium oxide is an amphoteric oxide.

Reason: Metal oxides which react with both acid as well as base are known as amphoteric oxide. (1)

Q.25.



Observe the above picture and answer the following:

(a) Identify the gases evolved at the anode and cathode in the above experimental set up.

(b) Name the process that occurs. Why is it called so? (2)

Q26. Attempt A or B

A.(i) Illustrate the formation of bond in magnesium chloride.

(ii) Ionic compounds do not conduct electricity in solid state, why? (2+1)

OR

B. Consider the following salts

(i) YCl (ii) NH_4X and (iii) ZCO_3

(a) What would be the pH of salt solution of YCl

(b) If in salt NH_4X, X is nitrate , then what colour solution will give with universal indicator and why?

(c) What will be change in colour in blue litmus solution if ZCO_3 solution is added to it and 'Z' is potassium. (1+1+1)

Q27. Write the balanced chemical equation for the following reaction:

(a) Phosphorus burns in presence of chlorine to form phosphorous pentachloride.

(b) Burning of natural gas

The process of respiration (1+1+1)

Q28.**Case study-based question**

On the basis of reactivity, metals are grouped into three categories, metals of low reactivity, metals of high reactivity and metals of medium reactivity. Therefore, metals are extracted in pure form from their ores on the basis of their chemical properties. Metals of high reactivity are extracted from their ores by electrolysis of their molten ores. Metals of low reactivity are extracted from their sulphide ores, which are converted into their oxide ores. The oxides of these metals are reduced to metals by simple heating.

(a) Name the process of reduction used for metal that gives a vigorous reaction with air and water both.

(b) Carbon cannot be used as reducing agent to obtain aluminium from its oxide. Why?

(c) Describe briefly the method to obtain copper from its ore.

Write the chemical equations for the reaction involved in the process.

OR

(c) Differentiate between roasting and calcination , giving chemical equation for each by taking an example. (1+1+2)

Q29. The following reaction takes place when aluminium powder is heated with MnO_2:

$3MnO_2 + 4Al \longrightarrow 3Mn + 2Al_2O_3 + heat$

(a) Where is oxidation and reduction taking place?

(b) A metal 'A', which is used in Thermit process, when heated with oxygen, gives an oxide' B', which is amphoteric in nature. Identify 'A' and 'B'. Write down the reactions of oxide B with HCl and NaOH. (2+3)

OR

(i) What happens when CO_2 is passed through lime water?

(ii) What are the necessary conditions for rusting to take place?

(iii) Why are gold and platinum used for making jewellery?

(iv) What is the nature of non-metallic oxides?
Give one example to explain (1+1+1+2)

SECTION-C

Q.30. Mirror 'X' is used to concentrate sunlight in solar furnace and Mirror 'Y' is fitted on the side of the vehicle to see the traffic behind the driver. Which of the following statements are true for the two mirrors?

(i) The image formed by mirror 'X' is real, diminished and at its focus.

(ii) The image formed by mirror 'Y' is virtual, diminished and erect.

(iii) The image formed by mirror 'X' is virtual, diminished and erect.

(iv) The image formed by mirror 'Y' is real, diminished and at its focus.

(A) (i) and (ii) (B) (ii) and (iii) (C) (iii) and (iv) (D) (i) and (iv) (1)

Q.31. Choose the correct option from below which explains the reason for us to perceive the day sky as blue.

(A) As sunlight passes through the atmosphere, shorter wavelengths, such as blue are scattered more than other colours.

(B) The sky appears blue because all colours are scattered equally, but blue light is stronger and more visible to the human eye.

(C) The blue colour of the sky is due to longer wavelengths like red and orange scattering more than shorter wavelengths, making blue stand out more.

(D) The atmosphere contains blue-coloured particles that give the sky its blue appearance. (1)

The following question consists of two statements – Assertion (A) and Reason (R). Answer these questions by 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.

Q.32. Assertion: A ray of light travelling from a rarer medium to a denser medium slows down and bends away from the normal. When it travels from a denser medium to a rarer medium, it speeds up and bends towards the normal.

