SCIENCE AND TECHNOLOGY (Theory)
Outside — 2006

General Instructions:

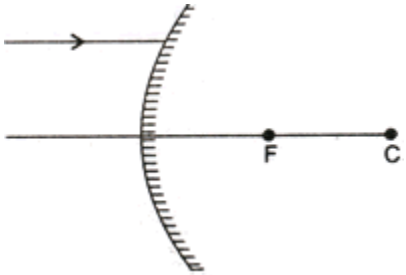
1. The question paper comprises two Sections, A and B. You are to attempt both the Sections.
2. The candidates are advised to attempt all the questions of Section A separately and Section B separately.
3. All questions are compulsory.
4. There is no overall choice. However, internal choice has been provided 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. Name the product other than water formed on burning or etnanol in air. **(1)**

Q. 2. How can you show that the magnetic field produced by a given electric current in the wire decreases as the distance from the increases? **(1)**

Q. 3. A ray of light is incident on a convex mirror as shown below: **(2)**



Redraw the above diagram after completing the path of the light ray after reflection from the mirror.

Q. 4. Why does magnesium powder react much more rapidly than magnesium ribbon with dilute sulphuric acid? **(1)**

Q. 5. An object is placed at a distance of 12 cm in front of a concave mirror. It forms a real image four times larger than the object. Calculate the distance of the image from the mirror. **(2)**

Q. 6.

i. Draw a diagram to show how two resistors R_1 and R_2 are connected in series.

ii. In a circuit if the two resistors of 5 ohm and 10 ohm are connected in series, how does the current passing through the two resistors compare?

Or

A bulb is rated at 5.0 volt, 100m A. Calculate its

i. power and ii. resistance.

Q. 7. Name the type of nuclear reaction by which the Sun produces its energy. List two conditions which are present at the centre of the Sun responsible for this reaction. **(2)**

Q. 8. Given below are the pH values of four different liquids:

7.0, 14.0, 4.0, 2.0 Which of these could be that of

i. lemon juice, iii. 1 M sodium hydroxide solution,

ii. distilled water, iv. tomato juice?

v. **(2)**

Q. 9. Distinguish between natural and artificial satellites.

To launch an artificial satellite in an orbit around the Earth what is the minimum:

i. Horizontal velocity required for the push?

ii. Height to lift the satellite from the ground? **(3)**

Q. 10.

i. Name the raw materials used in the manufacture of sodium carbonate by Solvay process.

ii. How is the sodium hydrogen carbonate formed during Solvay process separated from a mixture of NH_4CL and $NaHCO_3$?

iii. How is sodium carbonate obtained from sodium hydrogen carbonate? **(3)**

Q. 11.

a. What is the action on litmus of:

i. Dry ammonia gas

ii. Solution of ammonia gas in water.

b. State the observations you would make on adding ammonium hydroxide to aqueous solutions of:

i. Ferrous sulphate ii. Aluminium chloride.

Or

Explain the following terms by giving one example of each: **(3)**

i. Mineral iii. Gangue

ii. Ore

Q. 12.

i. How is methanal obtained from methanol?

ii. Write the chemical equation of the reaction involved in the preparation of methanal from methanol.

iii. Mention one t1se of an aqueous solution of methanal in the biology laboratory. **(3)**

Or

Complete the following reaction equations:

i. CH_3CH_2OH
ii. $HCHO + H_2$
iii. $CH_3COOH + C_2H_5OH$

Q. 13.

i. Name the four gases commonly present in biogas. **(3)**
ii. List two advantages of using biogas over fossil fuels.

Q. 14. What is a nuclear reactor? State one function each of

i. coolant and
ii. moderator in a nuclear reactor. **(3)**

Q. 15.

a. What is an electromagnet? What does it consist of?
b. Name one material in each case which is used to make a
   i. Permanent magnet
   ii. Temporary magnet
c. Describe an activity to show how you can make an electromagnet in your school laboratory.

Q. 16. What is an alloy? How is an alloy made? List two purposes of making alloys. Mention the constituents and two properties of each of the following alloys: **(5)**

i. Stainless steel
ii. Brass

SECTION B

Q. 17. Name the type of fission carried out by Amoeba. **(1)**

Q. 18. Write the expanded form of AIDS. **(1)**

Q. 19. Differentiate between tropic and nastic movements in plants. Give one example of each. **(2)**

Q. 20. "Rapid increase of population disturbs the biotic environment" Justify this statement taking any two aspects. **(2)**

Q. 21. Write the functions of the following in the digestive process: **(3)**

i. Bile
ii. Bicarbonate secreted by the duodenal
iii. Pancreatic amylase.

Q. 22. Give reasons for the following: **(3)**

i. The glottis is guarded by epiglottis.
ii. The lung alveoli are covered with blood capillaries.
iii. The wall of trachea is supported by cartilage rings.

Q. 23. Who proposed the "Theory of Natural Selection"? Explain this theory briefly. **(3)**

Q. 24.

a. Draw a diagram of the human urinary system and label in it:
   i. Kidney
   ii. Ureter
   iii. Urinary bladder
   iv. Urethra
b. Name the two major components of normal human urine. OR **(5)**
   i. Name the blood groups under ABO system.
   ii. Differentiate between universal donor and universal recipient under this system. **(5)**