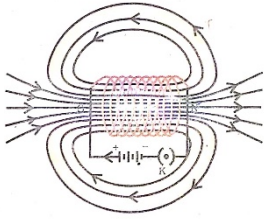


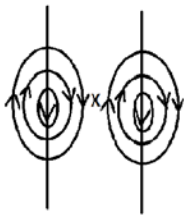
**Strictly Confidential: (For Internal and Restricted use only)**  
**Secondary School Examination**  
**March 2019**  
**Marking Scheme – SUBJECT - SCIENCE (SUBJECT CODE 086)**  
**(PAPER CODE – 31/4/2)**

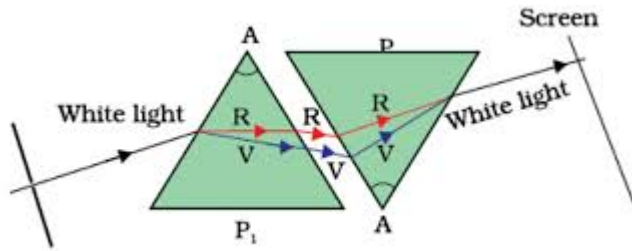
**General Instructions: -**

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully. **Evaluation is a 10-12 days mission for all of us. Hence, it is necessary that you put in your best efforts in this process.**
2. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them.**
3. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
4. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled.
5. If a question does not have any parts, marks must be awarded in the left hand margin and encircled.
6. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
7. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
8. A full scale of marks 1 to 80 has to be used. Please do not hesitate to award full marks if the answer deserves it.
9. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 25 answer books per day.
10. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
  - Leaving answer or part thereof unassessed in an answer book.
  - Giving more marks for an answer than assigned to it.
  - Wrong transfer of marks from the inside pages of the answer book to the title page.
  - Wrong question wise totaling on the title page.
  - Wrong totaling of marks of the two columns on the title page.
  - Wrong grand total.
  - Marks in words and figures not tallying.
  - Wrong transfer of marks from the answer book to online award list.
  - Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
  - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
11. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as (X) and awarded zero (0) Marks.
12. Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
13. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
14. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
15. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

**SET 31 / 4 / 2**

Q. No.	Value Point / Expected Answer	Value	Total Marks
1	The rate of flow of charges through a conductor is called electric current. Its S.I. unit is ampere (A)	$\frac{1}{2}$ $\frac{1}{2}$	1
2	Infrared (attempted answers will be awarded full marks)	1	1
3	<b>First law</b> :The incident ray ,the refracted ray and the normal to the interface of two mediums at the point of incidence, all lie in the same plane. <b>Second law</b> :The ratio of sine of angle of incidence to sine of angle of refraction is always constant for a given pair of medium .This constant is called refractive index.  OR (i)Erect (ii) virtual (iii) magnified (iv) Behind the mirror	1  1  $\frac{1}{2} \times 4$	2
4	Field pattern  Polarity Direction of field  	1  $\frac{1}{2}$ $\frac{1}{2}$	2
5	Compounds name –ethanol molecular formula- $C_2H_5OH$ Reaction: $C_2H_5OH + \text{conc. } H_2SO_4 \rightarrow CH_2=CH_2 + H_2O$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$	2
6	<ul style="list-style-type: none"> <li>Gradual change that takes place over millions of years occurring in living organisms.</li> <li>Reason: More complex group of organisms are formed even though simpler forms continues to flourish and are equally efficient. Eg bacteria can survive.</li> </ul> Eg: Bacteria.	1  1  1	3
7	(a) The plant will immediately change the shape by changing the amount of water in them (swelling or shrinking) thus bringing movement. (b) (i) Gibberellin/Auxin (ii) Cytokinin	1  1  1	3

