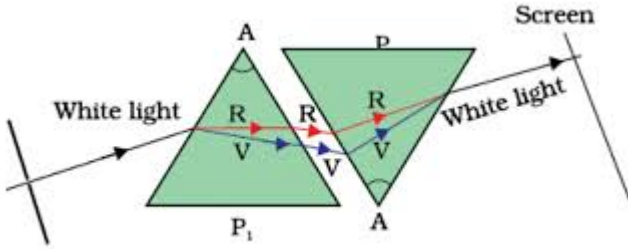
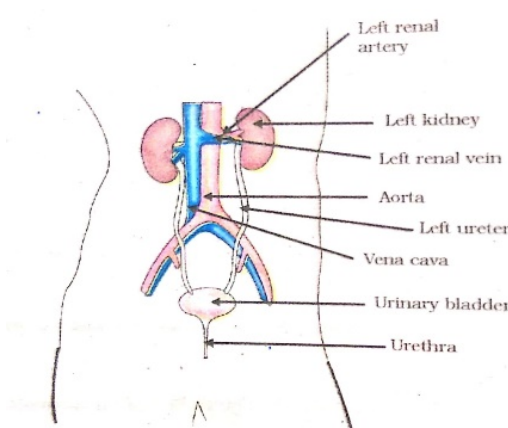


Strictly Confidential: (For Internal and Restricted use only)
Secondary School Examination
March 2019
Marking Scheme – SUBJECT - SCIENCE (SUBJECT CODE 086)
(PAPER CODE – 31/4/3)

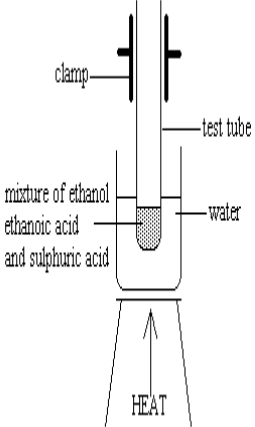
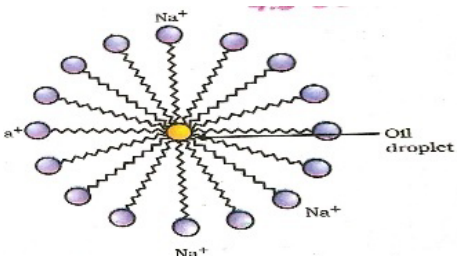
General Instructions: -

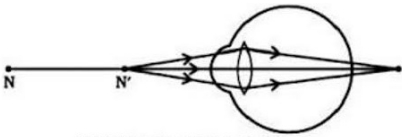
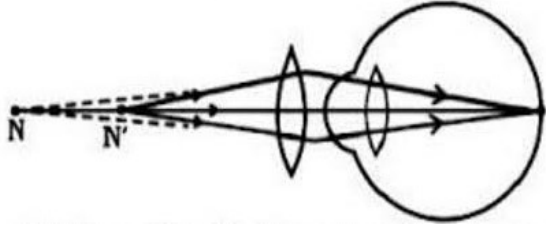
1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested 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.

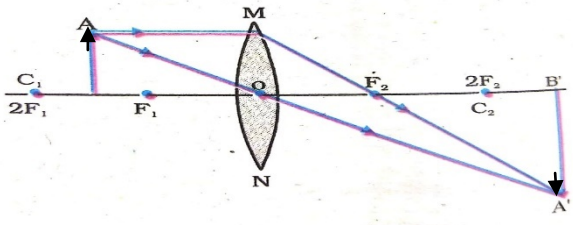
	<p>free oxygen atoms . These atoms then combine with molecular oxygen to form ozone..</p> $O_2 \xrightarrow{UV} O+O$ $O_2+ O \longrightarrow O_3$ <ul style="list-style-type: none"> • It prevents harmful UV radiation to reach the earth. • CFC/chlorofluoro carbon/aerosol • Skin cancer/reduction in immune system/cataract/damages eyes. 	<p>1 ½ ½ ½ ½</p>	<p>3</p>
<p>8</p>	<ul style="list-style-type: none"> • Right hand thumb rule: If we hold a current carrying straight conductor in our right hand , such that the thumb gives the direction of electric current then the curled fingers give the direction of the magnetic field. • The magnetic field will be directed perpendicular into the plane of table inside the circular loop. • The magnetic field will be directed perpendicular outside plane of table for a point outside the circular loop. / Diagram: <p style="text-align: right;">(diagram is not necessary)</p>	<p>1 1 1</p>	<p>3</p>
<p>9</p>	<ul style="list-style-type: none"> • Cause of dispersion: <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& labelling</p>  <p style="text-align: center;">OR</p> <p>Scattering of light means to throw light in all possible direction when light intract with particles of medium.</p> <p>(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</p> <p>(ii)The sky appears blue: Blue colour has shorted 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 spears blue.</p>	<p>1 1 1 1 1</p>	<p>3</p>
<p>10</p>	<ul style="list-style-type: none"> • X=Al , Y = Al₂O₃ • Al₂O₃ + 6HCl → 2AlCl₃ + 3H₂O 	<p>½ + ½ 1</p>	

