

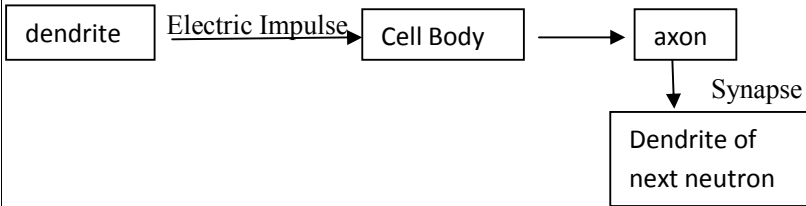
Strictly Confidential: (For Internal and Restricted use only)
Secondary School Examination
March 2019
Marking Scheme- SCIENCE (SUBJECT CODE 086)
(PAPER CODE-31/5/2)

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.

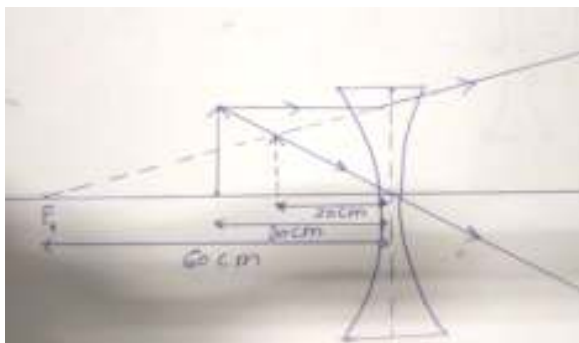
SET 31/5/2

Q.No	Value Point/Expected Answer	Value	Total Marks
1.	<ul style="list-style-type: none"> Volt Voltmeter 	$\frac{1}{2}$ $\frac{1}{2}$	1
2.	<ul style="list-style-type: none"> It is less expensive . It produces a large amount of heat. It can be stored and transported easily. It has high calorific value . It is ecofriendly or do not cause pollution . <p>(for any two correct answers)</p>	$\frac{1}{2} + \frac{1}{2}$	1
3.	<p style="text-align: center;">SECTION-'B'</p> <div style="text-align: center;"> </div> <p>(i) draw mirror (ii) Complete ray diagram (iii) $\angle i$ and $\angle r$ is labelled (iv) Arrows marked</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
4.	<ol style="list-style-type: none"> The field lines emerge from north pole and merge at south pole. The magnetic field lines are stronger at poles. The magnetic field lines do not cross /intersect each other. The magnetic field lines are closed curves. 	$\frac{1}{2} \times 4$	2
5.	<ul style="list-style-type: none"> Brine – an aqueous solution of highly concentrated sodium chloride . When electric current is passed through an aqueous solution of sodium chloride it decomposes to form sodium hydroxide, chlorine gas and water. $2 \text{ NaCl (aq)} + 2 \text{ H}_2\text{O (l)} \longrightarrow 2 \text{ NaOH (aq)} + \text{ Cl}_2 \text{ (g)} + \text{ H}_2 \text{ (g)}$ <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Colour of the solution becomes blue – green due to formation of Copper (II) chloride. 	$\frac{1}{2}$ $\frac{1}{2}$ 1 1	