8	<p>a) i) Saliva –contains salivary amylase, converts starch to sugar                  ii) HCl in stomach- medium acidic/kills pathogen (germs)                  iii) Bile-emulsifies fats/neutralizes acidic food in the duodenum                  iv) Villi -increases surface area for absorption</p> <p>b) i) Pepsin: digest protein .                  ii) Lipase: digest fats</p>	<p><math>\frac{1}{2} \times 4</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>	<p>3</p>
9	<p>P- sodium bicarbonate, <math>\text{NaHCO}_3</math>                  Q- sodium carbonate, <math>\text{Na}_2\text{CO}_3</math>                  R- carbon dioxide, <math>\text{CO}_2</math></p> <p>Reaction:  <math>2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}</math>  <math>\text{CO}_2 + \text{Ca}(\text{OH})_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}</math></p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p> <p><math>\frac{1}{2}</math></p>	<p>3</p>
10	<p>a) i) double displacement reaction                  ii) combination reaction                  iii) decomposition reaction                  iv) displacement reaction</p> <p>b) <math>3\text{BaCl}_2 + \text{Al}_2(\text{SO}_4)_3 \rightarrow 2\text{AlCl}_3 + 3\text{BaSO}_4</math></p> <p style="text-align: center;"><b>OR</b></p> <p>a) Yellow, lead iodide                  b) <math>2\text{KI} + \text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbI}_2 + 2\text{KNO}_3</math>                  c) Double displacement, precipitation reaction</p>	<p><math>\frac{1}{2} \times 4</math></p> <p>1</p> <p><math>\frac{1}{2} + \frac{1}{2}</math></p> <p>1</p> <p><math>\frac{1}{2} \times 2</math></p>	<p>3</p>
11.	<ul style="list-style-type: none"> <li>The Metals high up in reactivity series are very reactive, because of difference in their reactivity.</li> <li>Methods of extraction of metals depends on their reactivity.</li> <li>Electrolytic reduction followed by electrolytic refining.</li> </ul>	<p>1</p> <p>1</p> <p>1</p>	<p>3</p>
12.	<div style="text-align: center;">  </div> <p>Magnetic field will be nullified. B will be zero at X.                  Since, direction of Magnetic Field lines due to both wires opposite to each other.</p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p>	<p>3</p>
13	<ul style="list-style-type: none"> <li>Cause of dispersion:</li> </ul> <p>(i) Shape of prism                  (ii) Different colours bend with different angles (different colour has different refractive index or different speed)</p> <p>diagram</p> <p>Arrow &amp; labelling</p>	<p>1</p> <p>1</p> <p>1</p>	<p>3</p>



OR

Scattering of light means to throw light in all possible direction when light interact with particles of medium.

**(i)The Sun appears reddish at sun-rise :** the Sun rays have to travel through a large atmospheric distance near the horizon .As the wave length of red light is maximum in the visible range , hence the scattering is least . The blue light and shorter wavelengths are scattered away by the particles .This gives rise to the reddish appearance of the sun./diagrammatic answers may be given fig:11.12

**(ii)The sky appears blue:** Blue colour has shorter wavelength than red. When sunlight passes through the atmosphere, the fine particles in the air scatter the blue light more strongly than red. Hence the clear sky appears blue.

1

1

1

3

14

(a)

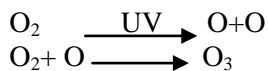
Manmade ecosystem	Natural ecosystem
no microbes to clean the water	microbes to clean the water

(b) The micro-organisms that breakdown the complex organic substances into simple inorganic substances.

- No decomposition would take place.
- Soil would be unsuitable for crops/it would result in imbalance in Ecosystem
- nutrients would not returned back to the nutrient pool
- Land pollution/affect soil fertility or any other.

OR

- The higher energy UV radiations split apart some molecular oxygen into free oxygen atoms . These atoms then combine with molecular oxygen to form ozone..



- It prevents harmful UV radiation to reach the earth.
- CFC/chlorofluoro carbon/aerosol
- Skin cancer/reduction in immune system/cataract/damages eyes.

1 ½

½

½

½

3

15

Excessive use of natural resources, so that immediate benefits are available for present generation.

**Advantages**

- Industrial growth will be fast
- Rapid development will take place
- Resource are utilized to their maximum
- Growth in economy / employment (any other relevant advantage).

