Class X
Half Yearly Examination
(2024-2025)
Science

RIMT WORLD SCHOOL

Date : 21.09.2024
Time : 3hrs

Roll. No. : ....
M.M. : 80

General Instructions:

a) **This question paper consists of 39 questions and 5 sections.**

b) **All questions are compulsory. However, an internal choice is provided in some questions.**

c) **Section A consists of 20 objective type questions carrying 1 mark each.**

d) **Section B consists of 6 Very Short questions carrying 2 marks each.**

e) **Section C consists of 7 Short Answer type questions carrying 3 marks each.**

f) **Section D consists of 3 Long Answer type questionscarrying 5 marks each.**

g) **Section E consists of 3 source-based/case study based questions of 4 marks each with sub-parts.**

Section-A

1. A person cannot see distinctly objects kept beyond 2m. This defect can be corrected by using a lens of power.
   a) +0.5 D
   b) -0.5D
   c) +0.2D
   d) -0.2D
2. $CuSO_4.5H_2O$: In this Compound, the water molecule is called –
   a) Pure water
   b) Water of crystallisation
   c) Soda water
   d) None of these
3. Lime water reacts with chlorine to give $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$
   a) Bleaching powder
   b) Baking powder
   c) Baking soda
   d) Washing soda
4. Lipase acts on
   a) Amino acids
   b) Fats
   c) Carbohydrates
   d) All of these
5. A substance 'X' is used in white-washing and is obtained by heating limestone in the absence of air. Identify 'X'. $CaCO_3 \rightarrow CaO + CO_2$
   a) $CaOCl_2$
   b) $Ca(OH)_2$
   c) CaO
   d) $CaCO_3$
6. Magnification produced by a rearview mirror fitted in vehicles:
   a) Is less than one
   b) Is more than one
   c) Is equal to one
   d) Can be more than or less than one, depending upon the position of the object in front of it

7. Example of an amphoteric oxide is:
   a) Na_2O b) K_2O
   c) Al_2O_3 d) MgO
8. The harmful chemical which is accumulating in human beings through the food chain is
   a) BHC b) DDT
   c) Both A and B d) CFC
9. Posture and balance of the body is controlled by
   a) Pons b) Medulla oblongata
   c) Cerebellum d) Cerebrum
10. If an object is placed symmetrically between two plane mirrors, inclined at an angle of 72 degrees, then the total no. of images formed is:
   a) 5 b) 4
   c) 2 d) infinite
11. Which of the following endocrine glands does not exist in pairs?
   a) Testes b) Adrenal
   c) Pituitary d) Ovary
12. Identify which of the following statements about thyroxine is incorrect?
   a) Thyroid gland requires iodine to synthesize thyroxine.
   b) Thyroxin is also called thyroid hormone.
   c) It regulates protein, carbohydrates and fat metabolism in the body.
   d) Iron is essential for the synthesis of thyroxine.
13. Farmers neutralise the effect of Acidity on the soil by adding –
   a) Slaked lime $Ca(OH)_2$ b) Gypsum
   c) Caustic soda NaOH d) Baking soda $NaHCO_3$
14. A researcher adds barium hydroxide to hydrochloric acid to form a white-coloured barium chloride. Which of the following option gives the balanced chemical equation of the reaction?
   $BaOH + HCl \rightarrow BaCl$
   a) $HCl + Ba(OH)_2 \rightarrow BaCl_2 + 2H_2O$
   b) $2HCl + Ba(OH)_2 \rightarrow BaCl_2 + 2H_2O$
   c) $2HCl + Ba(OH)_2 \rightarrow BaH_2 + 2HCl + O_2$
   d) $HCl + 2Ba(OH) \rightarrow 2BaCl_2 + 2H_2O + O_2$
15. In a synapse chemical signal is transmitted from _____.
   a) From dendrite of one neuron to axonal end of other neuron
   b) Axon to cell body of same neuron
   c) Cell body to axonal end of same neuron
   d) Axonal end of one neuron to dendrite of another neuron
16. Aqua regia is a freshly prepared mixture of concentrated HNO_3 and concentrated HCl in the ratio of:
   a) 1:3, respectively b) 2:3, respectively
   c) 3:1, respectively d) 3:2, respectively

DIRECTION : The following question 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 but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.
e) Both Assertion and Reason are false.

