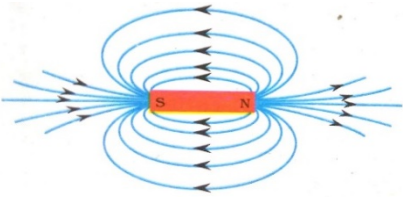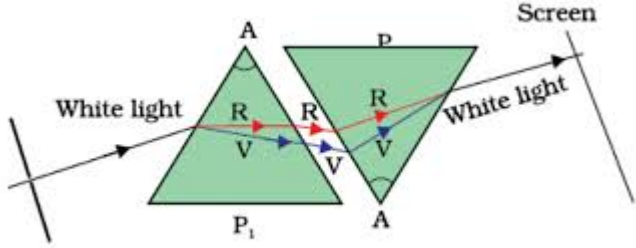**Strictly Confidential: (For Internal and Restricted use only)**
Secondary School Examination
March 2019
Marking Scheme – SUBJECT - SCIENCE (SUBJECT CODE 086)
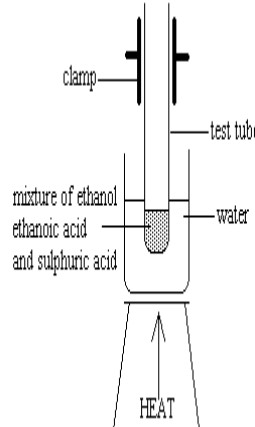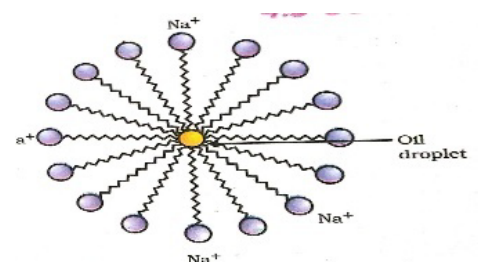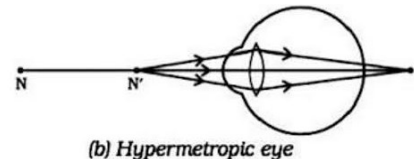**(PAPER CODE – 31/4/1)**

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.
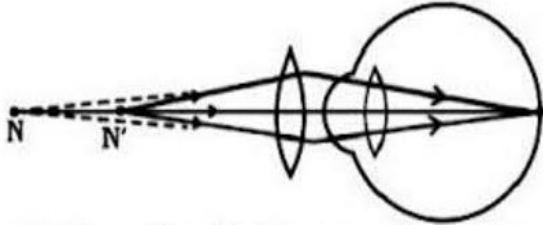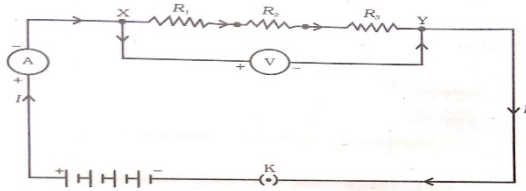
SET 31 / 4 / 1

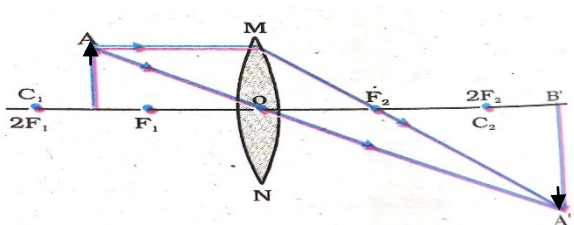| Q. No.	Value Point / Expected Answer	Value	Total Marks
1	• Resistance is the property of a conductor to resist the flow of charges through it • ohm (Ω)	½ ½	1
2	• Silicon, silver	½ ½	1
3	• **First law**: The incident ray, the reflected ray and the normal to the surface at the point of incidence all lie in the same plane. • **Second law:** Angle of incidence is equal to angle of reflection. OR • Refractive index of a transparent medium with respect to vacuum or air is called absolute refractive index. • Mathematically Absolute refractive index of a medium $= \dfrac{\text{Speed of light in vacuum or air}}{\text{Speed of light in the medium}}$ $n = c/v$	1 1 1 1	2
4	Field pattern Polarity Direction of field lines Diagram Labelling	 1 1	2
5	• Propyl alcohol gets oxidized to propanoic acid. KMnO$_4$ • $CH_3CH_2CH_2OH \xrightarrow{alk\ K\ MnO_4} CH_3CH_2COOH$ • Alkaline KMNO$_4$ is an oxidizing agent.	½ 1 ½	2
6	• 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. • Carbon Dating: Detecting the ratios of different isotopes of the same element in the fossil material.	½ + ½ 1 1	3
7	• Cause of dispersion: (i) Shape of prism (ii) Different colours bend with different angles (different colour has different refractive index or different speed) diagram Arrow& labelling	1 1	

