

MT

2017 ___ ___ 1100

MT - SCIENCE & TECHNOLOGY - I (72) - SEMI PRELIM - II : PAPER - 6

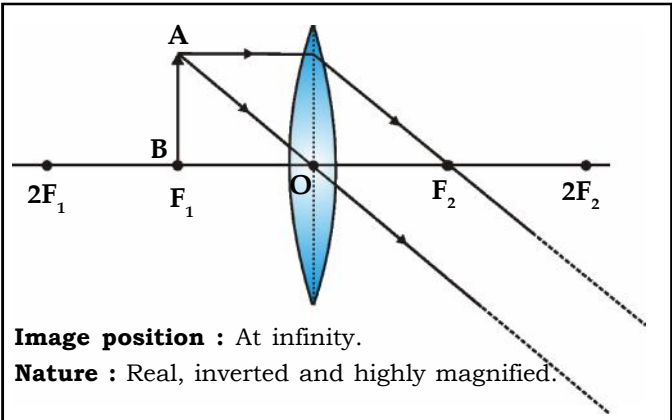
Time : 2 Hours

Model Answer Paper

Max. Marks : 40

A.1. (A) Fill in the blanks:						
(1) The arrangement of elements in a group of three is called triad .		1				
(2) The least distance of distinct vision is about 25 cm .		1				
(3) 1 kilowatt hr = 3.6 × 10⁶ Joules.		1				
A.1. (B) State whether the following statements are true or false and if false, write the correct statement:						
(1) False - (g) indicates the physical state as gas.		1				
(2) False - Voltmeter is always connected in parallel with the device.		1				
A.2. Rewrite the following statements by selecting the correct alternative:						
(1) To observe the reaction of water on quicklime, few drops of water are added to quicklime .		1				
(2) (c) Displacement reaction.		1				
(3) (a) always like a concave lens		1				
(4) (b) decreases		1				
(5) (a) series		1				
A.3. Answer the following in short : (Any 5)		2				
(1) When copper chloride reacts with potassium iodide, it gives a brown coloured precipitate of cupric iodide and potassium chloride. This reaction is a double displacement reaction. $\text{CuCl}_{2(\text{aq})} + 2\text{KI}_{(\text{aq})} \rightarrow \text{CuI}_2 \downarrow + 2\text{KCl}$ <table><tr><td>Copper chloride</td><td>Potassium iodide</td><td>Cupric iodide</td><td>Potassium chloride</td></tr></table>	Copper chloride	Potassium iodide	Cupric iodide	Potassium chloride		
Copper chloride	Potassium iodide	Cupric iodide	Potassium chloride			
(2) (i) The group number indicates the number of valence electrons i.e. electrons present in the outermost shell of an atom of an element.		2				

	(ii) All alkali metals have one electron in their outermost shell. Hence, they are placed in group 1.					
(3)	<table border="1"> <thead> <tr> <th>Groups</th> <th>Periods</th> </tr> </thead> <tbody> <tr> <td>(i) Vertical columns of elements in the Modern Periodic Table are called groups. (ii) There are 18 groups in the Periodic Table. (iii) The group number indicates the valence electrons in the outermost shell. (iv) The elements in same group have similar chemical properties.</td> <td>(i) Horizontal rows of elements in the Modern Periodic Table are called periods. (ii) There are 7 periods in the Periodic Table. (iii) The period number indicates the number of shells in the atoms of an element. (iv) The elements in a period exhibit gradual change in properties from left to right.</td> </tr> </tbody> </table>	Groups	Periods	(i) Vertical columns of elements in the Modern Periodic Table are called groups. (ii) There are 18 groups in the Periodic Table. (iii) The group number indicates the valence electrons in the outermost shell. (iv) The elements in same group have similar chemical properties.	(i) Horizontal rows of elements in the Modern Periodic Table are called periods. (ii) There are 7 periods in the Periodic Table. (iii) The period number indicates the number of shells in the atoms of an element. (iv) The elements in a period exhibit gradual change in properties from left to right.	2
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(4)	<p>When sucrose is heated strongly, it breaks down to give black coloured carbon and water. As heat is absorbed, it is an endothermic reaction. Since the decomposition is brought by heat, it is a thermal decomposition.</p> $\text{C}_{12}\text{H}_{22}\text{O}_{11(s)} \xrightarrow{\Delta} 12\text{C}_{(s)} + 11\text{H}_2\text{O}_{(g)}$ <p style="text-align: center;">Sugar Carbon Water</p>	2				
(5)	(i) Solar devices like solar cooker or solar water heater use solar energy to cook food or heat water. (ii) When Sun rays fall on the concave mirror, they converge. (iii) Due to convergence the intensity of Sun rays increases and the food or water is heated faster. Hence concave mirrors are used in solar devices.	2				
(6)	Conductors and Insulators.	2				
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(7)	 <p>Image position : At infinity. Nature : Real, inverted and highly magnified.</p>	2
A.4.	<p>Answer the following in brief : (Any 5)</p> <p>(1)</p> <ul style="list-style-type: none"> (i) In 1913, Henry Moseley, an English physicist found that it was atomic number (Z) and not atomic mass which was the fundamental property of an element. Thus atomic number is useful for arrangement of elements in the periodic table. (ii) The modern periodic table is also called as long form of periodic table. (iii) In the modern periodic table, elements are arranged in the increasing order of atomic number (Z). (iv) The modern periodic table contains 7 horizontal rows called periods and 18 vertical columns called groups. (v) Apart from the seven rows, there are two additional rows called lanthanide series and actinide series placed at the bottom of the periodic table. (vi) Based on electronic configuration, the modern periodic table is divided into four blocks namely, s-block, p-block, d-block and f-block. (vii) The blocks gives rise to 4 types of elements namely normal elements, zero group elements, transition elements and inner-transition elements. (viii) Elements belonging to a particular group show strong resemblance in their chemical properties like valency, formulae of compound and chemical reactions. (ix) Elements show gradual variation in chemical properties along a period. (x) Neighbouring elements within a period show some similarities but non-neighbours show appreciable dissimilarity in their chemical properties. <p>(2)</p> <ul style="list-style-type: none"> (i) Conversion of edible oils to fats is called as hydrogenation reaction. 	3

