PT-2

HALF YEARLY EXAMINATION

SCIENCE

CLASS X **Time : 3 hrs.**

Mark : 80

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 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. Answer 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 **20 × 1 = 20**

1. An object is placed in front of a screen and a convex lens is placed at a position such that the size of the image formed is 9 cm. When the lens is shifted through a distance of 20 cm, the size of the image becomes 1 cm. The focal length of the lens and the size of the object are respectively.

   a) 7.5 cm and 3.5 cm b) 7.5 cm and 4.5 cm

   c) 6 cm and 3 cm d) 7.5 cm and 3 cm

2. Which of the following phenomenon of light are involved in the formation of rainbow?

   a) Reflection, Refraction, Dispersion

   b) Refraction, Dispersion and internal reflection

   c) Dispersion, scattering and total internal reflection d) None of the above

3. A student sitting on the last bench can read the letters written on the blackboard but is not able to read the letters written in his text book. Which of the following statements is incorrect?

   a) He is suffering from far sightedness b) The near point of his eyes has receded away

   c) He needs convex lens of suitable power in order to correct his problem

   d) The far point of his eyes has receded away

4. Two different set-ups for collection of sulphur dioxide gas in the laboratory were shown and the students A, B, C and D were asked to choose the correct set-up and justify their selection. They reported the following.

   a) II is correct as sulphur dioxide is heavier than air

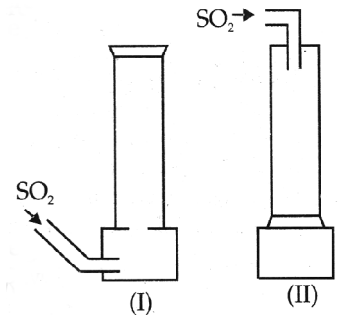
   b) I is correct as sulphur dioxide is lighter than air

   c) II is correct as sulphur dioxide is lighter than air

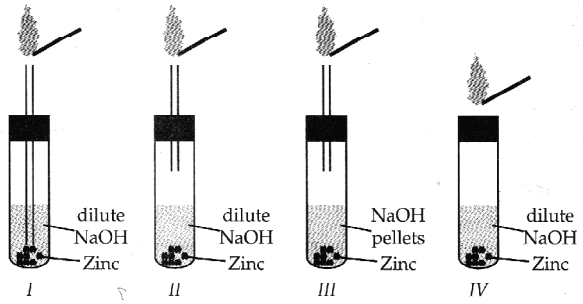
   d) I is correct as sulphur dioxide is heavier than air

   The correct choice and its justification is reported by student.

   a) a b) b c) c d) d



5. Which one of the following set ups is the most appropriate for the evolution of hydrogen gas and its identification?



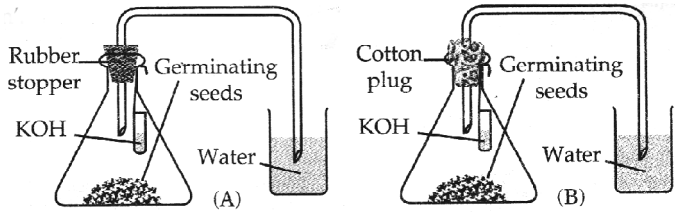
a) I

b) II

c) III

d) IV

6. The following experimental set-ups were kept in the laboratory to show that 'CO_2 is, given out during respiration'.



After two hours, students observed that water rises in the delivery tube:

a) only in set-up (A)

b) only in set-up (B)

c) in both (A) and (B)

d) neither in set-up (A) nor in set-up (B)

7. Which of the following statements about transmission of nerve impulse is incorrect?

a) Nerve impulse travels from dendritic end towards axonal end

b) At the dendritic end electrical impulses bring about the release of some chemicals which generate an electrical impulse at the axonal end of another neuron

c) The chemicals released from the axonal end of one neuron cross the synapse and generate a similar electrical impulse in a dendrite of another neuron

d) A neuron transmits electrical impulses not only to another neuron but also to muscle and gland cells

8. The cerebellum in the brain controls voluntary actions of the body. Which of these actions is controlled by the cerebellum?

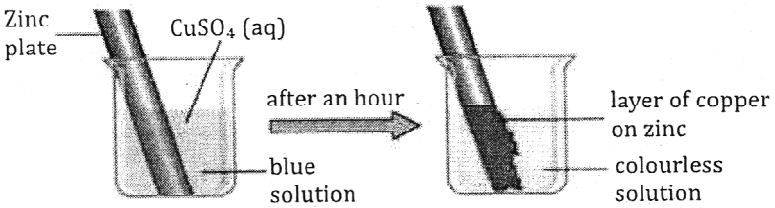
a) Beating of the heart

b) Blinking of the eyes

c) Watering of the mouth

d) Jumping from a height

9. Reena immersed a zinc plate in an aqueous solution of copper sulphate. She noticed a thick layer of copper on the surface of the zinc plate after an hour.