	<p style="text-align: center;">Or</p> <p>(a) When copper is heated in air, oxidation takes place</p> <p>(b) CuO/Copper oxide</p> <p>(c) $2 \text{Cu} + \text{O}_2 \longrightarrow 2 \text{CuO}$</p> <p>(d) On passing hydrogen gas over the heated material</p>	<p>1</p> <p>½</p> <p>1</p> <p>½</p>	3										
10.	<ul style="list-style-type: none"> It consists of sodium hydrogen carbonate and tartaric acid Sodium hydrogen carbonate release carbon dioxide gas which makes cakes soft and fluffy and Tartaric acid neutralizes the bitter taste of the salt $2\text{NaHCO}_3 \xrightarrow{\text{Heat}} \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$ 	<p>1</p> <p>1</p> <p>1</p>	3										
11.	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Blood</th> <th style="width: 50%; text-align: center;">Lymph</th> </tr> </thead> <tbody> <tr> <td>1. It is red coloured fluid because it contains RBC (haemoglobin)</td> <td>1. It is colourless fluid that do not contain RBC (haemoglobin)</td> </tr> <tr> <td>2. It flows in arteries, veins and capillaries.</td> <td>2. It flows in Lymph vessels.</td> </tr> <tr> <td>3. It carries absorbed nutrients, O₂, CO₂ and nitrogenous waste etc.</td> <td>3. It carries digested and absorbed fat from intestine.</td> </tr> <tr> <td>4. It consists of Plasma ,RBC, WBC, Platelets .</td> <td>4. It consists of Plasma, Proteins and WBC.</td> </tr> </tbody> </table> <p style="text-align: center;">Any three correct answers</p>	Blood	Lymph	1. It is red coloured fluid because it contains RBC (haemoglobin)	1. It is colourless fluid that do not contain RBC (haemoglobin)	2. It flows in arteries, veins and capillaries.	2. It flows in Lymph vessels.	3. It carries absorbed nutrients, O ₂ , CO ₂ and nitrogenous waste etc.	3. It carries digested and absorbed fat from intestine.	4. It consists of Plasma ,RBC, WBC, Platelets .	4. It consists of Plasma, Proteins and WBC.	1X3	3
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12.	 <p style="text-align: center;">This flow is unidirectional. (can award marks if student writes in a descriptive manner)</p>	½ x6	3										
13.	<p>Depending on the nature of variations, different individuals would have different kinds of advantages which enable them to survive and adapt in their environment.</p> <p>Example. Suppose there were a population of bacteria living in temperate waters and if the water temperature were to be increased by global warming, most of these bacteria would die, but a few variants resistant to heat would survive and grow further. Variation is thus useful for the survival of species over time. (or any other relevant example).</p>	<p>1</p> <p>2</p>	3										
14.	<ul style="list-style-type: none"> The series of living organisms taking part at various biotic level forms a food chain. Explanation : <ul style="list-style-type: none"> (i) An average of 10% of the food eaten is turned into its own body and made available for the next level of consumers (ii) The energy that is captured by the autotrophs does not revert back to the solar input. 	1											

	<p>(iii) The energy which is passed to the herbivores does not come back to the autotrophs. (iv) As it moves progressively through the various trophic levels it is no longer available to the previous level</p> <p style="text-align: right;">[Any two]</p> <p style="text-align: center;">Or</p> <p>(a) Since interference will create disturbances in the protected area (National Park) / To maintain the self sustainability in the protected area.</p> <p>(b) Reuse of materials is better than recycling because</p> <ul style="list-style-type: none"> • the process of recycling use some energy • in the reuse strategy things are used again and again. (If example is given then also award marks) 	<p>1+1</p> <p>1</p> <p>1+1</p>	<p>3</p>
15.	<ul style="list-style-type: none"> • Global warming, melting of glaciers (any other appropriate answer) • - More efficient lighting (CFL, LED) - Upgrade heating system - use of public transport (metro, bus) - Choosing renewable sources of energy (or any other appropriate answers other than given here) 	<p>1</p> <p>$\frac{1}{2} \times 4$</p>	<p>3</p>
16.	<p style="text-align: center;">Section -D</p> <p>$f = -60 \text{ cm}$ $h = 9 \text{ cm}$ $u = -30 \text{ cm}$</p> <p>Lens formula : $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$</p> $\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$ $= \frac{-1}{60} + \left[\frac{-1}{30} \right]$ $= \frac{-1}{60} - \frac{1}{30}$ $\frac{1}{v} = \frac{-1-2}{60}$ <p>$v = -20 \text{ cm}$</p> $m = \frac{v}{u} = \frac{-20}{-30} = \frac{2}{3}$ $m = \frac{h'}{h} \Rightarrow h' = m \times h$ $= \frac{2}{3} \times 9$ <p>$h' = 6 \text{ cm}$</p>	<p>1</p> <p>1</p> <p>1</p>	

Image is : virtual, erect, smaller than object



1

1

17.