	<p>(ii) When H_2 gas is passed through edible oil in presence of Nickel which acts as a catalyst at high temperature, it gets converted into fats, this reaction is called as hydrogenation reaction.</p> $\begin{array}{ccc} \text{Edible oil}_{(l)} & + & H_{2(g)} \\ \text{(unsaturated} & & \text{Hydrogen} \\ \text{fatty acids)} & & \end{array} \xrightarrow[\text{Hydrogenation}]{\text{Ni/453K/Pressure}} \begin{array}{c} \text{Fats}_{(s)} \\ \text{(saturated} \\ \text{fatty acids)} \end{array}$	
(3)	<p>(a) (i) Iron is a widely used metal but if it used in the pure form, it may rust. (ii) When a small amount of carbon (varying from 0.1% to 1.5%) is mixed with iron, we get an alloy called steel. (iii) This alloy of iron is hard and strong and is used for making nails, screw, bridges, railway tracks, ships, construction of buildings, vehicles. (iv) An important property of alloys is that they resist corrosion. So, iron articles rust readily whereas steel which is also made of iron will not undergo corrosion.</p> <p>(b) A chemical reaction in which oxidation and reduction takes place simultaneously is called redox reaction.</p>	2
(4)	<p>(i) The ability of the lens of adjusting focal length is known as power of accommodation. (ii) The process of focusing the eye at different distances is called accommodation. (iii) This is brought about by a change in curvature of the elastic lens, making it thinner or fatter.</p>	3
(5)	<p>(a) Fuse protects circuits and electrical appliances by stopping the flow of excess of current. (b) Fuse is connected in series. So that whatever current is passing through appliances has to pass through fuse. The quantity of heat (H) generated in a conductor of resistance (R) when a current (I) flows through it for some time (t) is directly proportional to (i) The square of the current (ii) The resistance of the conductor, and (iii) The time for which the current flows.</p> $\therefore H = \frac{I^2 R t}{4.18} \text{ cal}$	3
(6)	<p>The rules are as follows :</p> <p>(i) If the incident ray is parallel to the principal axis, then the reflected ray passes through focus.</p>	3

	<p>(ii) If the incident ray is passing through the focus, then the reflected ray is parallel to the principal axis.</p> <p>(iii) If the incident ray passes through the centre of curvature, the reflected ray traces the same path.</p> <p>(7) Given : $R_1 = 3 \Omega$ $R_2 = 2 \Omega$ $R_3 = 5 \Omega$ P.D. (V) = 4 V</p> <p>To find : (1) Total resistance (R) (2) Current (I)</p> <p>Formula : (1) $R_s = R_1 + R_2$ (2) $\frac{1}{R_p} = \frac{1}{R_s} + \frac{1}{R_3}$ (3) $V = IR$</p> <p>Solution : $R_s = R_1 + R_2$ $\therefore R_s = 3 + 2$ $\therefore R_s = 5 \Omega$ $\frac{1}{R_p} = \frac{1}{R_s} + \frac{1}{R_3}$ $\therefore \frac{1}{R_p} = \frac{1}{5} + \frac{1}{5}$ $\therefore \frac{1}{R_p} = \frac{2}{5}$ $\therefore R_p = \frac{5}{2}$ $\therefore R_p = 2.5 \Omega$ $V = IR$ $\therefore I = \frac{V}{R}$ $\therefore I = \frac{4}{2.5}$ m I = 1.6 A</p> <p>The total resistance is 2.5 h and current is 1.6 A.</p>	3
A.5.	<p>Answer in detail: (Any 1)</p> <p>(1) (i) The arrangement in (A), is series. (ii) The arrangement in (B), is parallel. (iii) In parallel combination, the resistance would be less. (iv) The bulb in parallel combination would be brighter, as the resultant resistance in parallel is less, hence current flowing would be more and brightness will also be more.</p>	5

(2)	Based on electronic configuration, the modern periodic table is divided into four blocks namely, s-block, p-block, d-block, f-block.				5	
		s - block	p - block	d - block		f - block
	No. of shells incomplete/valence electrons	Outermost shell incomplete (1 or 2 valence electrons).	Outermost shell incomplete except zero group elements that have completely filled shells (3 to 8 valence electrons).	Last two shells incomplete.		Last three shells incomplete.
	Position	IA, IIA and hydrogen.	III A to VII A and zero group.	Group IIIB to IIB along with group VIII.		Lanthanides and actinides placed separately at the bottom of the periodic table.
	Includes	All metals except hydrogen.	Metals, non-metals, metalloids, zero group elements.	Metals.		Metals.
Types of elements	Normal elements.	Normal and inert elements.	Transition elements.	Inner-transition elements.		
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