17. **Assertion(A) :** Danger signals are made of red colour.
Reason (R) : Velocity of red light in air is maximum, so signals are visible even in dark. (A)
18. **Assertion (A) :** In electrolysis of water, the volume of hydrogen liberated is twice the volume of oxygen formed. (C)
Reason (R) : Water (H_2O) has hydrogen and oxygen in the ratio of 1:2 by volume.
19. **Assertion (A):** Arteries are thick-walled and elastic in nature.
Reason (R) : Arteries have to transport blood away from the heart. (A)
20. **Assertion(A):** A receptor is a specialized group of cells in a sense organ that perceive a particular type of stimulus. (B)
Reason (R) : Different sense organs have different receptors for detecting stimuli.

Section B

Question No. 21 to 26 are very short answer questions

21. Define the term power of accommodation. Write the modification in the curvature of the eye lens which enables us to see the nearby objects clearly. Ans
22. In one of the industrial processes used to manufacture sodium hydroxide, a gas X is formed as a byproduct. The gas X reacts with lime water to give a compound Y used as a bleaching agent in the chemical industry. Identify X and Y giving the chemical equation of the reactions involved.
23. Explain with the help of neat and well labelled diagrams the different steps involved in nutrition in Amoeba.

OR

a) In the process of respiration, state the function of alveoli.
b) Rate of breathing in aquatic organisms is much faster than that in terrestrial organisms. Give reasons.

24. State the two types of movements seen in plants. Give one example of each type.
25. a) From the following group of organisms create a food chain which is most advantageous for human beings in terms of energy.
Hawk, Rat, Cereal plant, Goat, Snake, Human being
b) State the possible disadvantage if the cereal plant is growing in soil rich in pesticides.
26. A concave mirror has a focal length of 20 cm. At what distance from the mirror should a 4 cm tall object be placed so that it forms an image at a distance of 30 cm from the mirror? Also calculate the size of the image formed. 60 , – 2

OR

Draw a labelled diagram and explain the formation of a rainbow in the sky.

Section-C

Question No. 27 to 33 are short answer questions

27 a) A spherical mirror produces an image of magnification -1.0 on a screen placed at a distance of 30 cm from the pole of the mirror.

i) Write the type of mirror in this case.

ii) What is the focal length of the mirror?

iii) What is the nature of the images formed?

iv) Draw the ray diagram to show the image formation in this case

28. Explain the following

a) Reactivity of Al decreases if it is dipped in HNO_3

b) Carbon cannot reduce the oxides of Na or Mg

c) NaCl is not a conductor of electricity in solid-state, whereas it does conduct electricity in aqueous solution as well as in the molten state

29. Name the hormone which is released into the blood when its sugar level rises. Explain the need of Chemical communication in multi cellular organisms, the organ which produces this hormone and its effect on blood sugar level. Also mention the digestive enzymes secreted by this organ with one function of each.

30. Suppose you have three concave mirrors A, B and C of focal lengths 10 cm, 15 cm and 20 cm. For each concave mirror you perform the experiment of image formation for three values of object distances of 10 cm, 20 cm and 30 cm. By giving reason, answer the following:

a) For the three object distances, identify the mirror/mirrors which will form an image of magnification -1.

b) Out of the three mirrors, identify the mirror which would be preferred to be used for shaving purposes/make up.

c) For the mirror B draw ray diagram for image formation for object distances 10 cm and 20 cm.

31 For making cake, baking powder is taken. If your mother uses baking soda instead of baking powder in cake at home,

a) How will it affect the taste of the cake and why?

b) How can baking soda be converted into baking powder?

c) What is the role of tartaric acid added to baking soda?

32. a) Name the radiations from the Sun that are absorbed by ozone layer. Mention one harmful effect caused by them.

b) Explain how making of "Kulhads" affects our environment.

33. What is myopia? What are its causes? Describe with a neat diagram how this defect of vision can be corrected by using a suitable lens

Section-D

Question No. 34 to 36 are long answer questions.

34. An object 4.0 cm in size, is placed 25.0 cm in front of a concave mirror of focal length 15.0 cm.
    a) At what distance from the mirror should a screen be placed in order to obtain a sharp image?
    b) Find the size of the image.
    c) Draw a ray diagram to show the formation of image in this case.
    d) Distinguish between real and virtual image.

OR

Give reasons for the following:
    a) Stars appear to twinkle
    b) The colour of clear sky is blue
    c) Danger signals are red in colour
    d) What causes tyndall effect
    e) Advanced sun-rise

35. a) What is meant by the reactivity series of metals ? Arrange the following metals in an increasing order of their reactivities towards water :
    Zinc, Iron, Magnesium, Sodium
    b) Hydrogen is not a metal but still it has been assigned a place in the reactivity series of metals. Why ?
    c) Name one metal more reactive and another less reactive than hydrogen.
    d) Name one metal which displaces copper from copper sulphate solution and one which does not.
    e) Name one metal which displaces silver from silver nitrate solution and one which does not.