	OR
	
	Scattering of light means to throw light in all possible direction when light intract 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 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.
		1
		
		1
		
		1
		
		1
			3

8	a) i) double displacement reaction ii) combination reaction iii) decomposition reaction iv) displacement reaction b) $3BaCl_2 + Al_2(SO_4)_3 \rightarrow 2AlCl_3 + 3BaSO_4$ **OR** a) Yellow, lead iodide b) $2KI + Pb(NO_3)_2 \rightarrow PbI_2 + 2KNO_3$ c) Double displacement, precipitation reaction	½ x 4 1 ½+½ 1 ½ x 2	3
9	(a) 	Manmade ecosystem	Natural ecosystem
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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..
	$O_2 \xrightarrow{\quad UV \quad} O+O$
	$O_2 + O \xrightarrow{\qquad} O_3$
	• It prevents harmful UV radiation to reach the earth.
	• CFC/chlorofluoro carbon/aerosol
	• Skin cancer/reduction in immune system/cataract/damages eyes.
		1
		
		1
		
		1
		
		1 ½
		½
		½
		½
			3

10	a) Plaster of Paris $CaSO_4.\frac{1}{2}H_2O$(Calcium sulphate hemihydrate) b) Heating calcium sulphate dihydrate, or gypsum, to373^0 K. $CaSO_4.2H_2O \xrightarrow{373\ K} CaSO_4.\frac{1}{2}H_2O+1\frac{1}{2}H_2O$ (c) on addition of water it sets into hard mass. $CaSO_4\frac{1}{2}H_2O + 1\frac{1}{2}H_2O \rightarrow CaSO_4.\ 2\ H_2O$ d) Making sculptures/statues / Decorative items/POP walls	½ ½ ½ 1 ½	3
11.	a)Deflection in the galvanometer in one direction. • Increase in magnetic field associated with coil. b)Deflection in the galvanometer in the opposite direction • Decrease in magnetic field associated with coil. c) Galvanometer shows no deflection • No changeof magnetic field associated with coil so no induced current in the coil.	½+ ½ ½ +½ ½ +½	3
12.	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 b) i) Pepsin: digest protein . ii)Lipase: digest fats	½ x4 ½ ½	3
13	(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
14	• The existence of a variety of species of plants and animals. • Forests are rich in different life forms. • Urbanisation/Pollution/Overgrazing/Over exploitation/population explosion /any other.	1 1 ½ x2	3
15	• The Metals high up in reactivity series are very reactive, because of difference in their reactivity. • Methods of extraction of metals depends on their reactivity. • Electrolytic reduction followed by electrolytic refining.	1 1 1	3

16	(a) $C_2H_5OH + CH_3COOH \rightarrow CH_3COO\ C_2H_5 + H_2O$(esterification)
	   Alcohol Acid Ester Water
	$CH_3COOC_2H_5 + NaOH$ $C_2H_5OH+ CH_3COONa$ (saponification)
	  Ester Base Alcohol Salt
	b) Diagram for esterification
		½
		
		½	

	Description 1mL ethanol, 1mL glacial acetic acid and a few drops of conc. H_2SO_4 $\downarrow$ Warmed in a water bath $\downarrow$ Water is poured into the beaker $\downarrow$ Fruity smell is produced **OR** • 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 • 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	1+1 ½ x 4 1½ 2 1 ½	5
17	(a) Hypermetropia / farsightedness Causes: i. Shortening of eyeball ii. Curvature of eye lens decreases / focal length of eye lens increases. b) (b) Hypermetropic eye	½ ½ ½ 1 ½	

	(c) Convex lens $1/f=1/v-1/u$ $=1/(-50cm) -1/(-25cm)$ $=1/50cm$ Hence ,f=50 cm=0.5m There fore power $=(1/0.5)D=2D$ (d)Correction of Hypermetropia 	½+ ½ ½ ½	
			5

