

# Board Activity Sheet Solution: March 2020

## Science and Technology Part – 1

<b>Q.1 (A)</b>	i. (B) <span style="float: right;">[1 Mark]</span> ii. (A) <span style="float: right;">[1 Mark]</span> iii. (C) <span style="float: right;">[1 Mark]</span> iv. (D) <span style="float: right;">[1 Mark]</span> v. (D) <span style="float: right;">[1 Mark]</span>				
<b>Q.1 (B)</b>	i. Thermometer <span style="float: right;">[1 Mark]</span> ii. Alkene : $C = C$ :: Alkyne: $C \equiv C$ <span style="float: right;">[1 Mark]</span> iii. True <span style="float: right;">[1 Mark]</span> iv. <table border="1" style="margin-left: auto; margin-right: auto; width: fit-content; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #cccccc; text-align: center; padding: 2px;">Column 'A'</th> <th style="background-color: #cccccc; text-align: center; padding: 2px;">Column 'B'</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">The wavelength of red light</td> <td style="padding: 2px;">(b) 700 nm</td> </tr> </tbody> </table> <span style="float: right;">[1 Mark]</span> v. Stupnik <span style="float: right;">[1 Mark]</span>	Column 'A'	Column 'B'	The wavelength of red light	(b) 700 nm
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The wavelength of red light	(b) 700 nm				
<b>Q.2 (A)</b>	i. <ol style="list-style-type: none"> <li>Mass is a fundamental quantity whose value remains same everywhere. Hence, the mass of an object on earth will not change from place to place.</li> <li>Weight of an object is product of mass and gravitational acceleration, i.e., <math>W = F = mg</math></li> <li>As the weight depends on the value of acceleration due to gravity (<math>g</math>) which changes from place-to-place, the weight of an object changes from place to place though its mass is constant.</li> </ol> <span style="float: right;">[2 Marks]</span> ii. <ol style="list-style-type: none"> <li>Due to the motion of atmospheric air and change in density and temperature, the atmosphere is not steady. As a result, refractive index of air in given region changes continuously and randomly.</li> <li>Due to this, the position and brightness of the star keep changing continuously and the star appears to be twinkling</li> <li>The rays of light from a planet pass through the atmosphere of the earth. As compared to stars, planets are nearer to earth. So a planet can be considered as a collection of large number of point sources of light.</li> <li>If the intensity of light from one point source decreases, it increases from the other source. Thus, the average intensity remains the same.</li> </ol> <p>Hence, stars twinkle but we do not see the twinkling of planets.</p> <span style="float: right;">[2 Marks]</span> iii. <ol style="list-style-type: none"> <li>The electronic configuration of the outermost shell is same for all the elements belonging to the same group.</li> <li>So, the number of valence electrons for all the elements in a group is the same.</li> <li>The valency of an element is determined by the valence electrons.</li> </ol> <p>Hence, elements belonging to the same group have the same valency.</p> <span style="float: right;">[2 Marks]</span>				
<b>Q.2 (B)</b>	i. <p><b>Solution:</b></p> <p><i>Given:</i> Mass (<math>m</math>) = 5 kg, specific heat of water (<math>c</math>) = 1 kcal/kg °C  <i>To find:</i> Change in temperature (<math>\Delta T</math>) = <math>100 - 20 = 80</math> °C  <i>Formula:</i> Heat energy (<math>Q</math>)  <math display="block">Q = m c \Delta T</math></p>				



	<p><b>Calculation:</b> According to principle of heat exchange, Energy supplied to water = Energy gained by water From formula, <math display="block">Q = 5 \times 1 \times 80 = 400 \text{ kcal}</math></p> <p><b>Ans:</b> Heat energy necessary to raise temperature of water is <b>400 kcal.</b></p>	[2 Marks]
ii.	<p><b>Label A:</b> Direction of magnetic field <b>Label B:</b> Direction of induced current</p>	[1 Mark] [1 Mark]
iii.	<p>a. Anomalous behaviour of water</p>	[1 Mark]
iv.	<p>b. This process takes place between the temperature interval of <math>0^{\circ}\text{C}</math> to <math>4^{\circ}\text{C}</math>.</p>	[1 Mark]
i.	<p>a. <math>\text{CuSO}_{4(\text{aq})} + \text{Fe}_{(\text{s})} \longrightarrow \text{FeSO}_{4(\text{aq})} + \text{Cu}_{(\text{s})}</math></p>	[1 Mark]
v.	<p>b. This reaction is displacement reaction.</p>	[1 Mark]
	<p>a. The homogenous mixture formed by mixing a metal with other metals or nonmetals in certain proportion is called an alloy.</p>	
	<p>b. Majority of the metallic substances used presently are in the form of alloys. The main intention behind this is to decrease the intensity of corrosion of metals.</p>	
	<p>c. For example, bronze is an alloy formed from 90% copper and 10 % tin. Bronze statues do not get affected by sun and rain. Stainless steel does not get stains with air or water and also does not rust. It is an alloy made from 74% iron, 18% chromium and 8% carbon.</p>	
	<p>d. In recent times various types of alloys are used for minting coins.</p>	
		[2 Marks]
<b>Q.3</b>		
i.	<p>a. The atomic number of the element is 12. b. The group number of the element is 2. c. The element belongs to period 3.</p>	[1 Mark] [1 Mark] [1 Mark]
ii.	<p>a. <b>Kepler's first law:</b> The orbit of a planet is an ellipse with the sun at one of the foci.</p>	[1 Mark]
	<p>b. <b>Kepler's second law:</b> The line joining the planet and the sun sweeps equal areas in equal intervals of time.</p>	[1 Mark]
	<p>c. <b>Kepler's third law:</b> The square of orbital period of revolution of a planet around the Sun is directly proportional to the cube of the mean distance of the planet from the Sun.</p>	[1 Mark]
iii.	<p>a. The 'live' and the 'neutral' wires have potential difference of 220 V. b. Due to a fault in the equipment or if the plastic coating on the 'live' and the 'neutral' wires gives away the two wires come in contact with each other and a large current flows through it producing heat. This is known as short circuiting. c. Fuse wire protects circuits and appliances by stopping the flow of any excess electric current.</p>	[1 Mark] [1 Mark] [1 Mark]
iv.	<p>a. Refraction of light b. Laws of refraction: 1. Incident ray and refracted ray at the point of incidence N are on the opposite sides of the normal to the surface of the slab at that point i.e. CD, and the three, incident ray, refracted ray and the normal, are in the same plane. 2. For a given pair of media, here air and glass, the ratio of <math>\sin i</math> to <math>\sin r</math> is a constant. Here, <math>i</math> is the angle of incidence and <math>r</math> is the angle of refraction.</p>	[1 Mark] [2 Marks]
v.	<p>a. If a manmade object revolves around the earth or any other planet in a fixed orbit it is called an artificial satellite.</p>	[1 Mark]