(A)

- $R = R_1 + R_2$
 $R = 1\Omega + 2\Omega$
 $R = 3\Omega$

 $\frac{1}{2}$ $\frac{1}{2}$

- $V = IR$
 $I = V/R$
 $I = \frac{6V}{3\Omega} = 2 \text{ Ampere or } 2 \text{ A}$

1

- $P = I^2 R$
 $= 2 \times 2 \times 2$
 $= 8 \text{ W}$

1

(B) $P = V^2/R$

$P = \frac{4 \times 4}{2}$

$P = 8 \text{ W}$

1

1

OR

(i) $P = 40 \text{ W}$
 $V = 220 \text{ V}$
 $P = VI$
 $I = \frac{P}{V} = \frac{40 \text{ W}}{220 \text{ V}}$
 $= 0.18 \text{ A}$

1

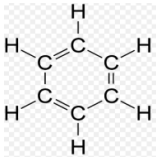
(ii) $R = \frac{V^2}{P}$
 $= \frac{220 \times 220}{40}$
 $= 1210 \Omega$

1

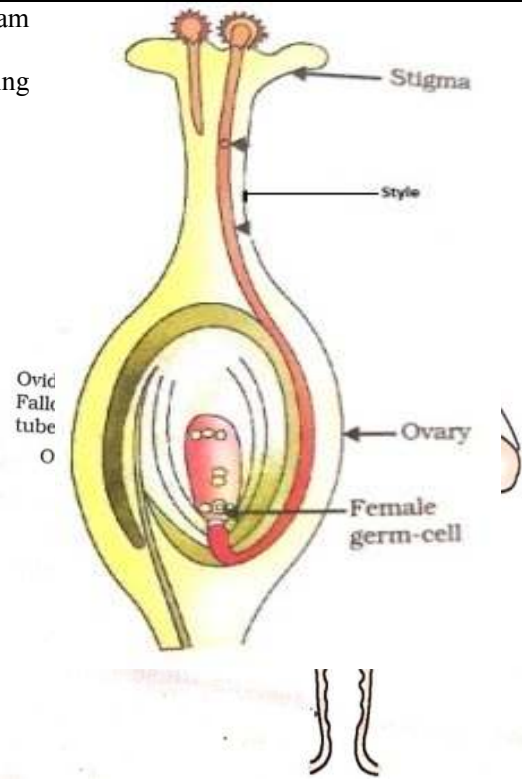

(iii) $P = 25 \text{ W}$
 $V = 220 \text{ V}$
 $P = VI$
 $I = \frac{P}{V}$
 $= \frac{25}{220} = 0.113 \text{ A}$

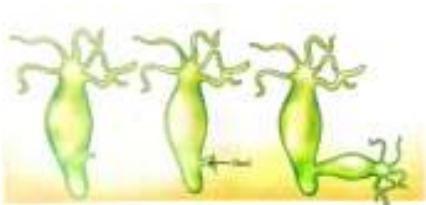
1

(iv) $R = V^2/P$

	$= \frac{220 \times 220}{25}$ $= 1936 \Omega$	1	
	(v) Yes there is a change in current and resistance	1	5
18.	<p>(a)</p> <ul style="list-style-type: none"> Carbon cannot form C^{4+} ions as very high energy is required to remove 4 electrons Carbon cannot gain 4 electrons to form C^{4-} ions as 6 protons cannot hold 10 electrons <p>(i) Covalent compounds are bad conductor of electricity as they do not have free electrons.</p> <p>(ii) Due to weak forces of attraction between the molecules, thus less energy is required for breaking the bond.</p> <p>(b)</p>  <p style="text-align: center;">Or</p> <p>(a) Isomers are those compounds which have the same molecular formula but different structural formula</p> <p>(b)</p> <ul style="list-style-type: none"> Propanal CH_3CH_2CHO Propanone CH_3COCH_3 <p>(c) (i) $CH_3CH_2OH \xrightarrow[\text{Conc. } H_2SO_4]{443 \text{ K}} H_2C=CH_2 + H_2O$</p> <p>(ii) $CH_3CH_2OH \xrightarrow[\text{Heat}]{\text{Alkaline } KMnO_4} CH_3CH_2COOH + H_2O$</p>	1 1 1 1 1 1 1+1 1+1	5
19.	<p>(a) Group: In modern periodic table vertical columns are known as 'Groups'. There are 18 groups.</p> <ul style="list-style-type: none"> Valency – remains same Atomic Size – Increases from top to bottom in a group Metallic Character – Increases from top to bottom in a group <p>(b) Atomic Number = 14 Electronic Configuration \longrightarrow K, L, M 2 8 4</p>	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1	5

