SAMPLE PAPER III

X - SCIENCE (THEORY)

Time : 2½ Hours **Max. Marks : 60**

General Instructions

2. All questions are compulsory.
3. There is no overall choice. However, internal choice has been provided in all the three questions of five marks category. Only one option in such questions is to be attempted.
4. All questions of section A and all questions of section B to be attempted separately.
5. Questions 1 to 6 in section A and 19 to 21 in section B are very short answer type questions and carry one mark each.
6. Questions 7 to 12 in section A and 22 to 24 in section B are short answer type questions and carry two marks each.
7. Questions 13 to 16 in section A and 25 and 26 in section B are also short answer type questions and carry three marks each.
8. Questions 17 and 18 in section A and question 27 in section B are long answer type questions and carry five marks each.

SECTION A

1. Dry Hydrogen Chloride gas does not turn blue litmus red whereas Hydrochloric acid does. Give one reason.
2. Identify the substance oxidized in the chemical reaction:

   $MnO_2 + 4\,HCl \rightarrow Mn\ Cl_2 + Cl + 2H\ O$
3. You are given two resistors of 5? and 20 ?, a battery of emf 2.5V, a key and an ammeter. Draw a circuit diagram of all given components such that the ammeter gives a reading of 0.1A.
4. Sketch magnetic field lines around a current carry straight conductor.
5. The electrical resistivity of few materials is given below in ohm-meter. Which one of these materials has the highest electrical conductivity?

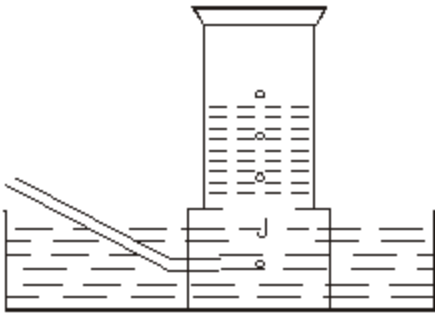
A	6.84 X 10-8
B	1.60 X 10-8
C	1.00 X 10-4
D	2.50 X 1012
E	4.40 X 10-5
F	2.30 X 1017

6. Refractive index of media A, B, C and D are

A	1.33
B	1.52
C	1.44
D	1.65

In which of the four media is the speed of light (i) maximum (ii) minimum?

7. A metal is treated with dilute sulphuric acid. The gas evolved is collected by the method shown in the figure. Answer the following



(a) (i) Name the gas.

(ii) Name the method of collection of the gas.

(b) How can you test whether the gas is combustible or not?

8. A household uses the following electric appliances:

(i) Refrigerator of rating 400 W for ten hours each day.

(ii) Two electric fans of rating 80 W each for twelve hours each day.

(iii) Six electric tubes of rating 18 W each for 6 hours each day.

Calculate the electricity bill of the household for the month of June if the cost per unit of electric energy is Rs. 3.00.

9. What is meant by the term 'frequency' of an alternating current? What is its value in India? Why is an alternating current considered to be advantageous over direct current for long range transmission of electric energy?

10. An old person is unable to see clearly nearby objects as well as distant objects.

a) What defect of vision is he suffering from?

b) What kind of lens will be required to see clearly the nearby as well as distant objects? Give reasons.

11. State two criteria each in the selection of each of the following:

(i) good fuel

(ii) good source of energy

12. (a) Name two elements which can be used for generation of electricity in a nuclear power plant.

(b) Why many nuclear power plants could not be installed in our country? Give two reasons.

13. 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 the reaction when

(i) gas was evolved

(ii) gas was passed through lime water.

14. Atomic number is considered to be a more appropriate parameter than atomic mass for classification of elements in a periodic table. Why?

How does metallic character of elements vary on moving from

(i) left to right in a period

(ii) from top to bottom in a group.

Give reasons for your answers.

15. Why does a current carrying conductor kept in a magnetic field experience force? On what factors does the direction of this force depend? Name and state the rule used for determination of direction of this force.

16. Answer the following:

(a) Why is formula of Plaster of Paris written as CaSo4 . ½ H_2O? How is it possible to have half a water molecule attached to $CaSO_4$?

(b) Why is Sodium Hydrogen Carbonate an essential ingrediant in most antacids?

(c) When electricity is passed through an aqueous solution of sodium chloride, three products are obtained. Why is the process called chlor-alkali process?

17. Four metals A, B, C and D are added to the following aqueous solutions one by one. The observations made are tabulated below:

Metal	Iron (II) Sulphate	Copper (II) Sulphate	Zinc Sulphate	Silver Nitrate
A	No reaction	Reddish brown deposit	-----	-----
B	Grey deposit	-----	No reaction	-----
C	No reaction	No reaction	No reaction	White shining deposit
D	No reaction	No reaction	No reaction	No reaction

Answer the following questions based on the above observations:

(i) Which is the most active metal and why?

