

SCIENCE AND TECHNOLOGY (Theory)
CLASS X

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) Question numbers **1-5** in Section A and **21-23** in Section B are very short answer questions carrying **1 mark** each. These are to be answered in **one word** or **one sentence**.
- (vi) Question numbers **6-10** in Section A and **24-25** in Section B are short answer questions carrying **2 marks** each. These are to be answered in **30-40** words each.
- (vii) Question numbers **11-17** in Section A and **26-29** in Section B are also short answer questions carrying **3 marks** each. These are to be answered in **40-50** words each.
- (viii) Question numbers **18-20** in Section A and **30** in Section B are long answer questions carrying **5 marks** each. These are to be answered in **70** words each.

SECTION-A

1. Give an example of an instantaneous reaction.
2. What is the relation between the critical angle and refractive index for a medium?
3. What is the effect on resistivity of a pure metal with the increase in temperature?
4. Define the term 'metallurgy'
5. Name the enzymes required for the fermentation of sugarcane to alcohol.
6. How is bleaching powder prepared? What happens when it is exposed to air? Give chemical equations also.
7. Give reasons:
 - a) Solar corona is seen only at the time of total solar eclipse.
 - b) Asteroids should be watched carefully.
8. What is rusting of iron? State two ways of preventing it.
9. Complete the following nuclear reactions:
 - a) ${}_{13}^{27}\text{Al} + {}_2^4\text{He} \rightarrow {}_{14}^{30}\text{Si} + ?$
 - b) ${}_{12}^{24}\text{Mg} + ? \rightarrow {}_{11}^{23}\text{Na} + {}_1^1\text{H}$

10. A wire of resistance 20Ω is cut into two halves and both the ends of both the halves are joined to each other. What is the equivalent resistance of the combination?

OR

Two resistances of 10Ω and 15Ω connected in parallel are connected to a 12 V battery. Calculate the total current flowing in the circuit.

- 11.
- What is a catalyst? What happens to the catalyst after the chemical reaction is over?
 - What is a negative catalyst? Give an example.
12. What are the three layers of the earth? Mention the properties of each.
13. What is the importance of a nuclear reactor? What role do the moderator and coolant play in a nuclear reactor?
14. How do the molecules of sulphur exist? Draw the diagram of a sulphur molecule. How can sulphur be oxidised to sulphur dioxide and sulphur trioxide?
15. What is formalin? What are the products formed when it is heated with Fehling's Solution? How are Fehling A and Fehling B solutions prepared?
16. What is the monomer of natural rubber? Why is natural rubber heated with sulphur before use? What is this process known as? What are the uses of the rubber obtained after this process?
17. Which physical parameters are conserved during a nuclear reaction? What are the two major kinds of nuclear reactions? Give examples of each.

OR

What are the different kinds of nuclear *fission*? How can you relate sunlight and nuclear *fusion*?

- 18.
- State the differences in the physical properties of metals and non-metals.
 - Give two reactions of zinc oxide to show that it is an amphoteric oxide.
 - How do sodium and magnesium react with water?

OR

- What are the steps used for the enrichment of the ores of the metals?
 - What is 'calcination'? Give an example.
 - Give the reactions taking place in the blast furnace during the metallurgy of iron. Name one alloy of iron and its other constituents.
19. What is a fuse? How does it function? Explain the terms 'short-circuiting' and 'overloading' in an electric supply.
- 20.
- Derive the relation for the magnification produced by a convex lens.
 - Draw a ray diagram for the formation of image by a convex lens when the object is placed:
 - Beyond twice the focal length.
 - Between the focus and the pole.

OR

- What do you mean by the refractive index of a medium?
- Which phenomenon does an optical fibre work upon?

- c) Why does a diamond glitter?
- d) Explain the phenomenon of mirage seen in a desert.

SECTION-B

- 21. What do you mean by photolysis?
- 22. Define the term 'transportation'.
- 23. What are the components of a chromosome?
- 24. What is blood? What are its components?
- 25. Mention *four* conservation practices.
- 26. What is pollination? Distinguish between self-pollination and cross-pollination.
- 27. What are the different types of nervous system in humans? Mention the function of each.
- 28. What are occupational hazards? Mention *four* such hazards.
- 29. Draw the labelled diagram of the human respiratory system.
- 30.
 - a) What do you mean by 'organic evolution'?
 - b) Who wrote the book '*Philosophique Zoologique*'? Explain his theory on organic evolution.
 - c) What do you mean by the following types of organs:
 - (i) Vestigial
 - (ii) Analogous
 - (iii) HomologousGive examples of each