FIITJEE

CBSE PART TEST – II

ALL XTH STUDYING BATCHES

SCIENCE

Time: 1:30 Hours **Max Marks: 40**

Instructions:

1. The question paper comprises four sections A, B, C & D. There are 13 questions in the question paper.
2. Section – A consists of 3 questions of 1 mark. Q4 – Q 6 contain five sub – parts each. You are expected to answer any four sub – parts in these questions
3. Section – B contains 2 questions of 2 marks each. Section – C contains 2 questions of 3 marks each. Section – D contains 3 questions of 5 marks each.
4. There is no overall choice. However, internal choice have been provided in some questions.
5. Wherever necessary, neat and properly labled diagram should be drawn.

Name of the Candidate : .....

Enroll Number : .....

Date of Examination : .....

SECTION – A

Very Short Answer type (1 mark each)

1. Which blood cell helps in the transportation of oxygen?

2. What is the rate of flow of electric charges called?
   (A) Electric potential (B) Electric conductance
   (C) Electric current (D) None of these

3. In Mendeleev's periodic table, gaps were left for the elements to be discovered later. Which of the following elements found a place in the periodic table later?
   (A) Chloride (B) Silicon
   (C) Oxygen (D) Germanium

Directions (Questions 4 – 6): Questions contain five sub – parts each. You are expected to answer any four sub – parts in these questions.

4. Circulatory system is responsible for transportation of oxygen to all the cells and also for the transport of carbon dioxide outside the cells. Circulatory system works in close association with respiratory system for exchange of gases. Two main components of blood are plasma and blood cells. Plasma is a pale yellow in colour and content of water in plasma is 90-92%. Plasma also contains a protein, called fibrinogen that is responsible for blood coagulation. Forty-five per cent of the total volume of blood is occupied by blood cells. Blood cells are of three types RBC, WBC and Platelets.

(i). Which one of the following contains hemoglobin?
   (a) RBC (b) WBC
   (c) Platelets (d) None of these

(ii). What is the function of WBCs?
   (a) Transport of oxygen (b) Fight against germs
   (c) Involved in blood clotting (d) All of these

(iii). Blood platelets help in
   (a) Formation of urine (b) excretion of urine
   (c) Sweating (d) blood clotting

(iv). The absorption of nutrients and exchange of respiratory gases between blood and tissues takes place in:
   (a) Veins (b) arteries
   (c) Heart (d) capillaries

(v). Which of the following is the main circulatory fluid in our body?
   (a) Plasma (b) Lymph
   (c) Blood (d) None of these

5. The rate at which electrical energy is dissipated is called 'electric power' P. Thus,

   $\text{Power, } P = \frac{W}{t}$

   or $P = \frac{V\,I\,t}{t} = V\,I$

   for a resistor, V = IR

Therefore, $P = V\,I = I^2R = \frac{V^2}{R}$

The SI unit of power is 'watt' (W).

The electrical energy dissipated in a resistor is given by H = V × I × t

Answer any four part based on the above paragraph:

(i) Calculate the resistance of a bulb of rating 100 W – 220 V.

(A) 484 Ω (B) 242 Ω

(C) 968 Ω (D) None of these

(ii) A 220 V – 100 W bulb is connected to a 220 V source. Calculate the power consumed by the bulb.

(A) 50 W (B) 25 W

(C) 100 W (D) 75 W

(iii) An electric iron consumes energy at the rate of 1000 W. If main voltage be 200 V. What is the current flowing?

(A) 5 A (B) 8 A

(C) 4 A (D) None of these

(iv) An electric heater is rated 220 V, 1000 W. Calculate the electrical energy consumed in 4 hours.

(A) 4 kWh (B) 5 kWh

(C) 2000 kWh (D) 4000kWh

(v) An electric appliance of resistance 110 Ω is used at 220 V. Find the current flowing through it.

(A) 2 A (B) 4 A

(C) 5 A (D) 0.5 A

6. The properties which are directly or indirectly related to electronic configuration and which show a regular gradation when we move from left to right in a period or from top to bottom in a group of a periodic table are called periodic properties. There are certain factors which influence periodic properties.

(i) Variation of ionic size among the isoelectronic ion Al^{3+}, Mg^{2+}, Na^{+}

(A) $Al^{3+} < Mg^{2+} < Na^{+}$ (B) $Na^{+} < Mg^{2+} < Al^{3+}$

(C) $Mg^{2+} < Na^{+} < Al^{3+}$ (D) $Al^{3+} < Na^{+} < Mg^{2+}$

(ii) The largest atomic radii in the following will be

(A) F (B) Cl

(C) Na (D) K

(iii) According to Mendeleev's periodic law, which states that "the properties of elements are periodic function of their

(A) Atomic masses (B) Atomic number

(C) Atomic radii (D) None of these

(iv) On moving from left to right in a periodic table:

