



विद्या सर्वार्थ साधिका

ANANDALAYA

PERIODIC TEST- 3

Class: X

Subject: Science (086)

Date : 20-12-2024

MM : 40

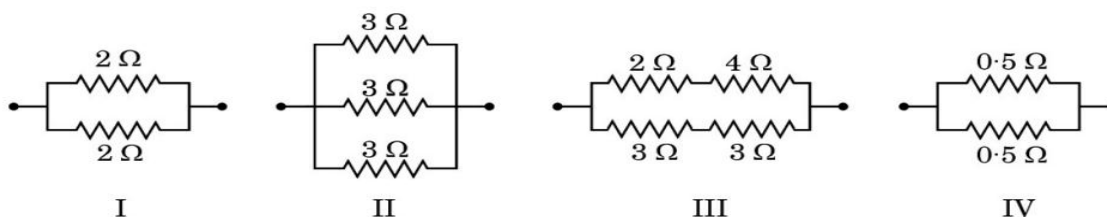
Time: 1 Hr. 30 min.

General Instructions:

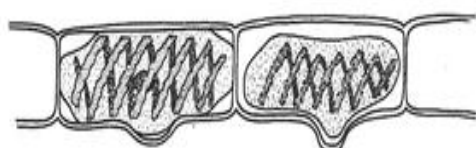
1. There are 17 questions in all. All questions are compulsory.
2. This question paper has five sections: Section A, Section B, Section C, Section D and Section E. All the sections are compulsory.
3. Section A consists of 8 multiple choice questions of 1 mark each, Section B consists of 2 very short questions of 2 marks each, Section C consists of 2 short answer type questions of 3 marks each, section D consists of 2 long answer questions of 5 marks each and Section E consists 3 source-based/case study-based questions of 4 marks each with sub-parts.

SECTION A

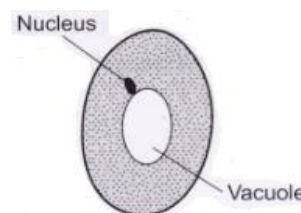
1. The commercial unit of electrical energy is equal to _____. (1)
(A) 3.6×10^6 J (B) 3.6×10^5 J (C) 0.36×10^4 J (D) 36×10^6 J
2. Four different combinations of resistors are shown below. Which two combinations have equivalent resistance 1Ω ? (1)



- (A) I and II (B) II and III (C) III and IV (D) I, II and III
3. The metal X does not react with cold water but floats on hot water with formation of colourless bubbles. Identify X. (1)
(A) Aluminium (B) Sodium (C) Magnesium (D) Calcium
 4. Alloys are homogeneous mixtures of a metal with another metal or non-metal. Which among the following alloys contain non-metal as one of its constituents? (1)
(A) Brass (B) Bronze (C) Amalgam (D) Steel
 5. When a human adult shows increased metabolism, nervousness, and weight loss, the hormone responsible for these symptoms is _____. (1)
(A) Growth hormone (B) Thyroxine
(C) Insulin (D) Adrenaline
 6. Identify the organisms X and Y and select the appropriate mode of asexual reproduction from the given options: (1)



X



Y

- (A) X - Fragmentation; Y - Spore Formation (B) X - Fragmentation; Y - Budding
(C) X - Budding; Y - Regeneration (D) X - Spore Formation; Y - Budding

In the following questions (Question. No. 7 and 8), a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choices.

- (A) Both A and R are true, and R is the correct explanation of A.
 (B) Both A and R are true, but R is not the correct explanation of A.
 (C) A is true, but R is false.
 (D) A is false, but R is true.

7. (A): Electrons move from lower potential to higher potential in a conductor. (1)
 (R): A dry cell maintains electric potential difference across the ends of a conductor.
8. (A): Compounds like; NaCl and CaO have high melting and boiling points. (1)
 (R): A considerable amount of energy is required to break the strong inter-ionic attraction.

SECTION B

9. A 2000 W heater has a resistance of about $25\ \Omega$, whereas a 100 W bulb has a resistance of $500\ \Omega$. When 220 V is applied on these, then which of the two may be used with an electrical circuit having 1.0 A rating? (2)
10. (a) Give reason: Hydrogen gas is not evolved when a metal reacts with nitric acid. (2)
 (b) Arrange the following metals in decreasing order of their reactivity. Fe, Al, Mg, Zn.