(ii) What would be observed if B is added to a solution of copper (II) sulphate and why?

(iii) Arrange the metals A, B, C and D in order of increasing reactivity.

(iv) Container of which metal can be used to store both zinc sulphate solution and silver nitrate solution.

(v) Which of the above solutions can be easily stored in a container made up of any of these metals?

OR

Identify the type of chemical reaction taking place in each of the following:

(a) Barium chloride solution is mixed with copper sulphate solution and a white precipitate is observed.

(b) On heating copper powder in air in a China dish, the surface of copper powder turns black.

(c) On heating green coloured ferrous sulphate crystals, reddish brown solid is left and smell of a gas having odour of burning sulphur is experienced.

(d) Iron nails when left dipped in blue copper sulphate solution become brownish in colour and the blue colour of copper sulphate fades away.

(e) Quick lime reacts vigorously with water releasing a large amount of heat.

18. Draw ray diagrams to show the formation of a three times magnified (i) real image (ii) virtual image of an object kept in front of a converging lens. Mark the positions of object, F, 2F, O and position of image clearly in the diagram.

An object of size 5 cm is kept at a distance of 25 cm from the optical centre of a converging lens of focal length 10cm. Calculate the distance of the image from the lens and size of the image.

OR

Suggest reasons for each of the following:

(i) The sky appears to be blue during day time to a person on earth.

(ii) The sky near the horizon appears to have a reddish heu at the time of sunset and sunrise.

(iii) The sky appears dark instead of blue to an astronaut.

(iv) The stars appears to twinkle.

(v) The planets do not twinkle.

SECTION B

Q.19 Give any one reason for which environmentalists protested against raising height of the Sardar Dam on river Narmada? 1

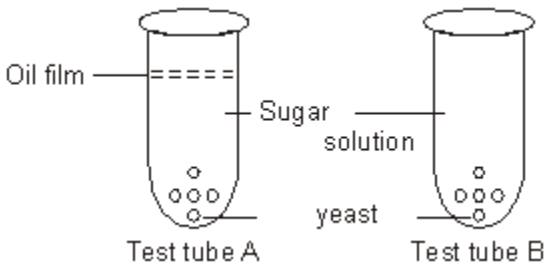
Q.20 Malarial parasite divides into many daughter individuals simultaneously through multiple fission. State an advantage the parasite gets because of this type of reproduction. 1

Q.21 The human hand, cat paw and the horse foot, when studied in detail show the same structure of bones and point towards a common origin.

(i) What do you conclude from this?

(ii) What is the term given to such structures? 1

Q.22 In the test tube A and B shown below, yeast was kept in sugar solution. Which products of respiration would you expect in tubes A and B?

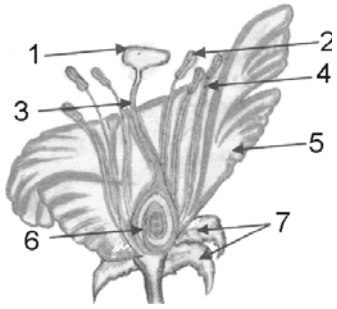


Q.23 Write one feature which is common to each of the following pairs of terms/organs

(i) glycogen and starch (ii) chlorophyll and hemoglobin

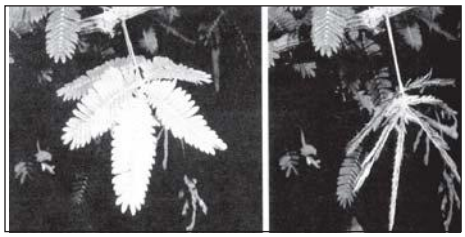
(iii) gills and lungs (iv) arteries and veins 2

Q.24

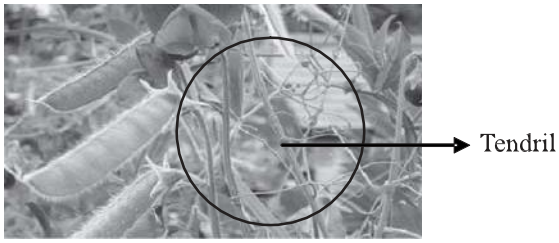


(i) Label any four parts. 2

Q.25 Following are the two examples of plant movement.



A - Sensitive plant



B - Pea plant

a) What is the stimulus which is common for movement in both the cases.

b) Does the movement take place away/at the point where stimulus is received? Mention sepa rately for both.

c) Give one reason for the movement in each case. 3

Q.26 Write the aquatic organisms in order of who eats whom starting from producer and form a chain of at least three steps. What name is given to such a chain is an ecosystem and what name is given to each stage. 3

a) What would be the colour of the patchy area in case of A and B and why.

b) During the experiment, why is the leaf dipped in alcohol?