(A) Number of electrons increases

(B) Number of electrons decreases

(C) Number of neutrons decreases

(D) Number of electrons first increases then decreases

(v) In the modern periodic table, the elements are arranged in order of
(A) Increasing number of neutrons (B) Increasing mass number
(C) Increasing atomic number (D) Both (A) and (C)

SECTION – B

Short Answer type-I (2 marks each)

7. What are the two factors responsible for ascent of sap? [2]

8. A sulphate salt of group 2 element of the periodic table is a white soft substance, which can be moulded into different shapes by making its dough. When the compound is left in the open or sometime, it becomes a solid mass and cannot be used for moulding purposes. Identify the sulphate salt and why does it show such behaviour? [2]

SECTION – C

Long Answer type-I (3 marks each)

9. Write one function each of the following components of the transport system in human beings: [3]
(i) White blood cells
(ii) Lymph
(iii) Heart

10. Two lamps, one rated 60 W at 220 V and the other 40 W at 220 V, are connected in series to the electric supply at 220 V.
(a) Draw a circuit diagram to show the connections.

(b) Calculate the current drawn from the electric supply.

(c) Calculate the total energy consumed by the two lamps together when they operate for one hour

SECTION – D

Long Answer type-I (5 marks each)

11. (i) Define osmoregulation. [1]
(ii) Mention four nitrogenous waste produced by animals? [4]

OR

11. (a) Name the organs that form the excretory system in human beings. [2]
(b) Describe in brief how urine is produced in human body. [3]

12. (a) What is the charge on an electron?

(b) Should the resistance of an ammeter be low or high? Give reason.

(c) How does use of a fuse wire protect electrical appliances?

(d) State Ohm's law?

(e) What is electrical resistivity of a material? What is its unit?

OR

12. (a) Draw a schematic labelled diagram of a domestic wiring circuit which includes:
(i) a main fuse
(ii) a power meter
(iii) one light point
(iv) a power output socket

(b) In this circuit, on which wire of the circuit is the mains on/off switch connected.
(c) Distinguish between the terms 'overloading' and 'short-circuiting' as used in domestic circuits.

13. (i) F, Cl and Br are the elements each having seven valence electrons. Which of these
(a) has the largest atomic radius
(b) is most reactive?
Justify your answer stating reason for each [3]
(ii) State the modern periodic law for classification of elements. How many groups and periods are there in modern periodic table? [2]

OR

(i) Give reasons:-
(a) Elements in a group have similar chemical properties.
(b) Elements of group I form ions with a charge of +1. [2]

(ii) The atomic number of an element is 16. Predict
1. The number of valence electrons in its atom.
2. Its valency.
3. Its group number.
4. Whether it is a metal or a non-metal.
5. The matter of oxide formed by it.
6. The formula of its chloride. [3]

HINTS AND SOLUTIONS

1. Red blood cells help in the transportation of oxygen.
2. C
Sol. The rate of flow of electric charges is called Electric current.
3. D
Sol. Germanium is found a place in the periodic table later.

4.
(i). A
Sol. RBC's contains hemoglobin.
(ii). B
Sol. Fight against germs is the function of WBC's.
(iii). D
Sol. Blood platelets help in blood clotting.
(iv). D
Sol. The absorption of nutrients and exchange of respiratory gases between blood and tissues takes place in capillaries.
(v). C
Sol. Blood is the main circulatory fluid in our body.

5.
(i) A
Sol. $R = \frac{V^2}{P} = \frac{220 \times 220}{100} = 484\ \Omega$
(ii) C
Sol. R = 484 Ω
$P = \frac{220 \times 220}{484} = 100\,W$
(iii) A
Sol. P = VI
1000 = 200 I
I = 5 A
(iv) A
Sol. Energy consumed = P × t
$\Rightarrow$ 1000 × 4 $\Rightarrow$ 4000 Wh
$\Rightarrow$ 4 KWh
(v) A
Sol. $I = \frac{V}{R} \Rightarrow \frac{220}{110} \Rightarrow 2\,A$

6.
.(i) A
Variation of ionic size among the isoelectronic ion Al^{3+}, Mg^{2+}, Na^{+} is $Al^{3+} < Mg^{2+} < Na^{+}$.
(ii) D
The largest atomic radii in the following will be K.
(iii) A
According to Mendeleev's periodic law, which states that "the properties of elements are periodic function of their atomic masses."
(iv) A
On moving from left to right in a periodic table number of electrons increases.
(v) C
In the modern periodic table, the elements are arranged in order of increasing atomic number.

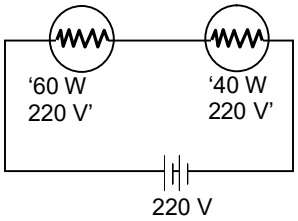
7. The two factors responsible for ascents of sap are root pressure and transpiration pull.

