

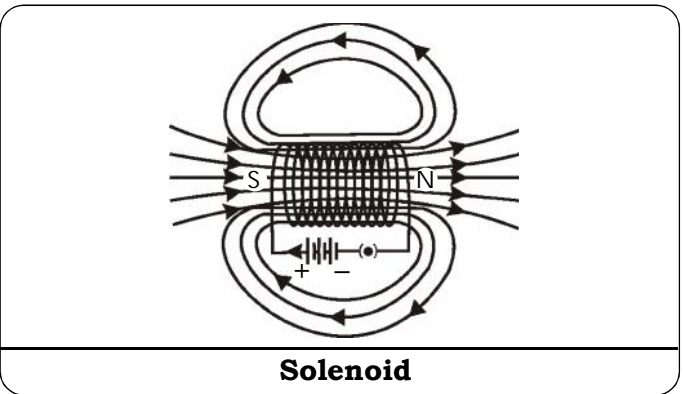
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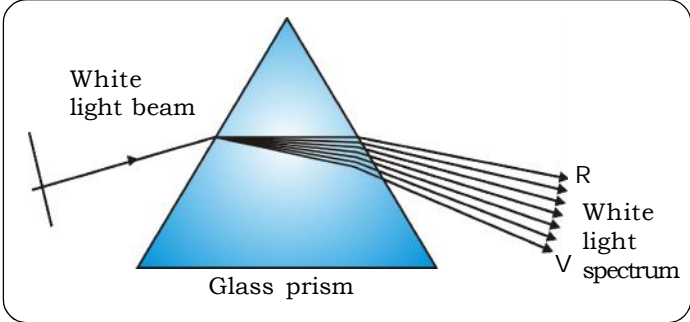
MT - SCIENCE & TECHNOLOGY - I (72) - SEMI PRELIM - I : PAPER - 2

Time : 2 Hours Semi Prelim - I : Model Answer Paper Max. Marks : 40

| SECTION - A | | | | | | | | | | | | |
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| A.1. (A) Fill in the blanks : | | | | | | | | | | | | |
| (1) Phenolphthalein is a synthetic type of indicator. | | 1 | | | | | | | | | | |
| (2) The phenomenon of splitting of light into its component colours is dispersion . | | 1 | | | | | | | | | | |
| (3) The device which converts electrical energy to mechanical energy is called as electric motor . | | 1 | | | | | | | | | | |
| A.1. (B) True or False : | | | | | | | | | | | | |
| (1) False : Sodium carbonate is known as washing soda. | | 1 | | | | | | | | | | |
| (2) False : During dispersion violet colour deviates the most. | | 1 | | | | | | | | | | |
| A.2. Rewrite the following statements by selecting the correct alternative: | | | | | | | | | | | | |
| (1) (b) NaOH solution | | 1 | | | | | | | | | | |
| (2) (c) Cl ₂ | | 1 | | | | | | | | | | |
| (3) (c) 40° | | 1 | | | | | | | | | | |
| (4) (a) $\hat{e}_i > \hat{e}_r$ but $\hat{e}_i = \hat{e}_e$ | | 1 | | | | | | | | | | |
| (5) (a) current and number of turns per unit length | | 1 | | | | | | | | | | |
| A.3. Answer the following in short : (Any 5) | | | | | | | | | | | | |
| (1) | <table border="1" style="width: 100%;"><thead><tr><th style="width: 50%; text-align: center;">Acid</th><th style="width: 50%; text-align: center;">Base</th></tr></thead><tbody><tr><td>(i) A substance which liberates H⁺ ions when dissolved in water is an acid.</td><td>(i) A substance which liberates OH⁻ ions in water is called a base.</td></tr><tr><td>(ii) Blue litmus turns red in an acid.</td><td>(ii) Red litmus turns blue in a base.</td></tr><tr><td>(iii) The pH of an acid ranges from 0 to 7.</td><td>(iii) The pH of a base range from 7 to 14.</td></tr><tr><td>(iv) Acids are sour to taste.</td><td>(iv) Bases are bitter to taste.</td></tr></tbody></table> | Acid | Base | (i) A substance which liberates H ⁺ ions when dissolved in water is an acid. | (i) A substance which liberates OH ⁻ ions in water is called a base. | (ii) Blue litmus turns red in an acid. | (ii) Red litmus turns blue in a base. | (iii) The pH of an acid ranges from 0 to 7. | (iii) The pH of a base range from 7 to 14. | (iv) Acids are sour to taste. | (iv) Bases are bitter to taste. | 2 |
| Acid | Base | | | | | | | | | | | |
| (i) A substance which liberates H ⁺ ions when dissolved in water is an acid. | (i) A substance which liberates OH ⁻ ions in water is called a base. | | | | | | | | | | | |
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| (iii) The pH of an acid ranges from 0 to 7. | (iii) The pH of a base range from 7 to 14. | | | | | | | | | | | |
| (iv) Acids are sour to taste. | (iv) Bases are bitter to taste. | | | | | | | | | | | |