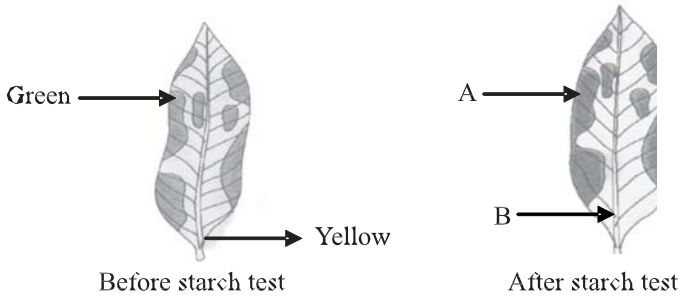
c) Why was the plant from which leaf is taken, kept in the dark?

d) What do you conclude from this experiment? 5

OR

Given below is the experiment carried out by Mendel to study inheritance of two traits in garden- pea.

Q.27 Given below are the diagrams of a variegated leaf, before and after starch test -



a) Fill in the boxes with appropriate answer.

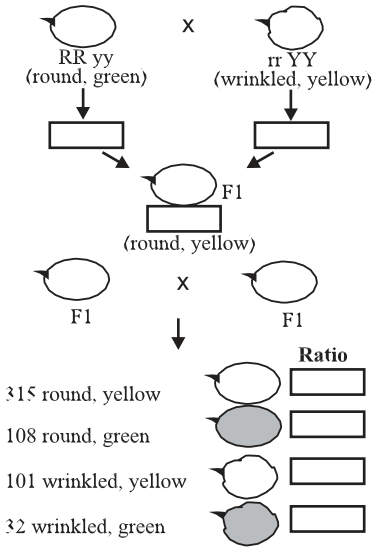
b) Why did Mendel carry out an experiment with two traits?

c) What were his findings with respect to inheritance of traits in F 1 and F 2 generations?

d) What do you conclude from this experiment? 5

OR

Given below is the experiment carried out by Mendel to study inheritance of two traits in garden- pea.



a) Fill in the boxes with appropriate answer.

b) Why did Mendel carry out an experiment with two traits?

c) What were his findings with respect to inheritance of traits in F 1 and F 2 generations? 5

SCIENCE Sample Paper III

Marking Scheme

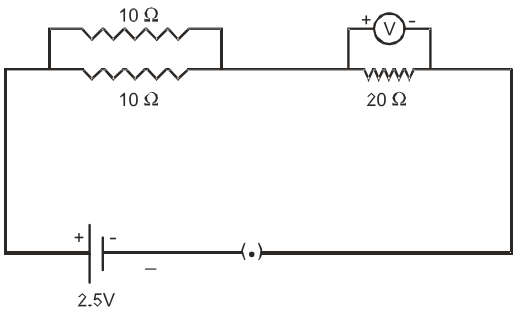
Value Points

Q.No. **Marks**

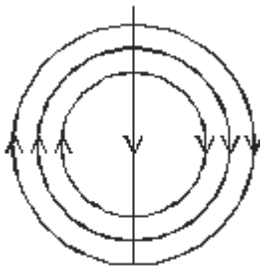
SECTION A

1. Hydrochloric acid produces H+(aq) Hydrogen ions in aqueous solution which are responsible for blue litmus turning red. Dry HCl does not ionize in the absence of water. 1

2. HCl is oxidized 1

3. 

4. 1


C and E

5. B

6. (i) A

   (ii) B

7. (a) (i) The gas is hydrogen.

   (ii) The method is downward displacement of water. 1

   (b) By bringing a burning splinter near the mouth of the gas jar filled with the gas, if the gas burns with a flame, it is combustible. 1

8. Electric Energy consumed per day

   = 400 x 10 + 2 x 80 x 12 + 6 x 18 x 6

   = 6568 wh 1

   Total Energy per month = $\frac{6568 \times 30}{1000}$ = 197.040 kWh ½

   Total Cost=197.040 x 3= Rs 591 (Approx.) ½

9. The frequency of an alternating current is the no. of times the direction of electric current changes in one second. 50 cycles/second. ½+½=1

At very high voltage, the transmission losses are minimized. At the receiving station, the voltage is stepped down for use. 1

10. (a) Presbyopia ½

(b) (i) Bifocal lenses ½

(ii) The upper portion (concave lens) facilitates distant vision and the lower portion (convex lens) facilitates near vision. 1

11. (i) Good Fuel: (1) High amount of heat released on combustion.