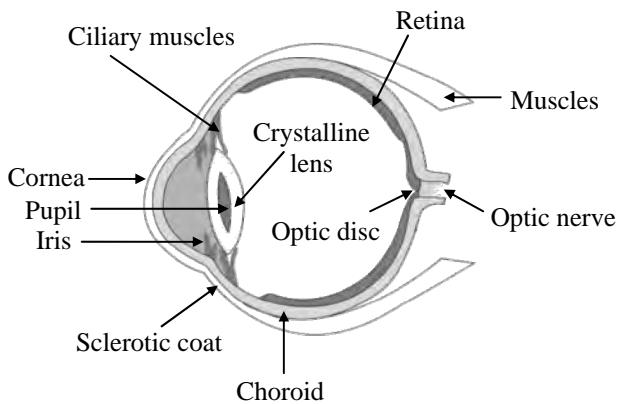
- b. Types of Artificial satellite
1. **Weather satellite:** These satellites are used to study and forecast weather conditions on the earth.
  2. **Communication satellite:** These satellites use specific waves to establish communication between different locations in the world.
  3. **Broadcast satellite:** These satellites are used to telecast different television programs all over the world.
  4. **Navigational satellite:** These satellites help in locating any place on earth's surface by fixing the location in terms of its precise latitude and longitude.
  5. **Military satellite:** These satellites collect information for security aspects of nation.
  6. **Earth observation satellite:** These satellites are used in the study of forests, deserts, oceans, polar ice on earth's surface. These are also used in exploration and management of natural resources. They also collect information which guides us in case of natural calamities like flood and earthquake.
- [Any two types and their functions] [1 Mark each]*
- vi. a. The compounds which contain carbon and hydrogen as the only two elements are called hydrocarbons. *[1 Mark]*
- b. There are two types of hydrocarbons; saturated hydrocarbons and unsaturated hydrocarbons. *[1 Mark]*
- c. 1. Cooking gas which is used in day-to-day life contains carbon compound called butane. *[1/2 Mark]*
2. Table sugar which is used in day-to-day life contains carbon compound called sucrose. *[1/2 Mark]*
- vii. a. Two metals that react with water: Potassium, sodium *[1 Mark]*
- b. Two moderately reactive metals: Zinc, iron *[1 Mark]*
- c. 1. Most highly reactive metal: Potassium *[1/2 Mark]*
2. Most less reactive metal: Gold *[1/2 Mark]*
- viii.

Straight chain of carbon atoms	Structural formula	Molecular formula	Name
C	<pre>       H         H - C - H               H     </pre>	CH <sub>4</sub>	Methane
C – C	<pre>       H   H             H - C - C - H                   H   H     </pre>	C <sub>2</sub> H <sub>6</sub>	Ethane
C – C – C	<pre>       H   H   H                 H - C - C - C - H                       H   H   H     </pre>	C <sub>3</sub> H <sub>8</sub>	Propane
C – C – C – C	<pre>       H   H   H   H                     H - C - C - C - C - H                       H   H   H     </pre>	C <sub>4</sub> H <sub>10</sub>	Butane

*[1/2 Mark for each correct blank]*

Q.4

i.



[Diagram - 1 Mark, labelling - 1 Mark]

[1 Mark]

[1 Mark]

[1 Mark]

- a. Convex lens
  - b. Cornea
  - c. Real and inverted
- ii.
- a. Rust is a reddish brown coloured hydrated ferric oxide layer deposited on the surface of iron objects that are exposed to moist air.
  - b. Chemical formula of rust is  $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$ .
  - c. Anode region:  $\text{Fe}_{(s)} \longrightarrow \text{Fe}^{2+}_{(aq)} + 2\text{e}^-$
  - d. Cathode region:  $\text{Fe}^{2+}_{(aq)} \longrightarrow \text{Fe}^{3+}_{(aq)} + \text{e}^-$
  - e. Metals get attacked by substances around it such as moisture, acids, etc. Metal is said to 'corrode' due to this attack and the process is called corrosion.

[1 Mark]

[1 Mark]

[1 Mark]

[1 Mark]

[1 Mark]

[1 Mark]