Reason: The speed of light is higher in a rarer medium than a denser medium. (1)

Q.33. An object is placed at a distance of 30 cm in front of a concave mirror of focal length 20 cm. Use mirror formula to determine the position of the image formed in this case. (2)

Q.34. Attempt either option A or B.

(A) Out of the two lenses, one concave and the other convex, state which one will diverge a parallel beam of light falling on it. Draw a ray diagram to show the principal focus of the lens. (2)

OR

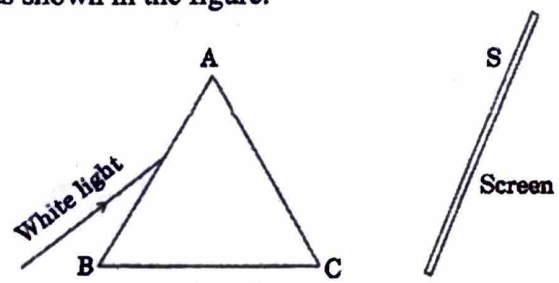
(B) A ray of light after refraction from a convex lens emerges parallel to its principal axis. Draw a labelled ray diagram to show it. In this case, the incident ray before refraction from the lens passes through a point on its principal axis. Name the point. (2)

Q.35. The power of a lens is -0.25 D. Based on this information, find out
(a) The type of lens and its focal length.
(b) The eye defect for which it may be used as a corrective lens.
(c) The nature and size of the image formed by this lens when an object is placed between F and 2F from the optical centre of this lens. (1+1+1)

Q.36. A convex lens forms an 8·0 cm long image of a 2·0 cm long object which is kept at a distance of 6·0 cm from the optical centre of the lens. If the object and the image are on the same side of the lens, find
(i) the nature of the image,
(ii) the position of the image, and
(iii) the focal length of the lens. (3)

Q.37. What do you mean by Hypermetropia? State its causes and explain how it can be corrected. (3)

Q.38. A person allowed a narrow beam of white light from the sun to enter a dark room through a small aperture and placed a glass prism in its path in such a manner that the beam falls on the face AB of the prism as shown in the figure.



A screen S is placed on the other side of the prism, facing AC. On turning the prism slowly, a beautiful band of colours is obtained on the screen. It is the spectrum of sunlight.
(a) Name the phenomenon due to which a prism splits the incident white light into a band of colours (1)
(b) State the reason of getting a band of seven colours in the above case. (1)
Attempt either c or d
(c) Explain with the help of a labelled ray diagram, an experimental arrangement to show the recombination of the spectrum of white light. (2)
OR
(d) Draw a labelled ray diagram to show the formation of a rainbow. (2)

Q.39. Attempt either (A) or (B)

(A) Analyse the following observation table showing variation of image distance (v) with object distance (u) in case of a convex lens and answer the questions that follow without doing any calculations:

Observation Number	Object distance (u) in cm	Image distance (v) in cm
1	–15	–60
2	–25	+100
3	–30	+60
4	–40	+40
5	–60	+30
6	–100	+25

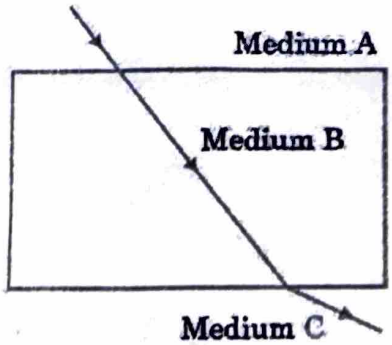
(i) Determine the focal length of the lens. (2)

(ii) Find magnification of the image formed in Observation No. 3. (1)

(iii) The numerical value of magnifications in cases of observation 1 and 2 is same. List two differences in the images formed in these two cases. (2)

OR

(B). (a) Observe the following diagram and compare (i) speed of light and (ii) optical densities of the three media A, B and C. Also give justification for your answer of any one of the two cases in terms of refractive indices of A, B and C. (3)



(b) Redraw the path of a ray of light through the three media, if the ray of light starting from medium A falls on the medium B

(i) Obliquely and the optical density of medium B is made more than that of A and C.

(ii) The ray falls normally from medium A to medium B. (1+1)