OR

    a) How is copper extracted from its sulphide ore? Explain the various steps supported by chemical equations. Draw a labelled diagram for the electrolytic refining of copper
    b) i) Write down the electronic configuration of magnesium and oxygen.
    ii) Give two general properties of the compound formed by combination of magnesium and oxygen.
    iii) Show the formation of this compound by the transfer of electrons.

36. a) Define reflex arc.
    b) Trace the sequence of events which occur in our body when a bright light is focussed on your eyes.
    c) What are plant hormones? Name the plant hormones responsible for the following :
    i) Growth of stem
    ii) Promotion of cell division
    iii) Inhibition of growth
    iv) Elongation of cell

OR

a) List the three events that occur during the process of photosynthesis. Explain the role of stomata in this process.

b) Describe an experiment to show that "sunlight is essential for photosynthesis."

SECTION – E

Question No. 37 to 39 are case-based/data –based questions with sub-parts. Internal choice is provided in one of these sub-parts.

37. Read the following and answer any four questions:

If the body design in the squirrel relied only on electrical impulses via nerve cells, the range of tissues instructed to prepare for the coming activity would be limited. On the other hand, if a chemical signal were to be sent as well, it would reach all cells of the body and provide the wide ranging changes needed. This is done in many animals, including human beings, using a hormone called adrenaline that is secreted from the adrenal glands.

i) Which is the target organ for the adrenaline hormone?

ii) Which hormone is released by thyroid gland?

iii) Name the hormone released by ovary.

iv) Name the three hormonal glands located in the brain.

OR

v) What is the function of thyroxine hormone?

38. **Read the following and answer any four questions:**

On the basis of reactivity of different metals with oxygen, water and acids as well as displacement reactions, the metals have been arranged in the decreasing order of their reactivities. This arrangement is known as activity series or reactivity series of metals. The basis of reactivity is the tendency of metals to lose electrons. If a metal can lose electrons easily to form positive ions, it will react readily with other substances. Therefore, it will be a reactive metal. On the other hand, if a metal loses electrons less rapidly to form a positive ion, it will react slowly with other substances. Therefore, such a metal will be less reactive.

i) Which of the following metals is less reactive than hydrogen?

a) Copper b) Zinc

c) Magnesium d) Lead

ii) Which of the following metals is more reactive than hydrogen?

a) Mercury b) Platinum

c) Iron d) Gold

iii) Which of the following metals reacts vigorously with oxygen?

a) Zinc b) Magnesium

c) Sodium d) Copper

iv) Which of the following represents the correct order of reactivity for the given metals?

a) Na > Mg > Al > Cu b) Mg > Na > Al > Cu

c) Na > Mg > Cu > Al d) Mg > Al > Na > Cu

OR

39. Read the following and answer any four questions:

We have, the object distance is the distance of the object from the pole of the mirror. And we always know that object is placed in front of mirror that means on left side and hence object distance u is always taken as negative. The distance of the image from the pole of the mirror is taken as image distance. The image distance may be positive or negative on the basis of nature of image formed. And the distance of principal focus from the pole is called as focal length of the mirror. Thus, the relationship between the object distance u image distance v and focal length f is given by mirror formula.Thus, Mirror formula:

$1/v + 1/u = 1/f$

And magnification in case of mirror gives the extent to which the image is magnified as compared to object size.

Magnification is given by the ratio of height of image (h') to the height of object (h)

Thus, magnification = (height of image)/(height of object)

Thus, $m = h'/h$

Also, in terms of object distance and image distance magnification is given by,

Magnification $m = h'/h = -v/u$

As we know that, image height is positive if the image formed is virtual while height of image is negative for real images.

Similarly in case of lenses, lens formula is given by $1/v - 1/u = 1/f$

And magnification in case of lenses is given by Magnification $m = h'/h = v/u$

The power of lens depends on the focal length of the lens and it is the ability of the lens to diverge or converge the number of rays incident on it. Also, power of lens is defined as the reciprocal of focal length of the lens.

Thus, $P = 1/f$

i) If the focal length of the lens is measured in meter what will be the unit of power of lens?

ii) What is the sign of power of convex and concave lens?

iii) If the lenses placed in contact of powers P1, P2, P3, P4 are used then what is the net power of lens system?

iv) If the magnification produced is negative and positive in case of mirrors then what about the nature of images formed there?