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| (2) | <p>(i) Buttermilk contains lactic acid which reacts with copper and forms a green coloured salt of copper.</p> <p>(ii) This salt dissolves in buttermilk and spoils its taste. Hence, buttermilk should not be stored in copper vessels.</p> | 2 |
| (3) | <p>When sodium bicarbonate is heated, it decomposes to form sodium carbonate, water and carbon dioxide gas is evolved.</p> $2\text{NaHCO}_{3(s)} \rightarrow \text{Na}_2\text{CO}_{3(s)} + \text{H}_2\text{O}_{(l)} + \text{CO}_2\uparrow$ <p style="text-align: center;"> Sodium Sodium Water Carbon bicarbonate carbonate dioxide </p> | 2 |
| (4) | <p>(i) If many electrical appliances of high power rating such as geyser, heater, motor, oven are switched on simultaneously, overloading occurs.</p> <p>(ii) This may result in switching off of the fuse resulting in disruption in power supply.</p> <p>(iii) It may also cause fire. Hence we should not use many electrical appliances simultaneously.</p> | 2 |
| (5) | <p>(i) In the visible range of light, maximum scattering of blue light and the least scattering of red light takes place.</p> <p>(ii) As red light is scattered the least by atmosphere, it can travel larger distance. Hence, danger signals are red coloured.</p> | 2 |
| (6) | <p>This rule gives the direction of magnetic field around a current carrying conductor.</p> <p>It states that : Imagine that you are holding a current carrying straight conductor in your right hand such that the thumb points towards the direction of current, then the curled fingers around the conductor will give the direction of the magnetic field.</p> | 2 |
| (7) |  <p style="text-align: center;">Solenoid</p> | 2 |