1

½ x4

3

16

- a) (i) Tall plants  
 (ii) Tall: dwarf = 3:1  
 (iii) Dwarf plants.  
 Tall is dominant and dwarf is recessive.  
 Segregation of genes

½

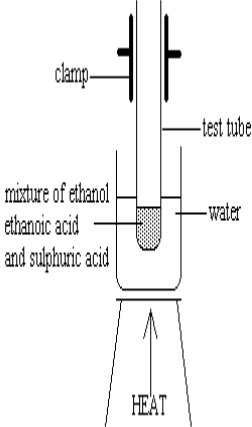
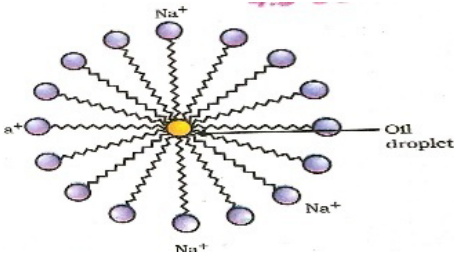
½

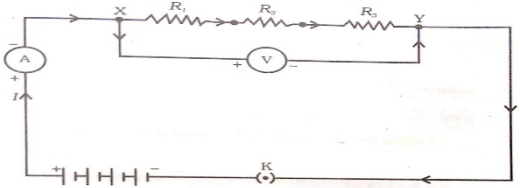
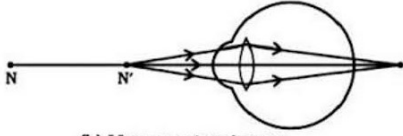
½

½ + ½

½

	<p>(b)</p> <ul style="list-style-type: none"> <li>The structures which have the same structural plans / origin but different functions.eg: forelimb of human and wings of a bird</li> <li>Yes</li> </ul>	<p>1½</p> <p>½</p>	5
17	<p>a) Reproduction through vegetative parts of a plant like Roots / stem / leaves/Artificial / Layering / Grafting (any two)</p> <p>b)</p> <p>(i) In some plants which produce non viable seeds. (ii) It consumes less time / fast method</p> <p>c) Budding in hydra:</p> <p style="text-align: right;">Diagram Labelling</p> <p>(if student writes explanation award marks) OR</p> <ul style="list-style-type: none"> <li>Prevention of unwanted pregnancy.</li> <li>Method : <ul style="list-style-type: none"> <li>(i) mechanical barrier – condom</li> <li>(ii) surgical method – tubectomy / vasectomy</li> <li>(iii) chemical – Oral and vaginal pills</li> <li>(iv) IUCD – copper -T</li> </ul> </li> <li>Reasons: <ul style="list-style-type: none"> <li>(i) Gap between children</li> <li>(ii) mother's health</li> <li>(iii) better living standard</li> <li>(iv) population under control</li> </ul> </li> </ul> <p style="text-align: right;">or any other relevant points.</p>	<p>1</p> <p>½ x2</p> <p>2 1</p> <p>1</p> <p>½ x 4</p> <p>½ x4</p>	5
18	<p>(a) (i) This law was applicable only upto calcium ii) Could not explain the position of hydrogen atom.</p> <p>(b) Atomic no of A / Ca-20. Electronic configuration 2.8.8.2 ; atomic no B / Cl- 17.Electronic configuration 2.8.7</p> <p>CaCl<sub>2</sub> / AB<sub>2</sub> Acidic salt It is a salt formed between strong acid and a weak base</p>	<p>1</p> <p>1</p> <p>½ + ½</p> <p>½</p> <p>½</p> <p>1</p>	5

