PRINCE ACADEMY
OF HIGHER EDUCATION
[Co-edu. Sr. Sec. School, Affiliated to CBSE, Affiliation No. - 1730387]

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SAMPLE PAPER

CLASS - X

SCIENCE - 086

Time : 03 Hours | **M. M. : 80**

General Instructions :

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 Very Short type questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
6. 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.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts. There is a choise only in subpart (iii).

SECTION-A

1. Black and white photography is an example of - 1
   (a) Displacement reaction (b) decomposition reaction
   (c) combination reaction (d) double displacement reaction
2. Which of the following reactions is an endothermic reaction? 1
   (a) Burning of coal.
   (b) Decomposition of vegetable matter into compost.
   (c) Process of respiration.
   (d) Decomposition of calcium carbonate to form quick lime and carbon dioxide.
3. A visually challenged student has to perform a lab test to detect the presence of acid in a given solution . The acid -base indicator preferred by him will be: 1
   (a) Blue litmus (b) clove oil (c) Turmeric (d) Methyl orange
4. Identify the basic salt from the following salts : 1
   (a) Na_2CO_3 (b) NH_4Cl (c) $NaNO_3$ (d) KCl
5. Calcium oxide reacts vigorously with water to produce slaked lime. 1

   $$CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(aq)$$

   This reaction can be classified as:
   (A) Combination reaction (B) Exothermic reaction
   (C) Endothermic reaction (D) Oxidation reaction
   Which of the following is a **correct** option?
   (a) A and B (b) C and D (c) A, C and D (d) A and C
6. Which of the following compound will give substitution reaction? 1
   (a) C_2H_4 (b) CH_4 (c) C_2H_2 (d) C_3H_6
7. Vinegar is a solution of : 1
   (a) 50% to 60% acetic acid in alcohol (b) 5% to 8% acetic acid in alcohol
   (c) 5% to 8% acetic acid in water (c) 50% to 60% acetic acid in water

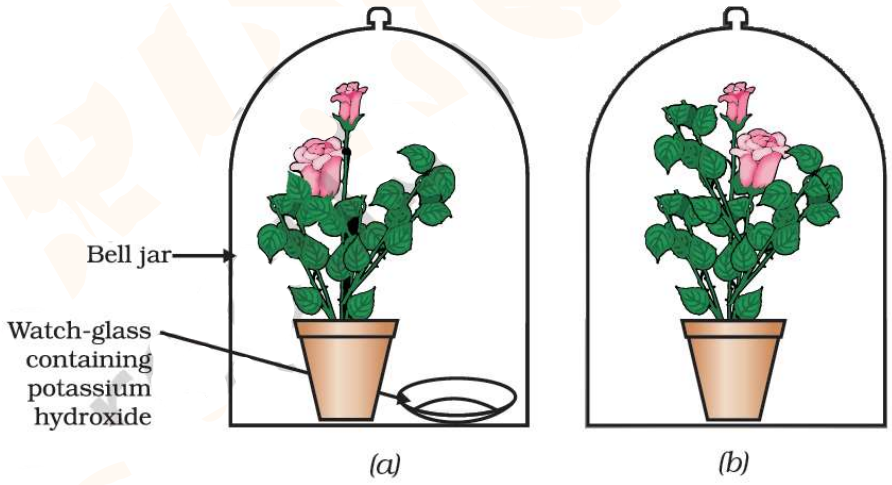
8. A student performs some activities on two substances and records the observations in a table as shown. 1

Activity	Substance M	Substance N
Cut with a knife	Forms small pieces	Forms small pieces
Beaten with hammer	Shape changes	Changes into powder
Stricken with a metal rod	Makes a sound	Changes into powder

Which option classifies the substances into metals and non-metals?
(a) Both the substances are non-metals.
(b) Both the substances are metals.
(c) Substance M is metal while substance N is non-metal.
(d) Substance M is non-metal while substance N is metal.

