Secondary School Compartmental Examination July 2019
Marking Scheme
SCIENCE (SUBJECT CODE 086)
(PAPER CODE – 31/1/1)

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 effortsin 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. Evaluators will mark(√) wherever answer is correct. For wrong answer 'X"be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.

5. 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. This may be followed strictly.

6. If a question does not have any parts, marks must be awarded in the left hand margin and encircled.This may also be followed strictly

7. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.

8. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

9. A full scale of marks 0-80 has to be used. Please do not hesitate to award full marks if the answer deserves it.

10. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 20 / 25 answer books per day.

11. 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.

12. 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.

13. 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.

14. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

15. 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.

16. 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.

Q. NO.	VALUE POINTS/ EXPECTED ANSWERS	VALUE	TOTAL MARKS
	SECTION – 'A'		
1.	Lipase, Trypsin *(any one)*	1	1
2.	Displacing large number of peasants and tribal without compensation or rehabilitation *(or any other reason)*	1	1
	SECTION – 'B'		

3.	• $MCO_3 + 2HCl \rightarrow MCl_2 + H_2O + CO_2 \uparrow$
	  (X) Brisk Effervescence
	
	• $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 \downarrow + H_2O$
	        White ppt
		1
		
		1
			2

4.	A – Ovary • Production of egg, Secretion of female sex hormones *(any one)* B – Oviduct/Fallopian tube – • Site of Fertilization	½ ½ ½ ½	2

5.	• Statement of Snell's Law: The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for the given pair of media. /
	
	  If i is the angle of incidence and r is the angle of refraction, then.
	  $\dfrac{\sin i}{\sin r} = $ constant *(either definition or formula)*
	
	• Absolute Refractive Index of a medium $= \dfrac{\text{Speed of Light in vacuum}}{\text{Speed of Light in the medium}}$
	
	OR
	
	• Refractive Index $= \dfrac{\text{Speed of Light in air}}{\text{Speed of Light in glass}}$
	
	  $1.5 = \dfrac{3 \times 10^8 \text{ m/s}}{\text{speed of light in glass}}$
	
	  Speed of light in glass $= \dfrac{3 \times 10^8}{1.5}$ m/s
	
	  $= 2 \times 10^8$ m/s
		1
		
		1
		
		½
		
		½
		
		1
			2

	SECTION – 'C'		
6.	a) • MnO_2 is an oxidant/ oxidizing agent ; as MnO_2 undergoes reduction. • HCl is a reductant/ reducing agent. HCl is getting oxidized. b) i) To prevent rancidity of fats and oils. ii) Silver chloride undergoes decomposition when exposed to sunlight to form silver and chlorine. Silver is grey in colour. /	½ ½ 1 1	

	$$2AgCl \xrightarrow{\text{sunlight}} 2Ag\,(s) + Cl_2$$ grey *(any one)*		3
7.	a) pH scale measures the hydrogen ion concentration in a solution thus indicating acidic/ basic nature of a solution.	1	
	b) From 0 to 14	1	
	c) Significance : Highest value - very basic/alkaline solution. Lowest value - very acidic solution.	½ ½	
	OR		

	a) The products formed are 'chlor' for chlorine and 'alkali' for sodium hydroxide.
	
	 $$2\,NaCl\,(aq) + 2\,H_2O\,(l) \rightarrow 2NaOH\,(aq) + Cl_2\,(g) + H_2\,(g)$$
	 b) Two observations :
	  i) Water droplets in the boiling tube.
	  ii) Change in colour from blue to white.
		1
		
		 1
		
		 ½
		 ½
			3

8.	a) Lithium has larger atomic radius compared to nitrogen, Reason : Along a period from left to right, there is an increase in nuclear charge which tends to pull the electrons closer to the nucleus. So, size of the atom of the elements decreases from Lithium to Nitrogen.	½ ½	
	b) Chlorine is more electronegative than potassium. Reason : Chlorine is smaller in size. So it has tendency to pull bonded electrons towards itself.	½ ½	
	c) Magnesium and Calcium have same valency. Reason : Both have the same number of valence electrons, i.e. 2.	½ ½	3
9.	Diagram : Structure of a neuron a) End of the dendritic tip b) Axon c) Nerve ending **OR** a) Gibberellins help in the growth of the stem. b) Auxins help the cells to grow longer. c) Abscisic acid inhibits growth.	1 ½ ½ ½ ½ 1 1 1	3
10.	a) <table><tr><th>XYLEM</th><th>PHLOEM</th></tr><tr><td>1. It helps in the movement of water and minerals from the soil to other parts of the plant.</td><td>1. It helps in the transport of the products of photosynthesis/food from leaves to other parts of the plant.</td></tr></table>	1	
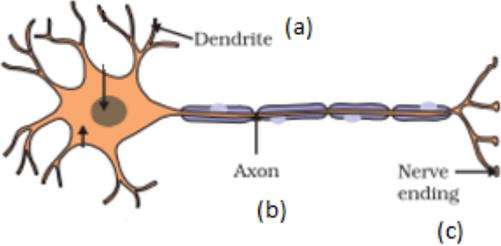
	2. It helps in the conduction of water in upward direction.	2. It helps in the conduction of food in upward as well as in downward directions.	1	

