

SCIENCE AND TECHNOLOGY (Theory)

Time allowed : 2½ hours

Maximum Marks: 60

General Instructions :

- (i) The question paper comprises of **two** sections, A and B. You have to attempt both the sections.
- (ii) You are advised to attempt all the questions of Section A 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) Questions number 1-4 in Section A and 17, 18 in Section B are very short answer questions. These are to be answered in **one word or one sentence**.
- (vii) Questions number 5-8 in Section A and 19, 20 in Section B are short answer questions. These are to be answered in **30 - 40** words each.
- (viii) Questions number 9-14 in Section A and 21 - 23 in Section B are also short answer questions. These are to be answered in **40 - 50** words each.
- (ix) Questions number 15, 16 in Section A and 24 in Section B are long answer questions. These are to be answered in **70** words each.

SECTION A

1. The pH values of three solutions A, B and C having equal molar concentration are respectively 2.0, 7.0 and 13.0 at 298 K. Which of the three solutions represents an acid solution ? 1
2. Write the chemical formula of simplest ketone. 1
3. Why is our galaxy called 'Milky Way' ? 1
4. If the distance between two electric charges is doubled, how much will the force exerting between them change to ? 1
5. State four characteristic features of 'Dynamic Equilibrium'. 2

6. What is Fehling's reagent ? What would you observe on heating formalin with Fehling's reagent in a test tube ? 2
7. Distinguish between a 'geosynchronous' and a 'polar' satellite. What is the usual time period of a 2
- (a) geosynchronous satellite ?
- (b) polar satellite ?
8. An electric heater is used on 220 V supply and takes a current of 3.4 A. Calculate (i) its power and (ii) its resistance, when it is in use. 2
9. What is 'Plaster of Paris' chemically ? How is it obtained from gypsum ? Write the condition and chemical equation involved in its manufacture. 3
10. Define the term, 'allotropy'. In which kind of properties are the two allotropes of an element (i) similar, (ii) different ? How can the two allotropes of sulphur be distinguished from one another ? 3
11. Give reasons for the following : 3
- (i) Alcohol supplied for industrial purposes is mixed with poisonous substances like copper sulphate.
- (ii) The reaction $\text{CH}_3\text{COONa} + \text{NaOH} \rightarrow \text{CH}_4 + \text{Na}_2\text{CO}_3$ is classified as a decarboxylation reaction.
- (iii) Formalin is used for preserving biological specimens.
12. A convex mirror used on a bus has a focal length of 200 cm. If a scooter is located at 400 cm from this mirror, find the position, nature and magnification of the image formed in the mirror. 3
13. (a) What is a 'solar cell' ?
- (b) Why is bio-gas considered an ideal fuel for domestic use ?
- (c) Name a device in which controlled chain reaction is used. 3
14. (a) Define the term, 'electroplating'.
- (b) With a labelled diagram describe an activity to show copper plating on a metal spoon. 3
15. (a) Write the name and formula of the main ore of aluminium.
- (b) What is alumina ? Which reducing agent is used for the reduction of alumina ?
- (c) Draw a diagram of the electrolytic cell used in the reduction of alumina. Label anode and cathode on it.

(d) Why is alumina dissolved in cryolite ? 5

OR

(a) What is an alloy ? How is an alloy made ?

(b) Name an alloy

(i) which has a lower melting point than its constituents.

(ii) which is more hard, tough and strong than its constituents.

(c) Name the constituents of the alloy, 'Magnalium'. Write its two uses. 5

16. Name the four common defects of vision and state the cause of each defect. A person cannot see distinctly objects placed beyond 2 metres. State the nature and focal length of the lens which could be used to correct this defect. 5

OR

(a) Describe with diagram an experiment to show that a force is exerted on a current carrying conductor when placed perpendicular in a magnetic field.

(b) State the rule to find the direction of the force exerted on a current carrying conductor in a magnetic field. 5

SECTION B

17. What is meant by 'translocation' with respect to transport in plants ? 1

18. What is a 'ganglion' ? 1

19. Anil has blood group 'A' while Om has blood group 'O'.

(a) Persons of which blood group(s) can receive blood from (i) Anil and (ii) Om ?

(b) Who can donate blood to (i) Anil and (ii) Om ? 2

OR

Draw the human heart and label (i) Aorta and (ii) Coronary artery on it. 2

20. What is autonomic nervous system ? Name the subsystems in which it is subdivided. 2

21. (a) How is the process of binary fission different from budding ?

(b) What is grafting ?

(c) List two advantages of vegetative propagation. 3

OR

Draw a diagram to illustrate fertilization in a flowering plant and label the following in it :

3

- (a) Pollen grains
- (b) Egg

22. How is the sex of the offspring determined in the zygote ? Explain.

3

23. Distinguish between 'Conservation' and 'Preservation'. Suggest any four practices which may help in protecting our environment.

3

24. (a) Draw the respiratory system of human beings.

(b) Label the following on the diagram drawn :

Larynx, Trachea, Primary Bronchus, Lungs.

(c) What happens to the carbon dioxide which collects in human tissues ?

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