

**Science and Technology**

**Class X**

**General Instructions**

1. The question paper consists of two sections, A and B. You are to attempt both the sections.
2. Marks allocated to every question are indicated against it.
3. Question no. 1- 5 in section A and 21 -23 in section B are to be answered in one word or one sentence.
4. Question no: 6-10 in section A and 24&25 in section B are to be answered in 30-40 words each.
5. Question no: 11-17 in section A and 26 -29 in section B are to be answered in 40 to 50 words each.
6. Question no: 18- 20 in section A and 30 in section B are to be answered in 60- 80 words each.

**SECTION - A**

1. How is  $^{239}\text{Pu}_{94}$  obtained from  $^{238}\text{U}_{92}$ . Trace the pathway. (1M)
  2. Name the compound that is used for removing permanent hardness in water. Give its formula. (1M)
  3. How should the two resistances of  $2\Omega$  each be connected so as to produce an equivalent resistance of  $1\Omega$ ? What conclusion can you draw from this? (1M)
  4. Why should air not enter into the vessel during fermentation of sugar to prepare ethanol? (1M)
  5. Name the non-metal which is used to make vegetable Ghee. What will be the product formed if this non metal is boiled with Sulphur. (1M)
  6. a) What happens when an  $\alpha$  particle hits a nitrogen atom?  
b) Why is a neutron considered a better projectile compared to an  $\alpha$  particle? (2M)
  7. Suggest a method to join cracked machine parts or railway tracks. Explain the method giving reason and give the necessary equation. (2M)
  8. Explain why the number of meteorites striking the moon's surface is quite large whereas very few reach the earth's surface. (2M)
  9. a) Give one example of a strong electrolyte and one example of a weak electrolyte.  
b) What do you understand by "Rate of Reaction"?  
OR  
a) What are negative catalysts? Give an example.  
b) Write the expression for the equilibrium constant for the following reaction. (2M)
- $$2\text{SO}_2 + \text{O}_2 = 2\text{SO}_3$$
10. A current of 4A flows through a car having a battery of 12V for 10 minutes. How much electrical energy is consumed during that time? (2M)
  11. What is Hypermetropia? How is it corrected? Explain with the aid of a diagram. (3M)
  12. a) What happens when a solution of Sodium hydrogen carbonate reacts with Sulphuric acid? What is commercial application of this reaction? Give the necessary equations.  
b) How is safety glass prepared? State its important property. (3M)

13. Draw the diagram to show the working of a motor. Explain how it works.

OR

Write brief notes on (i) Overloading (ii) Short circuiting and (iii) Van Allen belt. (3M)

14. What does 'the charge' consist of in a Blast furnace? Draw a labeled diagram of the Blast furnace and explain the chemical reactions taking place in it. (3M)

15. a) Why are solid fuels considered better for rockets? Give an example of a solid fuel mixture.  
b) Give three reasons as to why earth is considered to be a special planet among the terrestrial planets.

(3M)

16. a) How are the molecules of aldehydes and ketones structurally different?  
b) What is formalin? How does it react with Tollen's reagent? State any one of its uses.

OR

a) Write the functional group present in the compound  $\text{CH}_3\text{NH}_2$  and name it.  
b) What is fermentation? What happens when ethanol reacts with acetic acid? Give the equation involved. (3M)

17. Give reasons why,

(i) Water should never be added to conc.  $\text{H}_2\text{SO}_4$   
(ii)  $\text{H}_2$  gas is not evolved when a metal reacts with nitric acid.  
(iii) Silver or Copper is added to gold while making jewelry. (3M)

18. a) An object is placed 20 cm in front of mirrors  $m_1$  and  $m_2$  separately and the image is found to be formed at a distance of 15 cm, in front of it in case of  $m_1$  and behind it in case of  $m_2$ . Find the focal length of the mirrors and the kind of mirror in each case.

b) Give two differences between a "Real Image" and a "Virtual Image". (5M)

19. a) How is polyester manufactured?

b) What type of polymer does polyester belong to? Give its characteristic feature.  
c) Give two advantages of vulcanized rubber.

OR

a) Explain the mechanism of the cleansing action of soaps and detergents.  
b) Give two differences between detergents and soaps.  
c) What change has been made in the composition of detergents to make them biodegradable?

(5M)

20. a) The calorific value of coal is 30kJ/g. How many grams of coal will be needed to raise the temperature of water from  $20^\circ\text{C}$  to  $80^\circ\text{C}$ ? Specific heat of water is  $4.2\text{J/g}^\circ\text{C}$ .

b) Give two reasons as to why the use of solar cell is limited.  
c) When kerosene is used in a stove it produces a blue flame whereas in a kerosene-lantern it produces a yellow flame. Give reason.

OR

a) The heat produced by complete combustion of 10g of fuel could raise the temperature of 2kg of water from  $20^\circ\text{C}$  to  $70^\circ\text{C}$ . Calculate the calorific value of the fuel if the specific heat of water is  $4.2\text{J/g}^\circ\text{C}$ .

b) Give two reasons why the use of CNG has become popular these days as vehicle fuel.

c) It is difficult to use  $\text{H}_2$  as a source of energy although its calorific value is quite high.

Explain. (5M)

**SECTION - B**

21. Name the two substances which are responsible for the control and coordination in plants.

(1M)

22. What is agglutination? (1M)

23. What is parthenogenesis? (1M)

24. As a pollutant of the atmosphere, Carbon-monoxide is considered to be more dangerous than Carbon-dioxide. Why?

(2M)

25. What methods will you use to cultivate Rose plant and Jasmine plant? Explain. (2M)

26. Draw the structure of the human brain and label it. Give the role of the following: - "Temporal Lobe" and "Medulla oblongata". (3M)

27. What are the two vital functions of the kidney? Draw a labeled diagram of the human urinary system. (3M)

28. a) What are occupational diseases? Give an example.

b) Give the ill-effects of metallic particles discharged from the automobile exhausts.

c) What is bio-accumulation? Name the substance which can lead to bioaccumulation.

(3M)

29. What do you understand by karyotype? How is it done? How is the study of karyotypes helpful? Give an example.

OR

Describe the different types of chromosomes and draw a labeled diagram. (3M)

30. a) What are the steps involved in the light dependant reaction of photosynthesis.

b) Explain how light and temperature, affect the process of photosynthesis. (5M)