	<ul style="list-style-type: none"> $\text{Al}_2\text{O}_3 + 2\text{NaOH} \rightarrow 2\text{NaAlO}_2 + \text{H}_2\text{O}$ 	1	3
11	<p>a) Plaster of Paris $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ (Calcium sulphate hemihydrate)</p> <p>b) Heating calcium sulphate dihydrate, or gypsum, to 373°K. $\text{CaSO}_4 \cdot 2\text{H}_2\text{O} \xrightarrow{373\text{K}} \text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O} + 1\frac{1}{2}\text{H}_2\text{O}$</p> <p>(c) on addition of water it sets into hard mass. $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O} + 1\frac{1}{2}\text{H}_2\text{O} \rightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$</p> <p>d) Making sculptures/statues / Decorative items/POP walls</p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p>	3
12	<p>a) i) double displacement reaction ii) combination reaction iii) decomposition reaction iv) displacement reaction</p> <p>b) $3\text{BaCl}_2 + \text{Al}_2(\text{SO}_4)_3 \rightarrow 2\text{AlCl}_3 + 3\text{BaSO}_4$ OR</p> <p>a) Yellow, lead iodide b) $2\text{KI} + \text{Pb}(\text{NO}_3)_2 \rightarrow \text{PbI}_2 + 2\text{KNO}_3$ c) Double displacement, precipitation reaction</p>	<p>$\frac{1}{2} \times 4$</p> <p>1</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2} \times 2$</p>	3
13	<p>Diagram of the Human Excretory System</p>  <p style="text-align: right;">Diagram Labelling</p>	<p>$1\frac{1}{2}$</p> <p>$\frac{1}{2} \times 3$</p>	3
14	<p>(a) The plant will immediately change the shape by changing the amount of water in them (swelling or shrinking) thus bringing movement.</p> <p>(b) (i) Gibberellin/Auxin (ii) Cytokinin</p>	<p>1</p> <p>1</p> <p>1</p>	3
15	<ul style="list-style-type: none"> Fossils are dead remains or traces of preserved plants and animals buried under the earth's crust. Relative Dating: Digging the earth shows that the fossils closer to the earth surface are more recent than those in the deeper layers. 	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p>	

	<ul style="list-style-type: none"> Carbon Dating: Detecting the ratios of different isotopes of the same element in the fossil material. 	1	3								
16	<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.</p> <p>(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)</p> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Prevention of unwanted pregnancy. Method : <ol style="list-style-type: none"> mechanical barrier – condom surgical method – tubectomy / vasectomy chemical – Oral and vaginal pills IUCD / copper -T Reasons: <ol style="list-style-type: none"> Gap between children mother’s health better living standard population under control <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								
17	<table border="1" style="width: 100%;"> <thead> <tr> <th style="text-align: center;">Acquired Traits</th> <th style="text-align: center;">Inherited Traits</th> </tr> </thead> <tbody> <tr> <td>1. These traits are not transferred from one generation to the next generation</td> <td>1. These traits are transferred from one generation to the next</td> </tr> <tr> <td>2. They do not bring about change in DNA</td> <td>2. They bring about changes in DNA</td> </tr> <tr> <td>3. They do not direct evolution</td> <td>3.They do direct evolution.</td> </tr> </tbody> </table> <p style="text-align: center;">(or any other relevant point and example)</p> <ul style="list-style-type: none"> For limbs of human beings These characteristics show similarities since they have a common ancestor but are modified to perform the different functions. <p>Homologous characteristics helps to identify the relationship between organisms. These characters in different organisms could be similar</p>	Acquired Traits	Inherited Traits	1. These traits are not transferred from one generation to the next generation	1. These traits are transferred from one generation to the next	2. They do not bring about change in DNA	2. They bring about changes in DNA	3. They do not direct evolution	3.They do direct evolution.	<p>1x2</p> <p>1 1</p>	
Acquired Traits	Inherited Traits										
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3. They do not direct evolution	3.They do direct evolution.										

