

SYLLABUS : CHEMICAL REACTION AND EQUATION, PERIODIC CLASSIFICATION LIFE PROCESS, HERIDITY AND EVOLUTION, ELECTRICITY, OUR ENVIRONMENT, SOURCES OF ENERGY, MANAGEMENT OF NATURAL RESOURCES.

GENERAL INSTRUCTIONS : Draw Diagrams with Pencils.

- All questions are compulsory. **Maximum Marks are 60.**
- The question paper consists of 25 Questions.
- **Section – A :** Question 1 to 8 are 1 mark each.
- **Section – B :** Question 9 to 18 are 3 marks each.
- **Section – C :** Question 19 to 22 are 5 marks each.

SECTION A : (1 × 10 = 10)

1. What is meant by skeletal equation?
2. How does valency of an element vary across a period?
3. Answer question numbers 3(a) – 3 (d) on the basis of your understanding of the following paragraph and the related studied concepts.

All of our energy comes from the sun, which is our nearest star. The sun sends out huge amounts of energy through its rays every day. We call this energy through solar energy or radiant energy. Without the sun, life on earth would not exist, since our planet would be totally frozen. We use this solar energy in many different ways. The sun light lets us see and warms us. Planets use the light from the sun to grow. They store it as chemical energy. This process is called photosynthesis. The energy is stored in their roots, fruits, and leaves. This energy feeds every living things on the earth. When humans and animals eat plants, and the food made from plants, we store the energy in our bodies in our muscles and in our brain cells. We use this energy when we sing a song, think a thought, tell a joke, climb a ladder, make a pizza, or run a race. Everything needs energy!

Just as humans store energy in their bodies, the earth stores the sun's energy too. The sun's energy is stored in coal, natural gas, water and wind. Coal, oil and natural gas are known as fossil fuels.

Fossil fuels were formed over millions of years ago when the remains and fossils of prehistoric plants and animals sank to the bottom of swamps and oceans. These animals and plant remains were slowly covered and crushed by layers of rock, mud, sand, and water. The pressure of all those layers caused the plants and animals to break down and change into coal, oil and natural gas.

We use the energy in these fossil fuels to make electricity. We use fossil fuels to make electricity. We use electricity in many different ways. We light and heat our homes, schools and businesses using electricity, and to run computers, refrigerators, washing machines, and air conditioners. Our cars and planes run on gasoline, which comes from oil. As of the year 2013, most of the energy we use comes from fossil fuels. However, fossil fuels are known as non – renewable sources of energy. They cannot be used over and over again. This means that one day they will run out! Luckily, there are some renewable energy sources we can use that we can keep using. Unlike non – renewable fossil fuels, they will not run out. Three forms of renewable fuels are; solar (coming from the sun) energy, water energy and wind energy. Solar energy can be caught through solar cells and solar panels. People put solar panels on the top of houses to help capture the sun's energy and transform it into heat and electricity. Water is also used to produce electricity. Dams capture the energy of falling water and turn it into electricity. Wind is a third form of renewable energy. Wind turbines can capture the energy of the

moving air and turn it into electricity. All these renewable energy sources are essential for us because they will not run out, so we need to get better and better at using them.

- (a) Where does all of our energy come from?
- (b) How does the author describe renewable energy sources?
- (c) Most of the energy we use comes from fossil fuels. However, fossil fuels are known as non – renewable sources of energy, also one day they will run out.
- (d) Based on the evidence in the passage, how can the sun best be described?

4. Question numbers 4 (a) – 4 (d) are based on the paragraph given below. Study this paragraph and answer the questions that follow.

Chronic kidney disease (CKD) is a condition characterized by a gradual loss of kidney function over time. CKD is also known as chronic renal disease. With increasing life expectancy and prevalence of life style disease, US has seen a 30% increase in prevalence of chronic kidney disease (CKD) in the last decade. Unfortunately, from India there is no longitudinal study and limited data on the prevalence of CKD.

In western countries, diabetes and hypertension account for over 2/3rd of the cases of CKD. In India too, diabetes and hypertension today account 40 – 60% cases of CKD. As per recent Indian Council of Medical Research data, prevalence of diabetes in Indian adult population has risen to 7.1% (varying from 5.8% in Jharkhand to 13.5% in Chandigarh) and in urban population (over the age of 40 years) the prevalence is as high as 28%. Likewise, the reported prevalence of hypertension in the adult population today is 17% (14.8% from rural and 21.4% from urban belt). A similar prevalence of 17.4% has been reported by Panesar et al. (in the age group of 20 – 59 years) even from slum resettlement colony of Delhi. With rising prevalence of these diseases in India, prevalence of CKD is expected to rise, and obviously, this is the key target population to address.

A study published in this issue is from a rural belt of Karnataka. The population had a mean age of 39.88 ± 15.87 years with 3.83% prevalence of diabetes and 33.62% of hypertension. Authors found 6.3% prevalence of CKD stage 3; which is the highest reported till date by any Indian worker. It is disturbing to note, the high prevalence of hypertension in a rural setting where over 75% population had normal or low body mass index. In comparison to most other published studies from India, the present study population is younger and even the prevalence of diabetes is low but surprisingly despite that prevalence of stage 3 CKD is reported to be higher (6.3%). It is disturbing to see the rising prevalence of hypertension and CKD in rural belt. Possibly, with shifting population the difference between urban and rural areas is getting blurred. Undoubtedly, we need more Indian data to validate these findings.

- (a) What is CKD?
- (b) What are the major causes of CKD?
- (c) In which segment of society is CKD more prevalent?
- (d) What is the highest percentage of CKD reported?