SECTION C

11. A reddish-brown metal 'X', when heated in air, gives a black compound 'Y'. The compound 'Y' when heated in presence of H_2 gas gives 'X' back. 'X' is refined by the process of electrolysis; this refined form of 'X' is used in electrical wiring. (3)
 (i) Identify 'X' and 'Y'.
 (ii) Draw a well-labelled diagram to represent the process of refining 'X'.
12. Write the scientific reason for the following statements: (3)
 (i) A swollen neck is observed in the people living in the hills.
 (ii) Excessive weight and height above average in childhood.
 (iii) Development of facial hair in a 13-years old boy.

SECTION D

13. (a) State Ohm's law. (5)
 (b) Draw an electric circuit to describe Ohm's law. Label the circuit components used to measure electric current and potential difference.
 (c) In an experiment to study the relation between the potential difference across a resistor and the current through it, a student recorded the following observations:

Potential difference V in volt	1.0	2.2	3.0	4.0	6.4
Current I in ampere	0.1	0.2	0.6	0.4	0.6

On examining the above observations, the teacher asked the student to reject one set of readings as the values were out of agreement with the rest. Which one of the above sets of readings can be rejected? Calculate the mean value of resistance of the resistor based on the remaining four sets of readings.

14. (i) Draw a diagram showing the germination of pollen on the stigma of a flower and label the parts based on the following functions: (5)
 (a) Structure that carries male reproductive cells
 (b) Part/s that dries and withers off after zygote formation
 (c) Cells of embryo sac that degenerate after fertilization process
 (d) Part that develops into endosperm during seed formation
 (ii) Why does double fertilisation occur in flowering plants?

SECTION E

Questions 15 to 17 are Source-based/Case study based questions of 4 marks with sub-parts.

15. Resistance (R) is defined as the property of the conductor which opposes the flow of electric current. It depends on the length of the conductor, area of cross-section of the conductor and the nature of the material. Resistivity (ρ) is defined as the resistance offered by the material per unit length for a unit cross-section. Resistivity increases linearly with temperature. Mathematically $R = \rho l/A$. The resistivity of metal is slightly lower than that of the resistivity of an alloy.

Read the given information answer the questions that follow:

- Resistivity of Cu < Resistivity of Aluminium < Resistivity of nichrome.
- Six wires labelled as A, B, C, D, E, F have been designed as per the following parameters:

Wire	Length	Diameter	Material	Resistance
A	l	$2d$	Aluminium	R_1
B	$2l$	$d/2$	Nichrome	R_2
C	$3l$	$d/2$	Nichrome	R_3
D	$l/2$	$3d$	Copper	R_4
E	$2l$	$2d$	Aluminium	R_5
F	$l/2$	$4d$	Copper	R_6

- (i) Which of the wires has maximum resistance and why? (1)
(ii) Which of the wires has minimum resistance and why? (1)
(iii) Arrange R_1 , R_3 and R_5 in ascending order of their values. Justify your answer. (2)

OR

- (iii) Out of three materials, which one will be preferred as a heating element? Write any two reasons for your answer.

16. Metallurgy is a domain of materials science and engineering that studies the physical and chemical behaviour of metallic elements, their inter-metallic compounds, and their mixtures, which are known as alloys.

Extractive metallurgy is the practice of removing valuable metals from an ore and refining the extracted raw metals into a purer form. In order to convert a metal oxide or sulphide to a purer metal, the ore must be reduced physically, chemically, or electrolytically. The main steps involved here are concentration of ores, extraction and purification.

- (i) "Carbon cannot be used to reduce metal oxides of sodium, magnesium, calcium, and aluminium to respective metals". Comment. (1)
(ii) Write the chemical reaction involved in roasting of Cinnabar (HgS). (1)
(iii) The metals like sodium are obtained by electrolytic reduction of their molten chloride. (2)
Write the reactions that occur at the anode and cathode during the electrolytic reduction of molten sodium chloride.

OR

- (iii) Define: Thermite reactions. Also, illustrate the reduction of manganese dioxide with Aluminium powder with the help of a balanced chemical equation.

17. The modes by which various organisms reproduce depend on the body design of the organisms. In asexual reproduction, a single individual parent produces offspring without the involvement of gametes. Asexual reproduction occurs mostly in unicellular organisms, some plants and certain simple multicellular animals. This method is a common means of increasing the offspring rapidly under favourable conditions.

- (i) Name the organism in which binary fission takes place in a definite orientation and the disease caused by this organism. (1)
(ii) When the leaf of Bryophyllum falls on the soil and develops into new plants, whereas a banana leaf is not able to propagate. Why? (1)
(iii) With the help of a neat diagram, explain the process of regeneration in Planaria. (2)

OR

- (iii) Draw the diagram to show spore formation in Rhizopus and label its vegetative and reproductive parts.