What should Reena have done to make the reaction faster?

a) Use a thicker zinc plate

b) Use pieces of small zinc flakes

c) Use a copper vessel for the reaction

d) Use copper sulphate solution of higher concentration

10. Dilute HCl is added in zinc powder. Gas A evolves and compound B is formed. The following is correct about A and B.

a) A is lighter than air and B is insoluble in water

b) A is heavier than air and B is insoluble in water

c) A is lighter than air and B is soluble in water

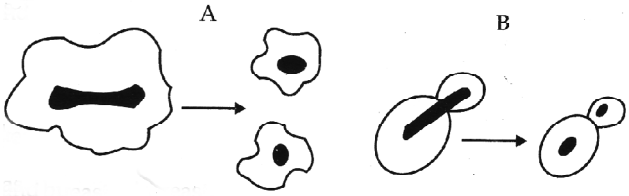
d) A is heavier than air and B is soluble in water

11. Aluminium is used for making overhead transmission wire. Which of the following properties of aluminium are responsible for the same?

I	Good thermal conductivity	II	Good electrical conductivity
III	Ductility	IV	High melting point

a) I and II b) I and III c) II and III d) I and IV

12. Slides A and B show stages of asexual reproduction in two different organisms. The slides A and B are depicting.



a) Binary fission in both Amoeba & yeast

b) Budding in both Amoeba and yeast

c) Binary fission in yeast and budding in Amoeba

d) Binary fission in Amoeba and budding in yeast

13. Offspring formed by asexual method of reproduction have greater similarity among themselves because

i) asexual reproduction involves only one parent

ii) asexual reproduction does not involve gametes

iii) asexual reproduction occurs before sexual reproduction

iv) asexual reproduction occurs after sexual reproduction

a) (i) and (ii) b) (i) and (iii) c) (ii) and (iv) d) (iii) and (iv)

14. The table shows four different materials and their resistivity.

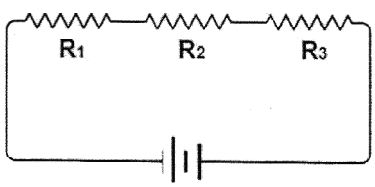
Material	**Resistivity** $(\Omega\ \mathrm{m})$
Material 1	1.62×10^{-8}
Material 2	100×10^{-6}
Material 3	6.84×10^{-8}
Material 4	44×10^{-6}

Which material is the best conductor of electricity?

a) Material 1 b) Material 2 c) Material 3 d) Material 4

15. Leena creates an electric circuit with three resistors R_1, R_2 and R_3.

What is the equivalent resistance of the circuit?



R_1	R_2	R_3
2Ω	3Ω	4Ω

a) 3Ω

b) 4Ω

c) 5Ω

d) 9Ω

16. According to Joule's law of heating, heat produced in a resistor is :
    a) directly proportional to the square of current for a given resistance
    b) directly proportional to resistance for a given current
    c) directly proportional to the time for which the current flows through the resistor
    d) All of the above

In the following questions (No. 17-20) a statement of Assertion followed by a statement of Reason is given. Choose the correct answer out of the following choices. 4 × 1 = 4

a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
c) Assertion is true but reason is false. d) Assertion is false but reason is true.

17. Assertion (A) : Brown fumes are obtained from the thermal decomposition of Lead Nitrate.
    Reason (R) : Nitrogen dioxide gas is released which is brown in colour.
18. Assertion (A) : Soda-acid fire extinguisher contains sodium hydrogen carbonate and sulphuric acid.
    Reason (R) : Sulphuric acid mixes with sodium hydrogen carbonate solution and produces a lot of CO_2 gas, which forms a blanket over fire and cuts it off from the supply of the air to the burning substance and the fire stops.
19. Assertion (A) : Different metals have different reactivities with water and dilute acids.
    Reason (R) : Reactivity of a metal depends on its position in the reactivity series.
20. Assertion (A) : Heater wire must have high resistance and high melting point.
    Reason (R) : If resistance is high, the electric conductivity will be less.

SECTION - B

21. An object is kept at a distance of 2 cm in front of a mirror of focal length –10 cm. Find the position, size and nature of the image. **2**
22. A student has been collecting silver coins and copper coins. One day she observed a black coating on silver coins and a green coating on copper coins. Which chemical phenomenon is responsible for these coatings? Write the chemical name of black and green coatings. **2**

OR

A student dropped few pieces of marble in dilute Hydrochloric acid contained in a test tube. The evolved gas was passed through lime water. What change would be observed in lime water? Write balanced chemical equations for both the changes observed.