b) Two advantages of Transpiration:
- It helps in absorption and upward movement of water.
- It helps in temperature regulation.
- It causes cooling effect in plants.
- Any other   *(any two)*

$2 \times \frac{1}{2}$ 3

11.	Focal length, f = +20 cm, Image distance, v = +30 cm, Object distance, u = ??	
	(values of u, v and f with proper sign)	$\frac{1}{2}$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$ $\frac{1}{2}$

$$\frac{1}{20} = \frac{1}{30} - \frac{1}{u}$$ $\frac{1}{2}$

$$\frac{1}{u} = \frac{1}{30} - \frac{1}{20}$$

$$\frac{1}{u} = \frac{2-3}{60} = \frac{-1}{60}$$

$$u = -60 \text{ cm}$$ 1

$$\text{Size of the image} = -\frac{30 \text{ cm}}{60 \text{ cm}} \times 4 \text{ cm} = -2.0 \text{ cm}$$ $\frac{1}{2}$

OR

Magnification, m = +2,   Focal length, f = -20 cm   (with proper sign) $\frac{1}{2}$

$$\text{Magnification} = -\frac{v}{u}$$ $\frac{1}{2}$

$$2 = -\frac{v}{u}$$

$$v = -2u$$ $\frac{1}{2}$

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u} \qquad [\text{ Mirror Formula }]$$ $\frac{1}{2}$

$$\frac{1}{-20} = [\frac{1}{-2} + \frac{1}{1}]\frac{1}{u}$$

$$\frac{2}{-20} = \frac{1}{u}$$

$$u = -10 \text{ cm}$$

(The object should be placed at a distance of 10 cm in front of concave mirror.)   1   3

12.	a) Due to high melting point/high resistance.	1	
	b) In series arrangement, same current will flow through all the appliances which is not required as every appliance needs current of different values. / If one component fails, the circuit is broken and none of the components works.	1	

	c) Good conductors of electricity/ Have low value of resistivity/ Less loss during transmission. *(any one)*	1	3
13.	Given: $R_1 = 10 \ \Omega$; $R_2 = 20 \ \Omega$; $R_3 = 30 \ \Omega$ According to Ohm's law, V = IR Given V = 12 V a) Current through resistor R_1 : $$I_1 = \frac{V}{R_1} = \frac{12}{10} = 1.2 \ A$$	½	
	Current through resistor R_2 : $$I_2 = \frac{V}{R_2} = \frac{12}{20} = 0.6 \ A$$	½	
	Current through resistor R_3 : $$I_3 = \frac{V}{R_3} = \frac{12}{30} = 0.4 \ A$$	½	
	b) Total circuit resistance, R $$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$ $$\frac{1}{R} = \frac{1}{10} + \frac{1}{20} + \frac{1}{30}$$ $$\frac{1}{R} = \frac{11}{60}$$ $$R = \frac{60}{11} = 5.45 \ \Omega$$	½ ½	
	c) The total current in the circuit is $I = I_1 + I_2 + I_3$ $= 1.2 + 0.6 + 0.4 = 2.2 \ A$	½	3
14.	• Controlled Nuclear Fission reaction • Uranium, Plutonium, Thorium *(any two)* Reasons: 1. Difficulty in storage and disposal of spent or used fuels. 2. Risk of accidental leakage of nuclear radiations. 3. High risk of environmental contamination. *(any two)*	1 ½ + ½ 2 × ½	3
15.	a) Energy keeps decreasing at every trophic level. Because the loss of energy at each trophic level is so great that very little usable energy remains after 3-4 trophic levels. b) Pesticides/harmful chemicals from the soil/water bodies are absorbed by the plants along with water and minerals. As these harmful chemicals are non-biodegradable, They get accumulated/magnified at each trophic level in a food chain.	½ 1 ½ ½ ½	3
	SECTION – 'D'		
16.	a) Copper (Cu) and Mercury (Hg)	½ + ½	

b)