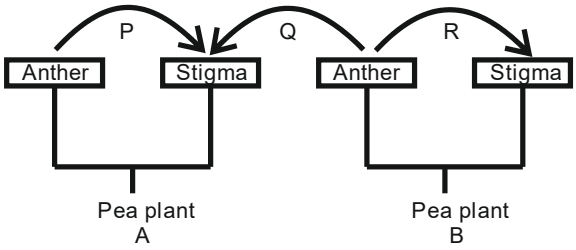
9. Which one of the following statement is **correct** about the human circulatory system :1
(a) Blood transports only Oxygen and not carbon dioxide
(b) Human heart has five chambers.
(c) Valves ensure that the blood does not flow backward
(d) Both oxygen rich and oxygen deficient blood gets mixed in the heart.

10. A student set up the apparatus as given below for doing an activity to show photosynthesis. The aim of activity is to show that: 1



(a) Chlorophyll is necessary for photosynthesis.
(b) Carbon dioxide is necessary for photosynthesis.
(c) Sunlight is necessary for photosynthesis.
(d) Water is necessary for photosynthesis.

11. Select the **incorrect** statement about the process given below. 1



(i) P represents cross pollination.
(ii) P and Q represent self pollination.
(iii) Q represents cross pollination
(iv) P and R represent self pollination.
(a) i & ii (b) i & iii
(c) ii & iv (d) iii & iv

12. Two pea plants one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds produce F_1 progeny that have round yellow (RrYy) seeds. When F_1 plants are self-pollinated, the F_2 progeny will have new combination of characters. Choose the new combination from the following 1

(i) Round, yellow (ii) Round, green
(iii) Wrinkled, yellow (iv) Wrinkled, green
(a) (i) and (ii) (b) (ii) and (iii) (c) (i) and (iv) (d) (i) and (iii)

13. Select the correct statement for the mirror used by dentist to examine a small cavity?1
(a) Concave mirror due to converging nature.
(b) Convex mirror due to diverging nature.
(c) Convex mirror due to formation of the diminished virtual- erect image.
(d) Concave mirror due to formation of enlarged virtual- erect image.

14. The commercial unit of electric energy is : 1
(a) Kilowatt hour (b) watt hour (c) Kilowatt second (d) Kilowatt

15. A normal eye can see objects clearly that are between 1
(a) our eye and infinity (b) 25 cm and infinity
(c) 50 cm and infinity (d)100 cm and infinity

16. What is the direction of magnetic field at a point A above the wire carrying current I as shown in figure? 1

(a) Out of the page (b) Into the page (c) Up the page (d) Down the page

Question no. **17 to 20** are **Assertion - Reasoning** based questions.
(a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
(b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
(c) Assertion is True but the Reason is False.
(d) Assertion is False but the Reason is True.

17. **Assertion:** The aqueous solutions of glucose and alcohol do not show acidic character. 1
Reason: The aqueous solutions of glucose and alcohol do not conduct electricity.

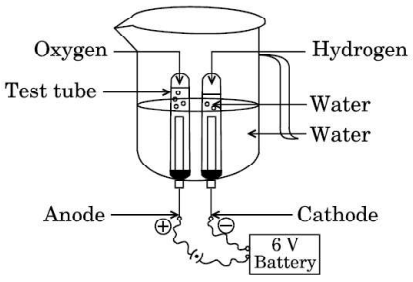
18. **Reason:** In human body if oxygen transports by diffusion then it would take 3 years for a molecule of oxygen to reach to our toes from our lungs. 1
Assertion: Diffusion is a slow process.

19. **Assertion:** Plant shoot bends towards the sunlight. 1
Reason: Auxin hormone moves away from the light.

20. **Assertion:** Longer wires have greater resistance and the smaller wires have lesser resistance. 1
Reason: Resistance is inversely proportional to the length of the wire.

SECTION-B

21. Study the figure given below and answer the following question: 2



(a) Name the process depicted (shown) in the diagram.
(b) Name the material used as the anode and the cathode
(c) Write the balanced chemical equation of the reaction taking place in this case.
(d) The reaction does not take place if few drops of dilute sulphuric acid are not added to water. Why?

22. Name the reaction used to join railway tracks and cracked machinery parts. Write a balanced chemical equation for the reaction. Which type of reaction is this? 2

OR

Aluminium is a highly reactive metal, yet it is used to make utensils for cooking. Give two resons.

