Strictly Confidential: (For Internal and Restricted use only)
Secondary School Examination
March 2019
Marking Scheme – SCIENCE (SUBJECT CODE 086)
(PAPER CODE – 31/5/1)

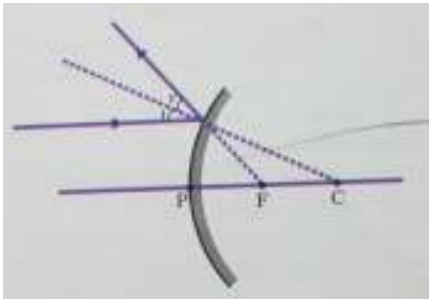
General Instructions: -

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.

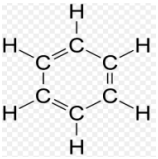
SET 31 / 5 / 1

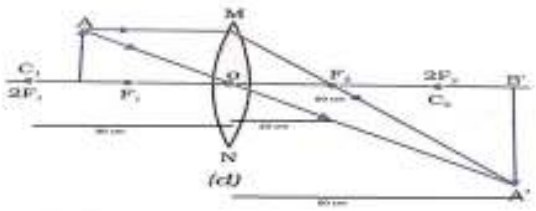
Q.No	Value Point/Expected Answer	Value	Total Marks
1.	**SECTION – 'A'** Ohm's law states that potential difference(V) is directly proportional to the current (I) flowing through the conductor provided the all physical conditions (temperature etc.) remains constant.	1	1
2.	i. Nitrogen ii. Phosphorous	½ ½	1
3.	**SECTION-'B'**  (i) draw mirror. (ii) Complete ray diagram (iii) ∠i and ∠r islabelled (iv) Arrows marked	 ½ ½ ½ ½	2
4.	(a) More deflection in compass needle ,Magnetic field is increased. (b) Less deflection in compass needle, Magnetic field is reduced/decreased.	1 1	2
5.	• Acetic acid (CH_3COOH) is a weak acid because it has less concentration of hydronium ion (H_3O^+/H^+) • eg. Zinc granules react with dil HCl very vigrously and liberate Hydrogen gas but in case of acetic acid, it reacts slowly to liberate hydrogen gas. OR • Sodium hydrogen carbonate ($NaHCO_3$) is a basic salt because $NaHCO_3$ is a combination of strong base and weak acid. • $2NaHCO_3 \xrightarrow{Heat} Na_2CO_3 + CO_2 + H_2O$	1 1 1 1	2
6.	**SECTION -'C'** • The branch of biology which deals with the study of heredity and variation.	 1	

	• The decrease in the number of surviving tigers is a cause of concern because fewer number of tigers impose extensive inbreeding among themselves, this limits the appearance of variation and put the species at a disadvantage if there are changes in the environment. Since the tigers fail to cope with the environmental changes, they may become extinct.	1	2
7.	$\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$ $\frac{1}{v}=\frac{1}{f}-\frac{1}{u}$ $\frac{1}{u}=\frac{1}{-20}+\frac{1}{30}$ u = -60cm(without unit (cm) deduct ½ mark) $m=\frac{-v}{u}$ $m=-[\frac{-30}{-60}]$ $m=-\frac{1}{2}$ $\frac{h_2}{h_1}=m$ $h_2 = h_1 \times m$ $h_2 = 4 \times [\frac{-1}{2}]$ $h_2 = -2$ cm or $m=\frac{v}{u}$ $m=-\frac{2}{3}$ $-\frac{2}{3}=\frac{v}{-12}$ v = 8 cm $\frac{1}{f}=\frac{1}{v}-\frac{1}{u}$ $\frac{1}{f}=\frac{1}{8}-\frac{1}{-12}$ $\frac{1}{f}=\frac{1}{8}+\frac{1}{12}$ $\frac{1}{f}=\frac{5}{24}$	½ 1 ½ 1 ½ ½	

	$f = \frac{24}{5}$ $f = 4.8$ cm	1 ½	3
8.	(a) Observations : i. Colour changes from green to white. ii. Formation of reddish brown Ferric oxide (Fe_2O_3) / evolution of SO_2 / SO_3 gas. (b) Decomposition reaction (c) $2FeSO_4 \xrightarrow{\text{Heat}} Fe_2O_3 + SO_2 + SO_3$ Ferric oxide Sulphur dioxide Sulphur trioxide Or (a) When copper is heated in air, oxidation takes place. (b) CuO /Copper oxide. (c) $2\,Cu + O_2 \longrightarrow 2\,CuO$ (d) On passing hydrogen gas over the heated material.	½+ ½ 1 1 1 ½ 1 ½	3
9.	• The series of living organisms taking part at various biotic level forms a food chain. • (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. (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. [Any two] OR (a) Since interference will create disturbances in the protected area (National Park) / To maintain the selfsustainability in the protected area (b) Reuse of materials is better than recycling because • 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 .)	1 1+1 1 1+1	3
10.	• 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.	1 1	