(2) Easily available

(3) Produces less smoke (Any two) ½+½

(ii) Good source of energy:

(1) Easily accessible

(2) Easy to store and transport

(3) High efficiency. (Any two) ½+½

12. (a) Uranium, Plutonium, Thorium (Any two) ½+½

(b) (i) High cost of installation

(ii) Environmental pollution

(iii) Limited availability of nuclear fuel (Any two) ½+½

13. (a) Lime water turns milky. 1

(b) (i) $CaCO_3(s) + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$

(Marble) (calcium chloride) 1

(ii) $Ca(OH)_2(aq) + CO_2(g) \rightarrow CaCO_3(s) + H_2O$ 1

14. The properties of the elements could be predicted more precisely when elements are arranged on the basis of increasing atomic number. The atomic number is equal to thenumber of protons= the number of electrons. It is the number of electrons which decide the properties of the element. 1

(i) Decreases: This is due to an increase in nuclear charge which tends to pull the electrons closer to the nucleus and reduce the size of the atom. 1

(ii) Increases: This is because new shells are being added as we go down the group. It increases the distance between the nucleus and the valence shell. 1

15.

- A current carrying conductor has a magnetic field associated with it. The two magnetic fields, one due to the magnet and the other due to current in the conductor, interact. This produces a force on the conductor. 1
- The strength of electric current and the strength of the magnetic field. ½

- Fleming's left hand rule statement. ½
- Statement of the rule. 1

16. (a) It is written in this form because two formula units of $CaSO_4$ share one molecule of water. 1

(b) Being alkaline, it neutralizes excess acid in the stomach and provides relief. 1

(c) Because of the products formed (Sodium hydroxide, chlorine and hydrogen) Chlor stands for chlorine and alkali stands for sodium hydroxide. 1

17. (i) B is the most reactive metal because it could displace iron sulphate which no other metal could.

(ii) B will displace copper from copper sulphate solution because it is more active than copper.

(iii) D < C < A < B

(iv) Container of metal D could be used for storing zinc sulphate and silver nitrate solution

(v) Zinc sulphate can be stored easily in a container made up of any of these metals. 5

OR

(a) Double Displacement Reaction

(b) Oxidation Reaction / Combination Reaction

(c) Decomposition Reaction

(d) Displacement Reaction

(e) Combination Reaction 5

18. • Real Image ray diagram 1

- Virtual Image ray diagram 1
- $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ 1

Correct Substitution and calculation, v = 16.67cm (Approx.) 1
Size of the image = 3.33 (Approx.) cm 1

OR

(i) Scattering of blue colour in sunlight by earth's atmosphere. 1

(ii) Light has to pass through thicker layers of air and large distance. Shorter wavelengths are scattered away. Only larger wavelength (red) of light reaches us. 1

(iii) No atmosphere, no scattering of light. 1

(iv) Due to atmospheric refraction of starlight and physical conditions of earth's atmosphere not being stationary. 1

(v) Planets are much closer to earth and are seen as extended sources.

SECTION - B

19. 1. Environmental problem
    Deforestation/loss of bio diversity
    2. Social problem - displacement of tribals, no compensation etc.
    3. Economics problem - public money consumed (any one) 1

20. - Progeny is identical like parent and in large number. ½
    - Single individual can reproduce. ½

21. (i) in course of evolution they have modified to perform different function. ½
    (ii) Homologous organs. ½

22. In test tube A - carbon dioxide + alcohol 1
    In test tube B - carbon dioxide + water 1

23. (i) carbohydrates / storage products
    (ii) pigments / found in living organisms.
    (iii) respiratory organs / for exchange of gases.
    (iv) vessels (blood) part of the circulatory system. ½×4 =2

24. 1. stigma
    2. anther
    3. style
    4. Filament
    5. Petal
    6. Ovary
    7. Sepal (any 4) ½×4=2

25. (a) Touch 1
    (b) A - away from contact B- at the point of contact ½ +½
    (c) A - change in amount of water / turgor pressure
    B - uneven growth / growth ½ +½

26. Phytoplankton
    ↓
    Zooplankton
    ↓
    Fish (any other suitable example of aquatic food chain) 1

- aquatic food chain 1

- Producer, herbivore, carnivore // Producer, Primary consumer, Secondary consumer. 1

27. a) A -Blue black ½+½+1

B- Yellow

Because of the presence of starch in A.

a) It helps dissolve chlorophyll 1

b) To use up the stored starch 1

c) Chlorophyll is required for photosynthesis 1

OR

a) Gametes - Ry, rY 7x½ = 3½

F1 - RrYy

Ratio - 9, 3, 3, 1

b) To study the independent inheritance of two traits in subsequent generation. ½

c) F1 progeny exhibited both the dominant traits. ½

F 2 exhibited parental traits along with new mixtures/recombinants. ½