5. Electrical resistivity of a given metallic wire depends upon
- (a) its length
 - (b) its thickness
 - (c) its shape
 - (d) nature of the material
6. In an electrical circuit two resistors of 2Ω and 4Ω respectively are connected in series to a 6 V battery. The heat dissipated by the 4Ω resistor in 5 s will be
- (a) 5 J
 - (b) 10 J
 - (c) 20 J
 - (d) 30 J
7. Calcium oxide reacts vigorously with water to produce:
- (a) Calcium hydroxide releasing a large amount of heat.
 - (b) Calcium hydroxide absorbing a large amount of heat
 - (c) Calcium oxide and hydrogen with a release of large amount of heat.
 - (d) Calcium oxide and hydrogen with the absorption of large amount of heat.

For question number 8, one statement are given – one labelled Asseration (A) and the other labelled Reason(R). Select the correction answer to these questions from the codes (i), (ii), (iii) and (iv) as given below

- (i) Below A and R are true and R is correct explanation of the assertion.
- (ii) Both A and R are true but R is not the correct explanation of the assertion
- (iii) A is true but R is false.
- (iv) A is false but R is true.

8. **Assertion :** laws of refraction are valid for all angles on incidence.

Reason : when a ray of light falls perpendicular on the interface separating two transparent surfaces, it does not undergo refraction.

- (i) A (ii) B (iii) C (iv) D

SECTION B : (3× 10 = 30)

9. In the electrolysis of water,
- (i) Name the gas collected at anode and cathode
 - (ii) Why is the volume of gas collected at one electrode double than the other?
 - (iii) What would happen if dil H₂SO₄ is not added to water?
10. Differentiate between the arrangement of elements in Mendeleev's periodic table and modern periodic table.
11. How do Mendel's experiments show the traits may be dominant or recessive.
12. Foetus derives its nutrition from the mother.
- (a) Identify the tissue used for the above purpose. Explain its structure.
 - (b) Explain how wastes generated by developing embryo are removed.
 - (c) How does the birth of child take place?
13. What is the role of fuse, used in series with any electrical appliance? Why should a fuse with defined rating not be replaced by one with a larger rating?
14. (i) Write two observations when lead nitrate is heated in a test tube.
(ii) Name the type of reaction.
(iii) Write a balanced chemical equation to represent the above reaction.
15. Two elements X and Y have atomic numbers 12 and 6 respectively. To which period of the modern periodic table do these two elements belong? What type of bond will be formed between them and why? Also give the chemical formula of the compound formed.
16. In a pea Plant, the trait of flowers bearing purple colour (PP) is dominant over white colour (pp). Explain the inheritance pattern of F₁ and F₂ generations with the help of a cross following the rules of inheritance of traits. State the visible characters of F₁ and F₂ progenies.
17. What is the importance of forest as a resources?
18. What is meant by biodiversity? List two advantages of conserving forests and wildlife.

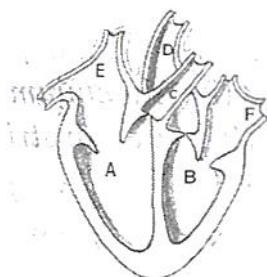
SECTION C : (5× 4 = 20)

19. Metal X is found in nature as its sulphide XS. It is used in the galvanisation of iron articles. Identify the metal X. How will you convert this sulphide ore into the metal? Explain with equations.

OR

State the reasons for the following:

- (i) Aluminium oxide is called an amphoteric oxide.
 - (ii) An iron strip dipped in a blue copper sulphate turns the blue solution pale green.
 - (iii) Hydrogen gas is not evolved when most metals reacts with nitric acid.
 - (iv) Calcium does not occur in Free State in nature.
 - (v) Sodium or potassium metals are kept immersed under kerosene.
20. (i) Identify any two parts from the below diagram which carry oxygenated and deoxygenated blood.

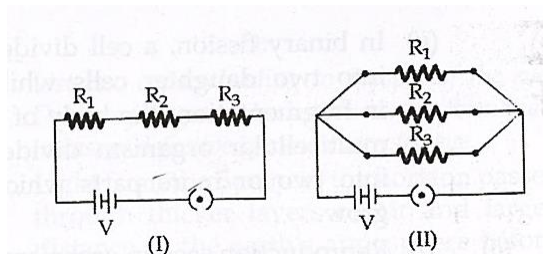


- (ii) Explain the process of double circulation with the help of a flow chart.
21. (a) What is meant by saying that the potential difference between two points is 1 volt?
 (b) Why does the connecting cord of an electrical heater not glow while the heating element does?
 (c) Electrical resistivities of some substance at 20°C are given below:

Silver	$1.60 \times 10^{-8} \Omega m$
Copper	$1.62 \times 10^{-8} \Omega m$
Tungsten	$5.2 \times 10^{-8} \Omega m$
Iron	$10.0 \times 10^{-8} \Omega m$
Mercury	$94.0 \times 10^{-8} \Omega m$
Nichrome	$100 \times 10^{-6} \Omega m$

Answer the following questions in relation to them:

- (i) Among silver and copper, which one is better conductor? Why?
 - (ii) Which material would you advise to use in electrical heating device? Why?
22. (a) Name an instrument that measures potential difference between two points in a circuit. Define the unit of potential difference between two points in a circuit. Define the unit of potential difference in terms of SI unit of charge and work. Draw the circuit symbols for (i) variable resistor (i) a plug key which is closed one.
 (b) Two electric circuits I and II are shown below



- (i) Which of the two circuits has more resistance?
- (ii) Through which circuit more current passes?
- (iii) In which circuit, the potential difference across each resistor is equal?
- (iv) If $R_1 > R_2 > R_3$ in which circuit more heat will be produced in R_1 as compared other two resistors?