

Science 2004 – Outside Delhi

SECTION A

Q. 1. How is the rate of reaction influenced by **1**

- a) raising the temperature of reactants?
- b) Adding to the reacting mixture a product of reaction without change in volume?

Q. 2. How are the molecules of aldehydes and ketones structurally different? **1**

Q. 3. Name one non-metal and one metal which are in liquid state at room temperature. **1**

Q. 4. Name two other planets of the Solar System which are similar to the Earth in composition and structure. **1**

Q. 5. How is the strength of the magnetic field at a point near a wire related to the strength of the electric current flowing in the wire? **1**

Q. 6. How is chloride of lime chemically different from calcium chloride? Why does chloride of lime gradually lose its chlorine when kept exposed to air? **2**

Q. 7. What is formalin? How does it react with Tollen's reagent? State any one of its uses. **2**

Or

Complete the following reaction equations:

(i) $\text{CH}_2\text{CH}_2\text{OH} + \text{Na} \rightarrow$

H

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(ii) $\text{H}-\text{C}=\text{O} + \text{HCN} \rightarrow$

Q. 8. What is a galaxy? Name two common shapes of galaxies. Why is our galaxy called Milky Way? **2**

Q. 9. State one point of difference between a natural satellite and an artificial satellite. Name the type of orbit suitable for a geostationary satellite. **2**

Q. 10. Give one example of a nuclear fusion reaction. Describe one method for making such reactions possible. **2**

Q. 11. State Arrhenius' concept of acids and bases. Giving reason, select a strong acid and a weak base from amongst the following substances: **3**

H_2CO_3 , HNO_3 , NaOH , NH_4OH

Q. 12. How is it that we can use detergents for washing clothes even when the water is hard, but not soaps? What change has been made in the composition of detergents to make them biodegradable? **3**

Or

What is a polymer? How have polymers been classified? Name one polymer for each of the following applications:

- a) For insulating electric wires
- b) For non-stick coatings on kitchen utensils
- c) For blending with cotton to make shrink-resist cloth

Q. 13. Give reasons for the following: **3**

- a) Silicon counts among metalloids.

- b) Carbon is not used for making aluminium from aluminium oxide.
c) For making hydrogen by reaction with hydrochloric acid, granulated zinc is preferred to a block of zinc.

Q. 14. Write chemical equations for reactions taking place when: **3**

- a) Zinc carbonate is calcined.
b) Ammonia gas is passed over heated copper (II) oxide.
c) SO₂ gas and H₂S gas are together bubbled through water.

Q. 15. What are electrolytes? Define Faraday's constant for electrolytic reactions. Find chemical equivalents of Cu (II) (at. wt. 63.5 and Ag(I) (at. wt. 108). **3**

Q. 16. A 5 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. The distance of the object from the lens is 30 cm. Find the (i) position, (ii) nature and (iii) size of the image formed. **3**

Q. 17. a) What is meant by 'critical angle' for a ray of light going from one medium into another?

b) What is the consequence of making angle of incidence of light, at an interface, greater than the critical angle?

c) Why does a cut diamond shine more than a glass piece with diamond cut? **3**

Or

Draw ray diagrams to show the formation of images when the object is placed in front of a concave mirror

- a) between its pole and focus points.
b) between its centre of curvature and focus point. **3**

Q. 18. Why is it that iron does not occur as a metal in the crust of the earth? What are the common compound forms in which iron occurs? Which of these is more often used for extracting iron? Why are carbon and limestone mixed with the iron ore before feeding it into the blast furnace? Write the chemical equations for the reduction step and the slag formation step. **5**

Or

Define an alloy and an amalgam. State the main constituents of the following alloys. In what property is each of them different from its main constituent:

(I) Stainless steel (II) Bronze?

Q. 19. With the help of a labelled ray diagram show the formation of image of an object by a compound microscope.

A compound microscope has an objective of focal length 0.5 cm and an eye-piece of focal length 2.5 cm. If its tube length is 25 cm, calculate what will be the magnifying power of the microscope. **5**

Q. 20. On what principle does a solar water heater operate? Draw a labelled schematic diagram for a solar water heater.

The solar constant at a place is 1.4 kW/m². How much solar energy will be received at this place per second over an area of 5m². **5**

Or

What is the main basic Cause for winds to blow? Name a part of India where wind energy is commercially harnessed. Compare wind power and power of water flow in respect of generating mechanical and electrical energies. What is the hindrance in developing them?

SECTION B

Q. 2.1. State one of the evolutionary forces leading to the origin of a new species according to the synthetic theory of evolution. **1**

Q. 22. Name the excretory units present in an earthworm. **1**

Q. 23. A farmer floods his field everyday thinking that watering in this manner will result in a better yield of his wheat crop. What will be the result of this action of the farmer? **1**

Q. 24. Describe how the sex of the offspring is determined in the zygote in human beings. **2**

Q. 25. State any two practices which can help in the protection of our environment. **2**

Q. 26. Define 'nerve impulse'. Which structure in a neuron helps to conduct a nerve impulse **3**

a) towards the cell body?

b) away from the cell body?

Q. 27. List the sequence of events that occur during the formation of a blood clot after an injury. **3**

Q. 28. What is potable water? State any four of its necessary characteristics. **3**

Q. 29. What is the function of gizzard in a grasshopper? Draw a labelled diagram showing the digestive system of a grasshopper. **3**

Or

What is the function of epiglottis in man? Draw a labelled diagram showing the human respiratory system. **3**

Q. 30. With the help of a labelled diagram describe double fertilisation in plants. **5**