23. How do traits get expressed in plants as dominent or recessive by a gene. Explain with one example. 2

OR

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

24. (A) Give two examples which indicate that sex is **not** genetically determined. 2

(B) Human females are homogametic. Justify.

25. Write two harmful effect of plastic bags on the environment. Suggest alternatives to the usage of plastic bags. 2

26. State Snell's law. Write its expression. Write the range of angle of incidence to which this law is true. 2

OR

List four characteristics of the image formed by a plane mirror.

SECTION-C

27. Give reason : 3

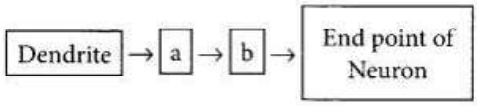
(i) Small amount of carbon (0.05%) is added to pure Iron.

(ii) Oxides of highly reactive metals can not be reduced using carbon.

(iii) Ionic compounds do not conduct electricity in solid state.

28. (a) Name one gustatory receptor and one olfactory receptor present in human beings.

(b) Write a and b in the given flow chart of neuron through which information travels as an electrical impulse. 3



(c) Name the process by which timing and amount of hormone released regulated. Explain with one example.

OR

(c) State three differences between nervous control and hormonal control.

29. Reproduction is one of the most important characteristics of living beings. Give three reasons in support of the statement. 3

30. (i) Define food chain. 3

(ii) Autotrophs are at the first level of food chain. Given reason.

(iii) In a food chain of frogs, grass, insects and snakes :

(A) Assign trophic level to frogs.

(B) To which category of consumers do frogs belong?

31. (A) The apparent position of an object, when seen through the hot air, fluctuates or wavers. State the basic cause of this observation. 3

(B) Why do stars appear to twinkle.

32. (a) Silver is the best conductor of electricity, why? 3

(b) Why is the tungsten used for filament of electric bulbs? Name the gases filled inside the bulbs.

33. (a) Will current flow more easily through a thick wire or a thin wire of the same material when connected to the same source? Why? 3

(b) When a 12 V battery is connected across an unknown resistor, there is a current of 2.5 mA in the circuit. Find the value of the resistance of the resister.

SECTION-D

34. (A) Write the name of reaction for the following : 5

(i) Production of vegetable ghee from vegetable oil.

(ii) The conversion of ethanol to ethanoic acid.

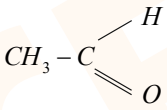
(iii) Reaction between ethanol and ethanoic acid in the presence of sulphuric acid.

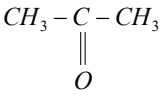
(iv) Reaction of ester with sodium hydroxide.

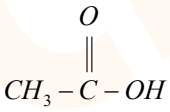
(B) Write the balanced chemical equation for reaction 4 and state the use of this reaction.

(C) Name the following compounds:

(a) $CH_3 - OH$

(b) 

(c) 

(d) 

OR

(A) What is a homologous series? Write the two next compounds of the homologous series of C_2H_4. Is there any difference in the chemical reactivity and melting, boiling points of these three compounds?

(B) What are structural isomers? Draw the structures of possible isomers of butane(C_4H_{10})

35. Explain the process of nutrition in amoeba with labelled diagram. State two differences between amoeba and paramoecium on the baiss of nutrition. 5

OR

(a) How do leave of plants help in excretion? State any two points.

(b) Describe the structure and function of a nephron.

36. It is desired to obtain an erect image of an object using concave mirror of focal length of 12 cm. 5

(a) What should be the range of distance of an object placed in front of the mirror.

Will the image be smaller or larger than the object. Draw ray diagram to show the formation of image in this case.

(b) Where will the image of this object be, if it is placed at 24 cm in front of the mirror? Draw ray diagram for this situation to justify your answer.

OR

(a) If the image formed by a mirror for all positions of the object placed in front of it is always diminished, erect and virtual , state the type of the mirror and also draw a ray diagram to justify your answer. Write one use of such mirrors.

(b) Define the radius of curvature of spherical mirrors. Find the nature and focal length of a spherical mirror whose radius of curvature is +24 cm.

SECTION-E

37. The pH of a solution is a measure of its hydrogen ion (H^+) concentration. It is measured generally using pH scale. The values on pH scale ranges from 0 to 14.

