

# SCIENCE AND TECHNOLOGY (Theory)

Time allowed : 3 hours ]

[ Maximum Marks : 75

## General Instructions :

- (i) The question paper comprises of **two** sections, A and B. You are to attempt both the sections.
- (ii) The candidates are advised to attempt all the questions of Section A separately and Section B separately.
- (iii) All questions are compulsory
- (iv) There is no overall choice. However, internal choice has been provided in some questions. You are to attempt only one option in such questions.
- (v) Marks allocated to every question are indicated against it.
- (vi) Question numbers **1-5** in Section A and **21-23** in Section B are very short answer questions. These are to be answered in **one word** or **one sentence**.
- (vii) Question numbers **6-10** in Section A and **24-25** in Section B are short answer questions. These are to be answered in **30-40** words each.
- (viii) Question numbers **11-17** in Section A and **26-29** in Section B are also short answer questions. These are to be answered in **40-50** words each.
- (ix) Question numbers **18-20** in Section A and **30** in Section B are long answer questions. These are to be answered in **70** words each.

## SECTION - A

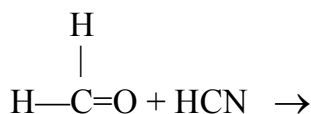
1. Why is much less heat generated in long electric than in filaments of electric bulbs ? 1
2. Where will the image be formed by a concave mirror when an object is placed between the pole and the focus point of the mirror ? 1
3. Write the chemical equation for the reaction of hot aluminium with steam. 1
4. Name a metal which offers higher resistance to the passage of electricity than copper. 1
5. Give an example of photochemical reactions. 1

6. What is the cause of release of unusually large energies in nuclear fission reactions ? How is the energy per fission calculated ? 2

Or

What is a thermal neutron ? Draw a schematic diagram depicting fission of a U-235 nucleus on absorption of a thermal neutron.

7. With respect to air the refractive index of kerosene is 1.44 and that for diamond is 2.42. Calculate the refractive index of diamond with respect to kerosene. 2
8. Draw diagrams to distinguish between 'equatorial orbit' and 'polar orbit' of artificial satellites of earth. 2
9. What justifies sulphuric acid being called the "king of chemicals" ? Why does sugar turn black in contact with concentrated sulphuric acid ? 2
10. How is plaster of Paris chemically different from gypsum ? How may they be interconverted ? Write one use of plaster of Paris. 2
11. Describe briefly the Big Bang Theory of the origin of universe. 3
12. Name three forms in which energy from oceans is made available for use. What are OTEC power plants ? How do they operate ? 3
13. A torch bulb is rated 5.0 V and 500 mA. Calculate (i) its power, (ii) resistance and (iii) energy consumed when it is lighted for four hours. 3
14. (a) Write the chemical equation representing the reaction for the preparation of methanal from methanol.
- (b) What happens when methanal is mixed with :
- (i) Ammoniacal silver nitrate solution and the mixture is warmed.
- (ii) Fehling's reagent and the mixture is warmed.
- (c) Complete the reaction equation :



Or

Write the formulae for the given compounds and name the functional groups present in each of them :

- (i) Ethanoic acid                      (ii) Propanone                      (iii) Nitromethane

15. (i) Distinguish between an addition polymer and a condensation polymer.  
(ii) Choose one condensation polymer and one addition polymer from amongst the following :  
nylon, teflon, neoprene, polyester  
(iii) Write a chemical equation for the reaction involved in the formation of a polyamide. 3
16. (a) Why ZnO called an amphoteric oxide ? Name another amphoteric oxide.  
(b) What are alkalies ? Give one example of alkalies. 5
17. (a) State the relation between hydrogen ion concentration of an aqueous solution and its pH.  
(b) The pH of an aqueous solution decreases from 3 to 2. Calculate how many times the hydrogen ion concentration of the solution will change. 3
18. (a) Draw a schematic labelled diagram of a domestic wiring circuit which includes (i) a mains fues (ii) a power meter, (iii) one light point, and (iv) a power plug.  
(b) Why is it necessary to connect an earth wire to electric appliances having metallic covers ? 5
19. (a) Explain the following terms used in relation to defects in vision and corrections provided for them—  
(i) Myopia (ii) Astigmatism (iii) Bifocal lenses (iv) Far sightedness.  
(b) Describe with a ray diagram how a person with myopia can be helped by
- Or**
- (a) What is a 'simple microscope' ? Draw diagrams to show the image formed by a simple microscope with the eye focussed—  
(i) on near point (ii) at infinity.  
(b) What is the maximum magnification obtainable by a simple microscope ?
20. (a) Write chemical equations for the reactions involved in obtaining pure alumina from the mineral bauxite which has impurities of iron oxide and silica.  
(b) Draw a labelled diagram of the electrolytic tank cell used for the extraction of aluminium from alumina. 5

**Or**

- (a) What is corrosion of metals ? Name one metal which does not corrode and one which corrodes on being kept in atmosphere.
- (b) How will you show that the rusting of iron needs oxygen and moisture at the same time.

**SECTION - B**

- 21. What is 'Green House Effect' ? 1
- 22. Name the type of chromosome in which one arm is very long and the other is Very short. 1
- 23. Write the expanded form of the abbreviation AIDS. 1
- 24. List any four practices which help in protecting our environment. 2

**Or**

Describe any four modes of disposal of waste.

- 25. What are 'fabric filters' ? Describe their function in controlling pollution of air. 2
- 26. What is 'organic evolution' ? How do embryological studies provide evidence for evolution ? 3
- 27. Differentiate between 'self pollination' and 'cross pollination'. Describe 'double fertilisation' in plants. 3
- 28. Draw a diagram of human brain and label on it the following of its parts :  
(i) Cerebrum (ii) Meninges (iii) Medulla Oblongata (iv) Cerebellum 3
- 29. What is 'translocation' ? Why is it essential for plants ? Where in plants are the following synthesized :  
(i) Sugars (ii) Hormones 3

**Or**

What is 'clotting of blood' ? Write a flow chart showing major events taking place in clotting of blood.

- 30. List three differences between respiration in plants and respiration in animals. Describe with a labelled diagram how gaseous exchange occurs through root hair in plants. 5