18	a) Valency depends on valence electron. It is the number of electrons taken or lost from the valence shell:
	    Atomic no = 9
	    Electronic Configuration = 2, 7.
	    Valency 8-7=1
	b)
	   i) D (2.8.8.1)
	   ii) A (2.2) and E (2.8.8.2) (same valency-2)
	   iii) D has larger radius as the atomic radii shrinks in moving from left
	to right in the same period due to addition of electrons in the
	same shell .
		1
		1
		1
		
		1
		1
			5

19	(a) It is the rate at which electrical energy is dissipated or consumed in an electrical circuit is called electric power .
	We know
	  $V=W/Q$
	$W=VQ$
	$W/t = VQ/t$
	$P = VI$
	$P = IR.I$
	$P = I^2R$
	
	(b) Bulb I: I=P/V,100W 220V
	$I_1 =100/220A$
	$=5/11A$
	Bulb II :60W 220V
	$I_2 = 60/220A$
	$= 3/11 A$
	Total current (5/11 +3/11)A =8/11A=0.72A
	
	 OR
	(a)
	
	   the battery and ammeter and a plug key.
	  • The ammeter reading is noted.
	  • Position of ammeter is changed to different position and readings taken
		1
		
		2
		
		2
		
		2½	

• Three resistors R_1, R_2, R_3 are joined.
• They are connected with

	each time. • The reading remain same. (If it is explained by diagram, give full credit)			
	(b) (i) $\dfrac{1}{R_P}=\dfrac{1}{R_1}+\dfrac{1}{R_2}$ $\dfrac{1}{R_1}=\dfrac{1}{R_1}+\dfrac{1}{R_1}$ $R_t = R_P + 12\,\Omega$ $R_t = 24\,\Omega$ $V = IR_T$ $I = 6/24 = 0.25$ Ampere (ii) Same readings of A_1 and A_2	1½ 1	5
20	a) Reproduction through vegetative parts of a plant like Roots / stem / leaves/Artificial / Layering / Grafting (any two) b) (i) In some plants which produce non viable seeds. (ii) It consumes less time / fast method c) Budding in hydra:	1 ½ x2	
	Diagram Labelling	2 1	
	(if student writes explanation award marks) OR • Prevention of unwanted pregnancy. • Method : (i) mechanical barrier – condom (ii) surgical method – tubectomy / vasectomy (iii) chemical – Oral and vaginal pills (iv) IUCD / copper -T • Reasons: (i) Gap between children (ii) mother's health (iii) better living standard (iv) population under control or any other relevant points.	1 ½ x 4 ½ x4	5

21	a)Height (tall and dwarf) and Shape (round and wrinkled) of seeds, colour of flower (white and violet) (any two)	½ x2	
	Tall x Short TT x tt	½	
		½	
	F_1 – Tt(tall) Both TT and Tt are tall plants ,tt are short plants. Single copy of T is tall hence dominant hence tt are recessive. b) Male x Female XY XX Gametes: X,Y X Zygote: XX XY Girl Boy Sex determination is purely by chance. The fusion of a particular sperm with an egg is purely a matter of chance	1 ½ x2 ½ ½	5
22	• No Change • In solid form (powder no reaction will take place because H^+/H_3O^+ (ions) are not available. $Na_2 SO_4$ + $BaCl_2$→NaCl + $BaSO_4$(white ppt) **OR** Cu<Fe< Zn<Al i) Deposition of brown colour on iron. ii) Blue Colour change is to green.	1 ½ + ½ 1 ½ ½	2
23	(i) X- acidic, pH of X is < 7 (ii) Y- basic, pH of Y is >7	1 1	2
24	Mistakes :F_1 and F_2 are not equidistant from the optical center of the lens. OF_1 ≠OF_2 ; $2OF_1$ ≠$2OF_2$ Image should form beyond $2F_2$ Image should be magnified (any two) OR (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 shouldbe taken between 30° and $60^o$to observe the refraction clearly. (v) Separation between the pins should be kept at least 5cm . (any four)	½ x2 1 ½ x4	2
25	• 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.	½ ½ + ½ ½	2

26	• Taking out the leaf peel and mount on the slide_ • stain with safranin • mount with glycerin • place cover slip and observe under microscope. OR i)To prevent the entry of oxygen/escape of CO_2 / air ii)KOHabsorb CO_2 gas iii)KOH absorb CO_2 gas/Partial vacuum created	½ x4 1 ½ ½	 2
27	• Nucleus elongates • Constriction in cytoplasm / cell membrane	1 1	 2