SCIENCE AND TECHNOLOGY— 2005

SECTION A

Q. 1. Give an example of photochemical reactions.
Q. 2. Name a metal which offers higher resistance to the passage of electricity than copper. **1**

Q. 3. State a reaction in which SO2 acts as an oxidising agent. **1**

Q. 4. 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**

Q. 5. Which has a higher resistance: a 50 W lamp bulb or a 25 W lamp bulb and how many times? **1**

Q. 6. How is plaster of Paris chemically different from gypsum? How may they be interconverted? Write one use of plaster of Paris. **2**

Q. 7. Allotropy is a property shown by which class of substances, elements, compounds or mixtures? Give one example of allotropy. **2**

Q. 8. Draw diagrams to distinguish between 'equatorial orbit' and 'polar orbit' of artificial satellites of earth. 2

Q. 9. With respect to air the refractive indices of water and benzene are 1.33 and 1.50 respectively. Calculate the refractive index of benzene with respect to water. **2**

Q. 10. 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.

Q. 11. (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**

Q. 12. Explain the following regarding the manufacture of ammonia by Haber's process, the reaction being;

N2(g) + 3H2(g) ^=± 2NH3(g) + heat

(i) This reaction is carried out at a high temperature even though it is an exothermic reaction.
(ii) To make ammonia, the mixture of Nz and H2 gases is passed over
heated iron. **3**

Q. 13. (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**

Q. 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: **3**

H

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H---H-C=O + HCN- à

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

Q. 15. A torch bulb is rated 2.5 V and 750 mA. Calculate (i) its power, (ii) its resistance and (in) the energy consumed if this bulb is lighted for
four hours. 3

Q. 16. Name three forms in which energy from oceans is made available for use. What are OTEC power plants? How do they operate? **3**

Q. 17. Describe briefly the Big Bang Theory of the origin of universe. **3**

Q. 18. (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.

Q. 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 spectacles. **5**
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?

Q. 20. (a) What are 'magnetic field lines'? How is the direction of a magnetic field at a point determined?
(b)Draw two field lines around a bar magnet along its length on its two sides and mark the field directions on them by arrow marks.
(c)List any three properties of magnetic field lines. **5**

SECTION B

Q. 21. Write the expanded form of the abbreviation AIDS. **1**

Q. 22. Why is one arm in sub-metacentric chromosome longer than the other? **1**

Q. 23. What is 'Green House Effect'? **1**

Q. 24. What is 'eutrophication'? Write its two harmful effects. **2**
Q. 25. List any four practices which help in protecting our environment. **2**
Or
Describe any four modes of disposal of waste.

Q. 26. What is 'translocation'? Why is it essential for plants? Where in plants are the following synthesized:**3** (i) Sugars (it) Hormones
Or
What is 'clotting of blood'? Write a flow chart showing major events taking place in clotting of blood.

Q. 27. Draw a diagram of human brain and label on it the following of its parts:
(i) Cerebrum (it) Meninges
(iii) Medulla Oblongata (iv) Cerebellum **3**

Q. 28. Differentiate between 'self pollination' and 'cross pollination'. Describe 'double fertilisation' in plants. **3**

Q. 29. What is 'organic evolution'? How do embryological studies provide evidence for evolution? **3**

Q. 30. Explain the process of 'photosynthesis' in plants. List four factors which influence this process and describe how each of them affects the rate of the photosynthesis process. **5**