8. Sulphate salt is calcium sulphate which is white and soft substance calcium substance is also known as POP.
POP has half molecule of water of crystallisation when we leave POP open for sometime, it absorb moisture to gain more water of crystallisation which is known as gypsum which is hard to make moulds.

$$\underset{\text{POP}}{CaSO_4 \cdot \frac{1}{4}H_2O} + 1\frac{1}{2}H_2O \longrightarrow \underset{\text{Gypsum}}{CaSO_4 \cdot 2H_2O}$$

9. (i) White blood cells – White Blood vessels helps to fight against the infections.
(ii) Lymph – Lymphatic system which comprises of lymph vessels and lymph nodes help in picking up tissue secretion and passing into blood. It maintains the blood volume. It also aids in defence of our body.
(iii) Heart – Heart is the pumping organ of blood vascular system.

10. (a)



(b) $R_1 = \frac{v^2}{P} = \frac{(220)^2}{60}$

$R_2 = \frac{(220)^2}{40}$

$R_{eq} = R_1 + R_2 = \frac{(220)^2}{60} + \frac{(220)^2}{40}$

$R_{eq} = (220)^2\left(\frac{100}{2400}\right)$

$R_{eq} = \frac{(220)^2}{24}\Omega$

$\text{Current} = \frac{V}{R} = \frac{220}{(220)^2} \times 24 = \frac{24}{220} = 0.109 \text{ A}$

(c) Total energy for 1 hour $= (i)^2 R_{eq} \times t$

$= \left(\frac{24}{220}\right)^2 \times \frac{(220)^2}{24} \times 60 \times 60$

$= 86400 \text{ J}$

11. (i) The process by which the water content and the ion concentration is regulated and kept constant in the cells is known as osmoregulation.
(ii) Four nitrogenous waste products produced by animals are:
1. Urea, 2. Uric acid, 3. Ammonia, 4. Amino acid

OR

11. (a) (i) a pair of kidneys, (ii) a pair of ureters, (iii) a urinary bladder and (iv) a urethra.
b) A kidney has a large number of filtration units called nephrons. Each nephron has cup shaped Bowman's capsule containing a bunch of capillaries called glomerulus. Blood gets filtered in the glomerulus. Filtrate gets collected in Bowman's capsule. Some useful

substances such as glucose, amino acids, salts and water are selectively reabsorbed as urine flows through nephron tube. The urine formed in each kidney is eventually stored in the urinary bladder.

12.

(a) 1.6×10^{-19} C.

(b) When the ammeter resistance is low, almost all the current in the circuit is allowed to pass through the ammeter.

(c) An electrical fuse works by breaking the circuit when there is a fault in an appliance that causes too much current to flow.

(d) Ohm's law states that under constant temperature, the current passing through conductor is directly proportional to potential difference applied across it.

$V = R\,I$ $\quad R \rightarrow$ Resistance

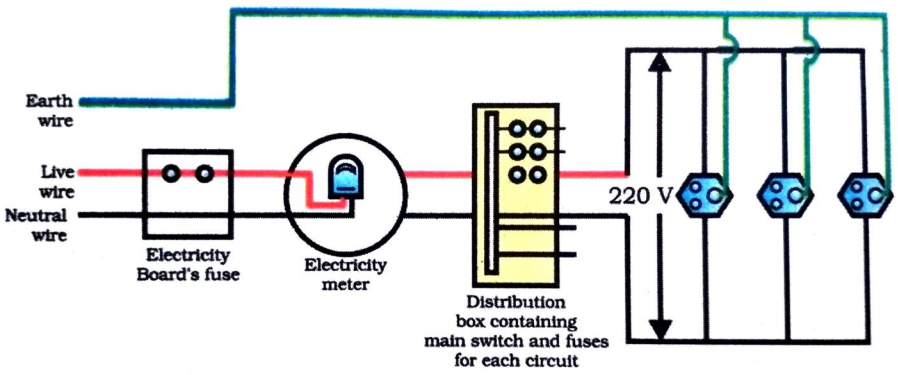
(e) Electrical resistivity is a fundamental property of a material that quantifies how strongly that material opposes the flow of electric current. A low resistivity indicates a material that readily allows the flow of electric current.

S.I. unit of resistivity is ohm – meter.

OR

12.

(a)



A schematic diagram of one of the common domestic circuits

(b) It should be connected in live wire.

(c) Overloading can occur when the live wire and the neutral wire come into direct-contact. In such a situation, the current in the circuit abruptly increases. This is called short-circuiting.

13. (i) (a) Br has largest atomic radius because it has four shells.

(b) F is mot reacting because it is smallest in size and can gain electron easily.

(ii) Properties of elements are periodic function of their atomic number. There are 18 groups and 7 periods in it.

OR

(i) (a) Elements in a group have same number of valence electrons and same valency, therefore have similar chemical properties.

(b) H is because elements of group 1 lose one electron to acquire +1 charge and become stable.

(ii) The electronic configuration of S(16) is 2, 8, 16.

1. 6
2. 2
3. 16
4. Non-metal
5. Acidic oxide
6. SCl_2 is a formula of its chloride.