	because they have been inherited from a common ancestor.	1	5
18	<p>(a) $C_2H_5OH + CH_3COOH \rightarrow CH_3COO C_2H_5 + H_2O$ (esterification)</p> <p>Alcohol Acid Ester Water</p> <p>$CH_3COOC_2H_5 + NaOH \rightarrow C_2H_5OH + CH_3COONa$ (saponification)</p> <p>Ester Base Alcohol Salt</p> <p>b) Diagram for esterification</p>  <p>Description</p> <p>1mL ethanol, 1mL glacial acetic acid and a few drops of conc. H_2SO_4</p> <p>↓</p> <p>Warmed in a water bath</p> <p>↓</p> <p>Water is poured into the beaker</p> <p>↓</p> <p>Fruity smell is produced</p> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Soaps are sodium salts of fatty acids. • Detergents are sodium salts of sulphonic acids. Soaps do not act in hard water due to formation of scum while detergents do. • Cleansing action of soaps: In soaps carbon chain dissolves in oil and the ionic end dissolves in water to form micelle  <ul style="list-style-type: none"> • Hard water contains Ca^{2+} / Mg^{2+} ions that react with soap and form precipitates called scum. • By using detergents in hard water / boiling hard water 	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1+1</p> <p>$\frac{1}{2} \times 4$</p> <p>1½</p> <p>2</p> <p>1</p>	5

19	<p>(a)</p> <ul style="list-style-type: none"> Increasing Atomic mass. Similar properties in a group. The physical and chemical properties of an element are periodic function of their atomic mass. No fixed position to Hydrogen because it resembles both alkali metals / group 1, as well as halogen /group 17 <p>(b) (i) Atomic size of elements decrease as we move from left to right across a period as effective Nuclear charge increases</p> <p>(ii) Increases down a group as number of shells increases.</p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	5
20	<p>(a) Hypermetropia / farsightedness</p> <p>Causes:</p> <ol style="list-style-type: none"> Shortening of eyeball Curvature of eye lens decreases / focal length of eye lens increases. <p>b)</p>  <p>(b) Hypermetropic eye</p> <p>(c) Convex lens</p> $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ $= \frac{1}{(-50\text{cm})} - \frac{1}{(-25\text{cm})}$ $= \frac{1}{50\text{cm}}$ <p>Hence, $f = 50\text{ cm} = 0.5\text{m}$</p> <p>Therefore power $= (1/0.5)\text{D} = 2\text{D}$</p> <p>(d) Correction of Hypermetropia</p> 	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p>	5
21	<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</p> $V = W/Q$ $W = VQ$ $W/t = VQ/t$ $P = VI$ $P = IR.I$	<p>1</p> <p>2</p>	

<p>24</p>	<ul style="list-style-type: none"> No Change In solid form (powder no reaction will take place because H^+/H_3O^+ (ions) are not available. $Na_2 SO_4 + BaCl_2 \rightarrow NaCl + BaSO_4(\text{white ppt})$ <p style="text-align: center;">OR</p> <p>$Cu < Fe < Zn < Al$</p> <p>i) Deposition of brown colour on iron. ii) Blue Colour change is to green.</p>	<p>1 $\frac{1}{2} + \frac{1}{2}$</p> <p>1 $\frac{1}{2}$ $\frac{1}{2}$</p>	<p>2</p>
<p>25</p>	<p>(i) X- acidic, pH of X is < 7 (ii) Y- basic, pH of Y is > 7</p>	<p>1 1</p>	<p>2</p>
<p>26</p>	<p>Mistakes : F_1 and F_2 are not equidistant from the optical center of the lens. $OF_1 \neq OF_2$; $2OF_1 \neq 2OF_2$ Image should form beyond $2F_2$ Image should be magnified</p> <p style="text-align: right;">(any two)</p>  <p style="text-align: center;">OR</p> <p>(i) Prism should be within the boundary all through the experiment . (ii) Pins should be fixed vertically and the feet of the pins should be observed. (iii) Protractor should be used correctly . (iv) Angle should be taken between 30° and 60° to observe the refraction clearly. (v) Separation between the pins should be kept at least 5cm .</p> <p style="text-align: right;">(any four)</p>	<p>$\frac{1}{2} \times 2$</p> <p>1</p> <p>$\frac{1}{2} \times 4$</p>	<p>2</p>
<p>27</p>	<ul style="list-style-type: none"> Set up A is correct. Ammeter should be connected in series whereas voltmeter should be connected in parallel to the resistor across which potential difference is to be measured. Positive of voltmeter and ammeter should be connected to the positive of supply voltage. 	<p>$\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$</p> <p>$\frac{1}{2}$</p>	<p>2</p>