	<ul style="list-style-type: none"> It is metalloid or semi – metal It exhibits some properties of both metals and non – metal. 	$\frac{1}{2}$ 1									
20.	<p>(a) (i) Homologous organs: Which have similar basic structures but have different functions. e.g. Forelimbs of human and forelimbs of Lizard</p> <p>(ii) Analogous organs : Which have different basic structure but perform similar function. e.g. Wings of insect and Wings of bat</p> <p>(iii) Fossils are remains or impression of the dead animals and plants that lived in past. e.g. Archeopteryx or any other example.</p> <p>(b) Methods to determine the age of fossils:</p> <p>(i) Relativedating : Fossils we find closer to the surface are more recent than those in deeper layers</p> <p>(iii) Dating Fossils: Detecting the ratios of different isotopes of the same element (C)in the fossil.</p>	1 1 1 1 1	5								
21.	<p style="text-align: center;">Section –D</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 10%;">(a)</th> <th style="width: 40%;">Cross Pollination</th> <th style="width: 10%;"></th> <th style="width: 40%;">Self Pollination</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Pollen is transferred from anther/stamen of one flower to another flower.</td> <td>1.</td> <td>Transfer of pollen from anther/stamen to the stigma of the same flower.</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Site of fertilization – Ovary Product of fertilization – Zygote <p>(b)</p>	(a)	Cross Pollination		Self Pollination	1.	Pollen is transferred from anther/stamen of one flower to another flower.	1.	Transfer of pollen from anther/stamen to the stigma of the same flower.	1 $\frac{1}{2}$ $\frac{1}{2}$	
(a)	Cross Pollination		Self Pollination								
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	<p>Correct diagram Correct labelling</p> <p>OR</p> <p>(a)</p>  <p>Oviduct Fallopi- an tube O</p> <p>Stigma</p> <p>Style</p> <p>Ovary</p> <p>Female germ-cell</p> <p>Correct diagram</p> <p>i. Ovary 1</p> <p>ii. Oviduct or fallopian tube 1/2 + 1/2</p> <p>(b) Syphilis and Gonorrhoea 1</p> <p>(c) Chemicals or materials required to avoid pregnancy 1</p> <p>(i) Controlling human population } any two</p> <p>(ii) To maintain good reproductive health</p> <p>(iii) Maintain gaps between successive birth</p> <p>1/2 x 2</p>	<p>1</p> <p>1/2 x 4</p> <p>1</p> <p>1/2 + 1/2</p> <p>1</p> <p>1</p> <p>5</p>	
<p>22.</p>	<p>Section -E</p>  <p>Plumule</p> <p>Cotyledon</p> <p>Radicle</p> <p>Diagram, Labelling 1/2 + 1 1/2</p>	<p>1/2 + 1 1/2</p>	

	OR		
		Diagram Process – Budding	1 1 2
23.	<ul style="list-style-type: none"> • Safranin is used to stain/colour the material for better view. • Glycerine prevents the leaf peel from getting it dried. 	1 1	2
24.	<ul style="list-style-type: none"> • No change/ An acid turns blue litmus to red ,so there is a need of blue litmus paper. To convert the blue litmus paper dip the red litmus paper into a basic solution and got blue litmus. <p style="text-align: center;">OR</p> <p>(i) Sodium hydrogen carbonate (NaHCO_3) or Sodium Carbonate (Na_2CO_3)</p> <p>(ii) $2\text{CH}_3\text{COOH} + \text{Na}_2\text{CO}_3 \longrightarrow 2 \text{CH}_3\text{COONa} + \text{H}_2\text{O} + \text{CO}_2$ or $\text{CH}_3\text{COOH} + \text{NaHCO}_3 \longrightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O} + \text{CO}_2$</p> <p>(iii) Liberated CO_2 is passed through lime water, which is turned to milky.</p>	2 $\frac{1}{2}$ 1 $\frac{1}{2}$	2
25.	<p>The solution turns</p> <ol style="list-style-type: none"> green to colourless black coating is formed on Zinc <p>Reason : Zinc is more reactive than iron so it displaces the iron from its salt solution .</p>	$\frac{1}{2} + \frac{1}{2}$ 1	2
26.	<p>(c) (20 cm, 20 cm) and (inverted and inverted)</p> <p>Reason: Only real and inverted image can be obtained on the screen and in both cases the image is formed at the principal focus.</p>	1 1	2
27.	<p>38 mA, 3.2 V</p> <p style="text-align: center;">Or</p> <p>(i) $V \propto I$</p>	1+1 1	2

	(ii) at 2.5 V current will be 0.25 A	1	
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