23. Mention the site of complete digestion in our body. Name the end products formed on complete digestion of carbohydrates, proteins and fats. **2**

OR

Major amount of water selectively reabsorbed by the tubular part of nephron in humans. What are the factors on which the amount of water reabsorbed depends?

24. Oxides of metal are basic in nature. Then, why does aluminium oxide react with sodium hydroxide? **2**

25. Trace the path of sperm during ejaculation and mention the gland and their functions associated with the male reproductive system. **2**

26. Heater A produces less heat than heater B when combined in series. Which heater will produce more heat when they are combined in parallel? Which of the two heaters' filament has lower resistance? **2**

SECTION - C

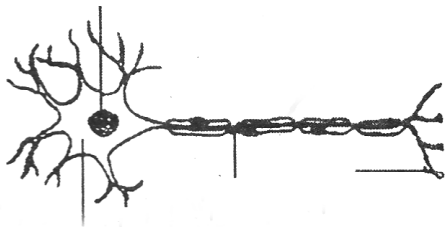
27. A student wants to project the image of a candle flame on a screen 90 cm in front of a mirror by keeping the flame at a distance of 15 cm from its pole.
    a) Suggest the type of mirror he should use.
    b) Determine the linear magnification in this case.
    c) Find the distance between the object and its image.
    d) Draw ray diagram to show the image formation in this case. **3**

28. Due to gradual weakening of ciliary muscles and diminishing flexibility of the eye lens a certain defect of vision arises. Write the name of this defect. Name the type of lens required by such persons to improve the vision. Explain the structure and function of such a lens. **3**

29. Translate the following statements into chemical equations and balance them.
    a) Hydrogen gas combines with nitrogen to form ammonia. **3**
    b) Hydrogen sulphide burns in air to give water and sulphur dioxide.
    c) Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate.

30. a) Why is diffusion insufficient to meet the oxygen requirements of large multicellular organisms like humans?
    b) What type of arrangement exists in the bodies of large animals to meet their oxygen requirement adequately? **3**

31. a) Redraw the given diagram of neuron and label the parts :
        i) Which receives the information?
        ii) Through which information travels as an electrical impulse?
        iii) Where this impulse is converted into chemical signal for onward transmission?



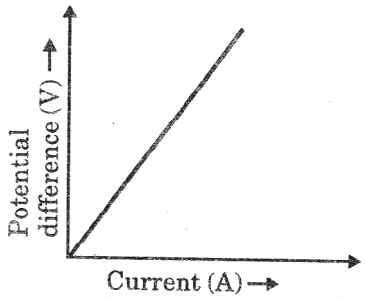
    b) Mention any two signals which will get disrupted in case of spinal injury. **3**

OR

Name the hormone secreted by thyroid gland. List its function. Why is the use of iodised salt advisable?

32. Pure iron is soft and stretches easily when hot.
    a) How does this property of iron change when : i)small amount of carbon is mixed with it? ii) nickel and chromium are mixed with it?
    b) Define an alloy. How is an alloy prepared?
    c) An alloy has low melting point and is therefore used for electrical fuse. Name the alloy and write its constituents. **3**

33. V-I graph for a conductor is as shown in the figure :



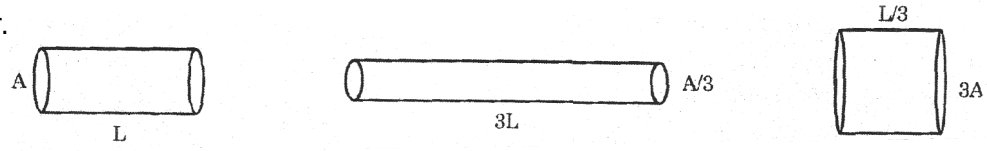
i) What do you infer from this graph?

ii) State the law expressed here.

iii) Name the physical quantity represented by the slope of this graph and state its SI unit. **3**

OR

The figure below shows three cylindrical copper conductors along with their face areas and lengths. Compare the resistance and the resistivity of the three conductors. Justify your answer.



(a) (b) (c)

SECTION - D

34. a) Define a universal indicator. Mention its one use.

b) Solution A gives pink colour when a drop of phenolphthalein indicator is added to it. Solution B gives red colour when a drop of methyl orange is added to it. What type of solutions are A and B and which one of the solutions A and B will have a higher pH value?

c) Name one salt whose solution has pH more than 7 and one salt whose solution has pH less than 7. **5**

OR

Give suitable reasons for the following statements :

a) Rain water conducts electricity but distilled water does not.

b) We feel burning sensation in the stomach when we overeat.

c) A tarnished copper vessel regains its shine when rubbed with lemon.

d) The crystals of washing soda change to white powder on exposure to air.

e) An aqueous solution of sodium chloride is neutral but an aqueous solution of sodium is basic.