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| <p>A.4.</p> <p>(1)</p> <p>(2)</p> <p>(3)</p> <p>(4)</p> | <p>Answer the following in brief : (Any 5)</p> <p>(i) When a base reacts with acid, then a salt and water is formed. This is called as neutralization reaction.</p> <p>(ii) E.g. :</p> <p>(a) When hydrochloric acid reacts with sodium hydroxide, sodium chloride and water are formed.</p> $\begin{array}{ccccccc} \text{HCl} & + & \text{NaOH} & \rightleftharpoons & \text{NaCl} & + & \text{H}_2\text{O} \\ \text{(Acid)} & & \text{(Base)} & & \text{(Salt)} & & \text{(Water)} \\ \text{Hydrochloric} & & \text{Sodium} & & \text{Sodium} & & \text{Water} \\ \text{acid} & & \text{hydroxide} & & \text{chloride} & & \\ \text{(b)} & \text{When carbon dioxide is passed through lime water, it turns milky due to the formation of white precipitate of calcium carbonate.} \\ \text{Ca(OH)}_{2(aq)} & + & \text{CO}_{2(g)} & \rightleftharpoons & \text{CaCO}_{3(s)} \downarrow & + & \text{H}_2\text{O}_{(l)} \\ \text{(Base)} & & \text{(Acid)} & & \text{(Salt)} & & \text{(Water)} \\ \text{Calcium} & & \text{Carbon} & & \text{Calcium} & & \text{Water} \\ \text{hydroxide} & & \text{dioxide} & & \text{carbonate} & & \\ \text{(c)} & \text{Thus this is a neutralization reaction where base reacts with acidic non-metallic oxide (CO}_2\text{) to form salt and water.} \\ \text{(i)} & \text{The term olfactory means relating to sense of smell. Those substances whose smell changes in acidic or basic solution are called as olfactory indicators. It works on the principle that when a base is added to it, its characteristic smell cannot be detected. Eucalyptus (nilgiri) oil, Eau de cologne, Onion and vanilla extract are olfactory indicators.} \\ \text{(ii)} & \text{Eg. : Onion has a characteristic smell. When a basic solution like sodium hydroxide solution is added to a cloth strip treated with onions, then the onion smell cannot be detected. An acidic solution like hydrochloric acid, does not destroy the smell of onions. This is used as a test for acids and bases.} \\ \text{(iii)} & \text{Eucalyptus (nilgiri) oil has a characteristic smell. If a basic solution like sodium hydroxide is added to Eucalyptus oil, then we cannot detect the characteristic smell of it. An acidic solution like hydrochloric acid, does not destroy the smell of Eucalyptus (nilgiri) oil. This is used as a test for acids and bases.} \\ \text{(i)} & \text{It is used in washing clothes as a cleansing agent.} \\ \text{(ii)} & \text{It is used for softening of hard water to soft water.} \\ \text{(iii)} & \text{It is used in refining of petroleum.} \\ \text{(iv)} & \text{It is used in manufacturing detergent powder, paper and glass.} \\ \text{(i)} & \text{The phenomenon of splitting of light into its component colours is called as dispersion.} \\ \text{(ii)} & \text{The band of coloured components of light beam is called} \end{array}$ | <p>3</p> <p>3</p> <p>3</p> <p>3</p> |
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| | <p>spectrum. The colours in the order from bottom to top are violet, indigo, blue, green, yellow, orange, red (VIBGYOR).</p> <p>(5) (i) If the current in coil A is changed, then some current will be induced in coil B. (3)</p> <p>(ii) As the current in coil A changes, the magnetic field related to it also change.</p> <p>(iii) Due to the changing magnetic field, current is induced in coil B.</p> <p>(6)  (3)</p> <p>(i) The phenomenon of splitting of light into its component colours is dispersion.</p> <p>(ii) Sir Issac Newton was the first to use a glass prism to obtain the spectrum of sunlight.</p> <p>(iii) A prism is a transparent medium bounded by two plane surfaces inclined at an angle.</p> <p>(iv) When white light is dispersed into seven colours by a prism, different colours of light bend through different angles with respect to incident ray.</p> <p>(v) Out of these seven colours, red light bends the least while violet light bends the most, as each colour bends in different angle. All colours become separate and we get a spectrum of seven different colours.</p> <p>(7) (a) It works on the principle of electromagnetic induction. (3)</p> <p>(b) X -Armature coil Y- Split ring</p> <p>(c) It generates direct current.</p> <p>A.5. Answer in detail: (Any 1)</p> <p>(1) (a) When light travels from one transparent medium to another transparent medium obliquely, the direction of propagation of light in the second medium changes. This phenomenon is called refraction of light. (5)</p> | |
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| | <p>(b) The light rays reflected from the coin, come obliquely. These rays bend away from the normal at the point of incidence (ie. the surface of water) and reach our eyes. These refracted rays appear to come from a point above the actual point and hence the coin appears to be raised up. Therefore the coin appears to float when the jar is tilted suitably and viewed at a suitable angle.</p> <p>(2) (a) $\text{Al}_2(\text{CO}_3)_3 + 6\text{HCl} \rightarrow 2\text{AlCl}_3 + 3\text{H}_2\text{O} + 3\text{CO}_2 \uparrow$ During this reaction carbon dioxide gas is released, this gas when passed through decanted solution of chalk with H_2O it turns milky due to formation of calcium carbonate.</p> <p>(b) When dil. HCl is added to red oxide i.e. (primer used before paint). We observe that the colour of the solution becomes blue. This is due to the formation of copper chloride. $\text{CuO} + 2\text{HCl} \rightarrow \text{CuCl}_2 + \text{H}_2\text{O}$</p> <p>(c) The process of alkaline hydrolysis of oils or fats is known as saponification.</p> | <p>2</p> <p>2</p> <p>1</p> |
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