19	<p>(a) <math>C_2H_5OH + CH_3COOH \rightarrow CH_3COO C_2H_5 + H_2O</math> (esterification)  Alcohol      Acid                      Ester                      Water</p> <p><math>CH_3COOC_2H_5 + NaOH \rightarrow C_2H_5OH + CH_3COONa</math> (saponification)  Ester                      Base                      Alcohol      Salt</p> <p>b) Diagram for esterification</p>  <p>Description  1mL ethanol, 1mL glacial acetic acid and a few drops of conc. <math>H_2SO_4</math>  ↓  Warmed in a water bath  ↓  Water is poured into the beaker  ↓  Fruity smell is produced</p> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• Soaps are sodium salts of fatty acids.</li> <li>• Detergents are sodium salts of sulphonc acids. Soaps do not act in hard water due to formation of scum while detergents do.</li> <li>• Cleansing action of soaps:  In soaps carbon chain dissolves in oil and the ionic end dissolves in water to form micelle</li> </ul>  <ul style="list-style-type: none"> <li>• Hard water contains <math>Ca^{2+} / Mg^{2+}</math> ions that react with soap and form precipitates called scum.</li> <li>• By using detergents in hard water / boiling hard water</li> </ul>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1+1</p> <p><math>\frac{1}{2} \times 4</math></p> <p><math>1\frac{1}{2}</math></p> <p>2</p> <p>1</p> <p><math>\frac{1}{2}</math></p>	<p>5</p>
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<p>20</p>	<p>(a) It is the rate at which electrical energy is dissipated or consumed in an electrical circuit is called electric power .</p> <p>We know  <math>V=W/Q</math>  <math>W=VQ</math>  <math>W/t = VQ/t</math>  <math>P = VI</math>  <math>P = IR.I</math>  <math>P = I^2R</math></p> <p>(b) Bulb I: <math>I=P/V, 100W 220V</math>  <math>I_1 = 100/220A</math>  <math>= 5/11A</math>          Bulb II : <math>60W 220V</math>  <math>I_2 = 60/220A</math>  <math>= 3/11 A</math>          Total current <math>(5/11 + 3/11)A = 8/11A = 0.72A</math></p> <p style="text-align: center;">OR</p> <p>(a)</p> <ul style="list-style-type: none"> <li>• Three resistors <math>R_1, R_2, R_3</math> are joined.</li> <li>• They are connected with the battery and ammeter and a plug key.</li> <li>• The ammeter reading is noted.</li> <li>• Position of ammeter is changed to different position and readings taken each time.</li> <li>• The reading remain same.</li> </ul> <p>( If it is diagram,</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>explained by give full credit)</p> </div> </div> <p>(b)</p> <p>(i) <math>\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}</math>      <math>\frac{1}{R_1} = \frac{1}{R_1} + \frac{1}{R_1}</math>      <math>R_t = R_p + 12 \Omega</math>  <math>R_t = 24 \Omega</math></p> <p><math>V = IR_T</math>  <math>I = 6/24 = 0.25</math> Ampere</p> <p>(ii) Same readings of <math>A_1</math> and <math>A_2</math></p>	<p>1</p> <p>2</p> <p>2</p> <p>2½</p> <p>1½</p> <p>1</p>	<p>5</p>
<p>21</p>	<p>(a) Hypermetropia / farsightedness          Causes:</p> <ol style="list-style-type: none"> <li>i. Shortening of eyeball</li> <li>ii. Curvature of eye lens decreases / focal length of eye lens increases.</li> </ol> <p>b)</p> <div style="text-align: center;">  <p>(b) Hypermetropic eye</p> </div>	<p>½</p> <p>½</p> <p>½</p> <p>1</p>	





25	<ul style="list-style-type: none"> <li>• Taking out the leaf peel and mount on the slide_</li> <li>• stain with safranin</li> <li>• mount with glycerin</li> <li>• place cover slip and observe under microscope.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p>i) To prevent the entry of oxygen/escape of CO<sub>2</sub>/air  ii) KOH absorb CO<sub>2</sub> gas  iii) KOH absorb CO<sub>2</sub> gas/Partial vacuum created</p>	<p style="text-align: center;">½ x4</p>     <p style="text-align: center;">1 ½ ½</p>	2
26	<ul style="list-style-type: none"> <li>• No Change</li> <li>• In solid form (powder no reaction will take place because H<sup>+</sup>/H<sub>3</sub>O<sup>+</sup> (ions) are not available.  Na<sub>2</sub> SO<sub>4</sub> + BaCl<sub>2</sub> → NaCl + BaSO<sub>4</sub>(white ppt)</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p style="text-align: center;">Cu &lt; Fe &lt; Zn &lt; Al</p> <p>i) Deposition of brown colour on iron.  ii) Blue Colour change is to green.</p>	<p style="text-align: center;">1 ½ + ½</p>     <p style="text-align: center;">1 ½ ½</p>	2
27	<p>(i) X- acidic, pH of X is &lt; 7  (ii) Y- basic, pH of Y is &gt; 7</p>	<p style="text-align: center;">1 1</p>	2