A pH of 1 is very acidic and corresponds to a high concentration of H^+ions. A pH of 14 is very basic and corresponds to a low concentration of H^+ions. The pH of a neutral solution is 7. The table given below shows the pH and H^+ion concentration of some common aqueous solutions. The leftmost column shows the number of mole of H^+ions in 1 mole of liquid. 4

The pH and Hydrogen ion (H^+) Concentration of Some Solutions are given in the table below :

H+ Concentration (moles)	pH	Solution
10^{-1}	1	Gastric (Stomach) juice
10^{-2}	2	cola, lemon juice
10^{-3}	3	Vinegar
10^{-4}	4	Tomato juice
10^{-5}	5	Black coffee, rain water
10^{-6}	6	Urine
10^{-7}	7	Pure water
10^{-8}	8	Sea water
10^{-9}	9	Baking soda
10^{-10}	10	Milk of magnesia
10^{-11}	11	Ammonia
10^{-12}	12	Household bleach
10^{-13}	13	Oven cleaner
10^{-14}	14	Sodium hydroxide

(i) How is the hydrogen ion concentration and pH related to each other?

(ii) A solution of pH 2 is filled in two separate beakers. A few drops of methyl orange and phenolphthalein are added into separate solutions. How will the colour of the indicators change? If sodium hydroxide is added drop by drop to each beaker then what change in colour will occur?

OR

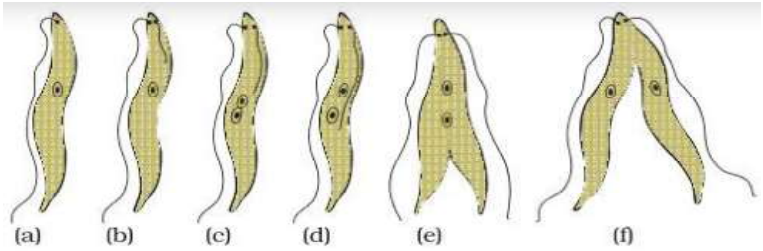
Which two substances from the table can be used as antacid and why?

(iii) On the basis of above table, arrange the following in the decreasing order of H^+ concentration.

Pure water, tomato juice, milk of magnesia, sea water

38. Unicellular organisms are single-celled whereas multicellular organisms are made up of many cells. Depending upon the complexity of the body, reproduction in unicellular organisms is different from that of multicellular organisms. Unicellular organisms generally reproduce by asexual means. In multicellular organisms, reproduction can be either sexual or asexual. The mode of reproduction in an organism depends upon the favourability of conditions prevailing. 4

(i) The figure given below respresents a type of asexual reproduction.
Identify the mode of asexual reproduction shown. State one disease caused by this organism.

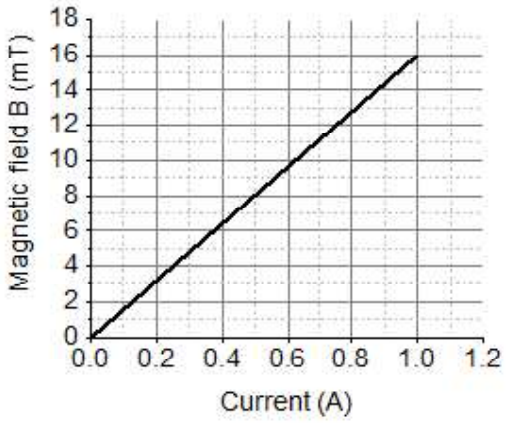


(ii) Name two modes of asexual reproduction used by **unicellular** organisms. Give one example of each.

OR

State two differences between asexual and sexual reproduction.
(iii) Some simple multicellular organisms when cut into pieces accidently then each piece can develop into new organism. Name this process and give one example of such organisms.

39. 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 field 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 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. 4



(i) After analysing the graph, what can be concluded?

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

(B)State two differences between the magnetic field in a bar magnet and current carrying solenoid.

OR

(A) Inside the solenoid magnetic field is uniform. Justify.

(B) The magnetic field in a given reason is uniform. Draw a diagram to support it.

(iii) Two electric motors A and B are given. B is more powerful than A. Which of the two motors has more number of turns in the coil. Justify.

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