	• $2NaHCO_3 \xrightarrow{Heat} Na_2CO_3 + CO_2 + H_2O$	1	3
11.	(a) • It will show deflection • Change in magnetic field lines associated with coil Q gives induced current (b) • No deflection • Because there is no change in magnetic field lines associated with coil 'Q'. So no induced current.	½ 1 ½ 1	3
12.	(a) • Xylem vessels and Xylem tracheids • At the roots, cells in contact with the soil actively take up ions. • Creates a difference in concentration of ions • So water moves up. (b) Plants do not move and have large proportion of dead cells in many tissues. Thus plants have low energy needs.	1 1 1	3
13.	dendrite → Electric Impulse → Cell Body → axon → Synapse → Dendrite of next neutron This flow is unidirectional. (can award marks if student writes in a descriptive manner)	½ x6	3
14.	• Global warming, melting of glaciers (or any other appropriate answer) • - More efficient lighting (CFL or LED) - Upgrade heating system - Use of public transport (metro, bus) - Choosing renewable sources of energy (or any other)	1 ½ x 4=2	3
15	• Carbonate ore Zinc Carbonate • Calcination $ZnCO_3 \xrightarrow[\text{In limited supply of air}]{Heat} ZnO + CO_2$ • Reduction: $ZnO + C \longrightarrow Zn + CO$	½ ½ ½ ½ ½ ½	3
16.	**SECTION- 'D'** (a) • 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.	1 1	

	(i) Covalent compounds are bad conductor of electricity as they do not have free electrons .	1	
	(ii) Due to weak forces of attraction between the molecules ,thus less energy is required for breaking the bonds.	1	
	(b)Structure of Benzene 	1	
	Or		
	(a) Isomers are those compounds which have the same molecular formula but different structural formula	1	
	(b) • Propanal------- CH_3CH_2CHO • Propanone------- CH_3COCH_3	1+1	
	(c) (i) $CH_3CH_2OH \xrightarrow[\text{Conc. } H_2SO_4]{443\ K} H_2C{=}CH_2 + H_2O$ (ii) $CH_3CH_2OH \xrightarrow[\text{Heat}]{\text{Alkaline } KMnO_4} CH_3CH_2COOH + H_2O$	1+1	5
17.	f= 20 cm, u = -30 cm (a) (i) $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$	½	
	$\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$		
	$\frac{1}{v} = \frac{1}{20} + \frac{1}{-30}$		
	$\frac{1}{v} = \frac{1}{60}$		
	v= 60 cm	½	
	(ii) Real, inverted and magnified	1½	
	(iii) $m = \frac{v}{u}$	½	
	$m = \frac{60}{-30}$		
	m = -2	½	
	h' = m x h		

	h' = -2 x 5 h' = -10 cm (b)  	½ 1	5
18.	(a) i. In a period -------Metallic character decreases. e.g.In 3rd period Na is more metallic than Cl ii. In a group -------- Metallic character increases. e.g. K is more metallic than Na. (b)Covalent bond, XCl_4 (c) • Atomic number = Mass number -no. of neutrons = 35 – 18 = 17 • Electronic configuration = K , L, M 2 8 7 • Valency = - 1	½ + ½ ½ + ½ ½ + ½ 1 ½ ½	5
19.	(A) • R = R_1 + R_2 R = 1Ω + 2Ω R = 3Ω • V = IR I = V/R I = $\frac{6\,V}{3\Omega}$ = 2 Ampere or 2 A • $P = I^2 R$ = 2x2x2 = 8 W (B) $P = V^2/R$ $P = \frac{4x4}{2}$ P = 8 W OR	½ ½ 1 1 1 1	

<table>
<tr><td></td><td>
(i) P = 40 W
V = 220 V
P = VI
$I = \frac{P}{V} = \frac{40\,W}{220\,V}$
= 0.18 A