35. i) Name the following :

a) Part of the female reproductive system that receives sperms.

b) Hormone produced by the testes.

c) Disc like structure that transports nutrition from mother to the foetus.

d) Tube that carries the egg from the ovary to the womb.

e) Site of location of testes.

ii) Explain the role of oviduct and placenta in female reproductive system. **5**

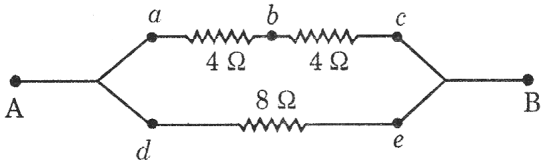
36. a) State Joule's law of heating. List two special characteristics of a heating element wire.

b) An electric iron consumes energy at the rate of 880 W when heating is at the maximum rate and 440 W when the heating is at the minimum rate. The applied voltage is 220 V. Calculate the current and resistance in each case. **5**

OR

a) Establish a relationship to determine the equivalent resistance R of a combination of three resistors having resistances R_1, R_2 and R_3 connected in parallel.

b) Three resistors are connected in an electrical circuit as shown. Calculate the resistance between A and B.



SECTION - E

37. **Read the following passage and answer the questions.**

Fertilisation takes place when the spermatozoon (male gametes) has successfully entered the ovum and the two sets of genetic material carried by the gametes fuse together, resulting in the zygote (a single diploid cell). This usually takes place in the ampulla of one of the fallopian tubes. The zygote contains the combined genetic material carried by both the male and female gametes which consists of the 23 chromosomes from the nucleus of the ovum and the 23 chromosomes from the nucleus of the sperm. The 46 chromosomes of the zygote undergo mitotic division which leads to the formation of the embryo. A fraternal twin pregnancy occurs when two eggs are released during ovulation, and both eggs are fertilized because they come from two separate ovaries and fertilized by two separate sperm cells, they won't have the same DNA and might not look identical. Sometimes, a single embryo splits after it's been fertilized, resulting in identical twins. They will have the same DNA, the same sex, and a nearly identical appearance.

i) Where does fertilization take place in a human female? **1**

ii) Distinguish between a gamete and zygote. **1**

iii) All animals follow the same process for sexual reproduction . Write the steps involved in this process. **2**

OR

Do twins have a closer relationship than other siblings? Justify.

38. **Read the following passage and answer the questions.**

Ionic compound is a chemical compound in which ions are held together by ionic bonds. An ionic bond is the type of chemical bond in which two oppositely charged ions are held through electrostatic forces. We know that, metal atoms have loosely bound valence electrons in their valence shell and non-metal atoms need electrons in their valence shell to attain noble gas configuration. The metal atom loses the valence electrons while non-metal atom accepts these electrons. By losing electrons, metal atoms change to cations and by accepting electrons, non-metals form anions. Ionic compounds are generally solid and exist in the form of crystal. They have high melting and boiling points.

i) Name one property which is not shown by the ionic compounds. **1**

ii) Why sodium chloride has high melting point? **1**

iii) NaCl is not a conductor of electricity in solid state, where as it conducts electricity in

aqueous solution as well as in molten state. Explain. **2**

OR

Ionic compounds are hard crystalline solids. Give reason.

39. **Read the following passage and answer the questions.**

Rajesh's father Mr. Jayesh runs a cosmetics and perfumes shop in a crowded market place. Mr. Jayesh is usually complains at home that there is lot of 'shop-lifting' in his shop which was causing loss to him. Rajesh used to hear such complaints of his father. One day Rajesh went to the market and purchased one big mirror of a special kind. He then went to his father's shop and fixed the mirror at strategic positions inside the shop as shown in the figure. Mr. Jayesh found that after the installation of the mirror, the shop-lifting almost stopped. He was very happy and thanked Rajesh for making this possible.

i) What type of mirror was fixed by Rajesh in the shop? **1**

ii) What special name/names is / are given to such mirror which help in preventing shop-lifting? **1**

OR

After few days that mirror becomes dirty. During cleaning, Rajesh held the mirror inside the water. So, what should be the change in the focal length of the mirror?

iii) One day Rajesh was going to his office in his car. While driving his car, he saw another car behind him through his rear-view mirror. He saw that the car coming from behind was at a distance of 4.5 m. If the radius of curvature of the mirror used as a rear view mirror in a moving car was 2.0 m. Calculate the position of the image of the car behind him. **2**