

SCIENCE AND TECHNOLOGY (Theory)
Outside Compartment — 2006

General Instructions:

1. The question paper comprises two Sections, A and B. You are to attempt both the Sections.
2. The candidates are advised to attempt all the questions of Section A separately and Section B separately.
3. All questions are compulsory.
4. There is no overall choice. However, internal choice has been provided in some questions. You are to attempt only one option in such questions.
5. Marks allocated to every question are indicated against it.
6. Question numbers 1—4 in Section A and 17— 18 in Section B are very short answer questions and are of 1 mark each. These are to be answered in one word or one sentence each.
7. Question numbers 5—8 in Section A and 19— 20 in Section B are short answer questions and are of 2 marks each. These are to be answered in 30—40 words each.
8. Question numbers 9—14 in Section A and 21—23 in Section B are also short answer questions and are of 3 marks each. These are to be answered in 40—50 words each.
9. Question numbers 15—16 in Section A and 24 in Section B are long answer questions and are of 5 marks each. These are to be answered in 70 words each.

SECTION A

- Q. 1.** List any two factors which affect the rate of a chemical reaction. **(1)**
- Q. 2.** Name the primary colours of light. **(1)**
- Q. 3.** Out of the two, a toaster of 1kW and an electric heater of 2 kW, which has a greater resistance? **(1)**
- Q. 4.** Why is alumina dissolved in molten cryolite during its electrolytic reduction? **(1)**
- Q. 5.** A calcium compound which is a yellowish white powder is used as a disinfectant and also in textile industry. Name the compound. Which gas is released when this compound is left exposed to air? **(2)**
- Q. 6.** Draw a labelled ray diagram to locate the image of an object formed by a convex lens of focal length 20 cm when the object is placed 30 cm away from the lens. **(2)**
- Q. 7.** Choose the metal (from the list given below) which can displace zinc from zinc sulphate solution—Lead, Copper, Magnesium, Silver. Write the equation of the chemical reaction involved. **(2)**
- Q. 8.** Why is a satellite lifted to a height of about 200 km from the ground before giving it a horizontal push? What is the minimum velocity required to launch an artificial satellite in an orbit around the earth? **(2)**
- Q. 9.** In the circuit shown below calculate:

- a. total resistance in the arm CE,
- b. total current drawn from the battery, and
- c. current in each arm, i.e., AB and CE of the circuit. (3)

Q. 10.

- a. Explain giving one example each the difference between average rate of reaction and instantaneous rate of reaction.
- b. Which solution has higher pH value, 1M HCl or 1M NaOH ? (3)

Q. 11.

- a. Name the organic acid present in vinegar. Write its chemical formula also.
- b. Name the products formed when
 - i. Ethanol burns in air.
 - ii. Sodium ethanoate is heated with soda lime. (3)

Q. 12. What are seismic waves? How do they help in the study of the internal structure of the Earth? Name the three layers of the Earth. (3)

Q. 13. What is meant by allotropy? Mention two allotropes of sulphur. What is the cause of their different shapes? Name the gas evolved when sulphur reacts with (3)

- a. Conc. H_2SO_4 ,
- b. Conc. HNO_3 .

Q. 14.

- a. Describe with flow diagram the manufacture of Ammonia gas.
- b. Write chemical equations of the reaction between ammonia and oxygen.
- c. Suggest one activity to show that ammonia gas is soluble in water and this solution is alkaline in nature. (3)

Or

- a. Define the terms mineral, ore and gangue as used in metallurgical operations.
- b. Describe with a labelled diagram, the method of concentration of a sulphide ore.
- c. Differentiate between roasting and calcination.

Q. 15. What is biogas? How can biogas be obtained? Why is the use of biogas obtained from cow-dung advised in preference to burning of cow-dung cakes? (3)

Q. 16.

- a. During its passage from one medium to another, when does a light ray change its path?
- b. Define the term absolute refractive index of a medium?
- c. With the help of a ray diagram explain the term 'critical angle'.
- d. For a ray of light going from a denser medium to air, what is the value of refractive index of the medium if the critical angle is equal to 45° . (5)

Or

- a. List four common defects of vision that can be corrected with the use of suitable spectacles.
- b. Suggest an activity to show the pattern of magnetic field lines, when you are provided with a bar magnet, a cardboard piece and iron filings.
- c. Draw a rough sketch of the field lines which you will observe.

SECTION B

Q. 17. Name the type of bond that joins the nitrogenous bases of the two strands of a DNA. **(1)**

Q. 18. List two functions performed by ovaries in a human female. **(1)**

Q. 19. Name the gas produced on

- i. complete and
- ii. incomplete combustion of charcoal. Which one of them is poisonous for human beings and why? **(2)**

Or

What is the cause of acid rain? Write its two harmful effects.

Q. 20. How are the following effective in controlling particulate emissions present in air?

- a. Wet scrubbers
- b. Electrostatic precipitators **(2)**

Q. 21. What is vegetative propagation? When is it used? Name three methods of vegetative propagation. **(3)**

Q. 22. Explain the role of the following in the process of digestion in the human body:

- i. Saliva
- ii. Gastric juices
- iii. Trypsin **(3)**

Or

Draw a diagram of the human respiratory system showing larynx, tracheae, primary bronchus and lungs.

Q. 23. How does blood circulate between lungs and heart in human beings? Give two functions of lymph in human body. **(3)**

Q. 24.

- a. What are 'hormones'?
- b. List four characteristics of hormones.
- c. Name the hormone required for the following:
 - i. Functioning of mammary glands
 - ii. Regulation of calcium and phosphate in blood
 - iii. Lowering of blood glucose
 - iv. Development of moustache and beard in human male. **(5)**