(ii) $R = \frac{V^2}{R}$
$= \frac{220\ X\ 220}{40}$
= 1210 Ω

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

(iv) $R = V^2/R$
$= \frac{220\ X\ 220}{25}$
= 1936 Ω

(v)Yes there is a change in current and resistance
</td><td>1

1

1

1

1</td><td>5</td></tr>
<tr><td>20.</td><td>
<table>
<tr><th>(a)</th><th>Cross Pollination</th><th></th><th>Self Pollination</th></tr>
<tr><td>1.</td><td>Pollen is transferred from anther/stamen of one flower to the stigma of another flower.</td><td>1.</td><td>Transfer of pollen from anther/stamen to the stigma of the same flower.</td></tr>
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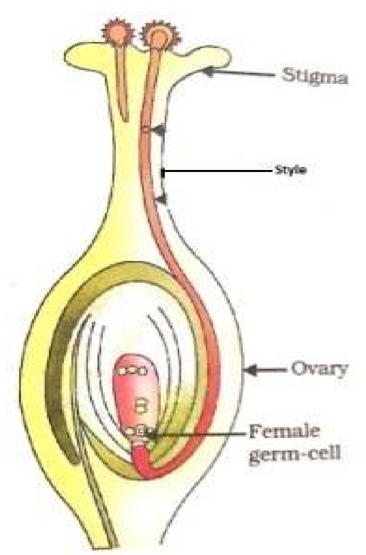
- Site of fertilization – Ovary
- Product of fertilization – Zygote

(b)



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½

½</td><td></td></tr>
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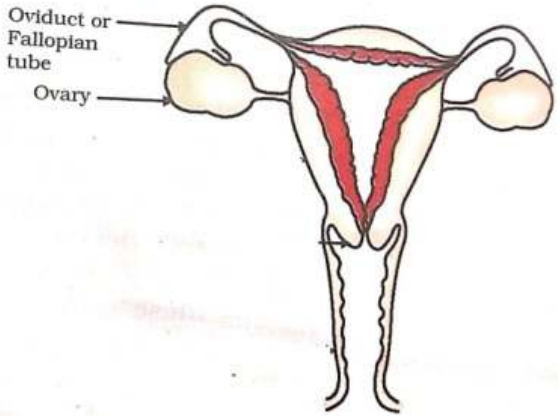
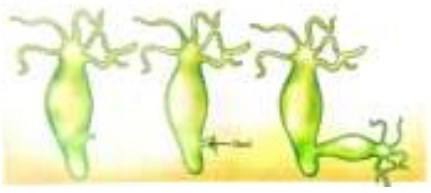
	Correct diagram Correct labelling OR  Correct diagram (i) Ovary (ii) Oviduct or fallopian tube (b)Syphillis and Gonnorhoea (c)Chemicals or materials required to avoid pregnancy • Reasons for adopting contraceptive devices are – (i) Controlling human population (ii) To maintain good reproductive health } any two (iii) Maintain gaps between successive birth	1 ½x4=2 1 ½ +½ ½ +½ 1 ½x2=1	5
21.	(a) (i) Homologous organs, which have similar basic structures but have different functions. e.g. Forelimbs of human and forelimbs of Lizard . (ii) Analogous organs are those which have different basic structure but perform similar function. e.g. Wings of insect and wings of bat. (iii) Fossils are remains or impression of the dead animals and plants that lived in the past. e.g. Archeopteryx or any other example (b) Methods to determine the age of fossils: (i) Relative dating: Fossils which are found closer to the surface are more recent than those in deeper layers. (ii) Dating Fossils: Detecting the ratios of different isotopes of the same element (C)in the fossil.	½ +½ ½ +½ ½ +½ 1 1	5
22.	**SECTION - 'E'**		

	The solution turns i. green to colourless and ii. black coating is formed on Zinc . Reason : Zinc is more reactive than iron so it displaces the iron from its salt solution .	½ +½ 1	2
23.	• No change / As acid turns blue litmus to red , so there is a need of blue litmus paper . To get the blue litmus dip the red litmus paper into a basic solution and get blue colour . OR (i) Sodium hydrogen carbonate ($NaHCO_3$) or Sodium Carbonate (Na_2CO_3) (ii) $2CH_3COOH + Na_2CO_3 \longrightarrow 2\ CH_3COONa + H_2O + CO_2$ or $CH_3COOH + NaHCO_3 \longrightarrow CH_3COONa + H_2O + CO_2$ (iii) Liberated CO_2 is passed through lime water, which is turned to milky.	2 ½ 1 ½	2
24.	(c) (20 cm, 20 cm) and (inverted and inverted) Reason: Only real and inverted image can be obtained on the screen and in both cases the image is formed at the principal focus.	1 1	2
25.	(i) 38mA, 3.2 V Or (i) V∝I (ii) at 2.5 V current will be 0.25 A	1+1 1 1	2
26.	• Safranin is used to stain/colour the material for better view. • Glycerine prevents the leaf peel from getting it dried.	1 1	2
27.	 Correct Diagram and Labelling OR  Diagram Process – Budding	½ +1½ 1 1	2