CALCINATION	ROASTING	
Zinc carbonate is heated in limited supply of air	Zinc sulphide is heated in excess of air.	½ + ½
$ZnCO_3 \xrightarrow{\Delta} ZnO + CO_2$	$2ZnS + 3O_2 \xrightarrow{\Delta} 2ZnO + 2SO_2$	½ + ½

c) Thermit reaction between iron (III) oxide and aluminium powder/
Fe_2O_3 (s) + 2Al (s) → 2Fe (l) + Al_2O_3 (s) + heat ... 1

Significance:
- It is a highly exothermic reaction. ... ½
- Iron is obtained in molten form. ... ½ ... 5

17.

a) Electron dot structure of Methane

... 1

b) i) Alcohol / -OH ... 1
   ii) Aldehyde / -CHO ... 1

c) Due to incomplete combustion in air, high temperature required for welding is not achieved. ... 1
   Due to excessive soot formation, welding is hampered. ... 1

OR

a) i)

$$CH_3CH_3OH \xrightarrow[\text{or Acidified } K_2Cr_2O_7 + \text{heat}]{\text{Alkaline } KMnO_4 + \text{heat}} CH_3COOH$$

... 1

ii)

$$C_2H_4 + H_2 \xrightarrow{\text{Ni catalyst}} C_2H_6$$

... 1

iii)

$$CH_3 - COOH + CH_3 - CH_2OH \xrightleftharpoons{\text{Acid}} CH_3 - \underset{O}{\overset{||}{C}} - O - CH_2 - CH_3 + H_2O$$

(Ethanoic acid) (Ethanol) (Ester)

... 1

- Names of above reactions : Oxidation Reaction, Addition/Hydrogenation Reaction and Esterification Reaction ... 1
  (1 mark even if two names are correct; ½ mark for one correct name)

b) Detergents are more effective than soaps in hard water as they do not form precipitate/scum in hard water. / Detergents can form lather in hard water.
(either of the three) ... 1 ... 5

18.

a) Mode of asexual reproduction in Amoeba and Leishmania is Binary Fission. ... ½

In Amoeba, during division splitting of the two cells can take place in any plane. ... ½

In Leishmania, binary fission occurs in a definite orientation in relation to the whip like structures present at one end of the cell. ... ½

	b) Regeneration is a process in which an organism is broken/ cut into pieces, these pieces may grow into separate individuals.
	
	Diagram :
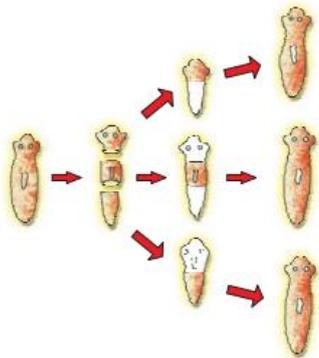	
	c) Spores are formed in Sporangia.
	Spores grow into a new individual under moist conditions.
	
	OR
	
	a) Two bacterial infections :
	  i) Gonorrhoea
	  ii) Syphilis
	
	Prevention:
	Using a covering called condom, for the penis, during sex helps in prevention of such infections.
	
	b) i) By changing hormonal balance using contraceptive pills/oral pills.
	  ii) Contraceptive devices like loop or Copper – T.
	  iii) Surgical methods like blocking fallopian tubes or vas deferens.
	
	c) i) The health of women will not be affected adversely if she adopts contraceptive measures.
	  ii) Maintain gap between two pregnancies/children.
	  iii) To prevent sexually transmitted diseases (STDs)
		1
		
		1 ½
		
		½
		½
		
		½
		½
		
		1
		
		½
		½
		½
		
		½
		
		½
		½
			
			5

19.	a) i) • Mendel crossed pure tall pea plants with pure short pea plants. • All tall plants were produced in the F1 generation. • When F1 tall plants were self-pollinated, Mendel got both tall and short plants in the ratio of 3 Tall : 1 Short. • This clearly indicated that tall character is dominant over short character which although present would not be expressed in F1 generation. **/** *(either explanation or figure)*	4 × ½	

ii) When pea plants with two different characteristics like plants with **round and green** seeds and the plants with wrinkled and yellow seeds; were bred with each other, the F1 generation had plants with round and yellow seeds **(dominant character).**
On self-pollination of F1 generation plants, F2 generation obtained **was a mixture of round yellow, round green, wrinkled yellow and wrinkled green** in the ratio **9:3:3:1**, thus showing that the traits are inherited independently. /
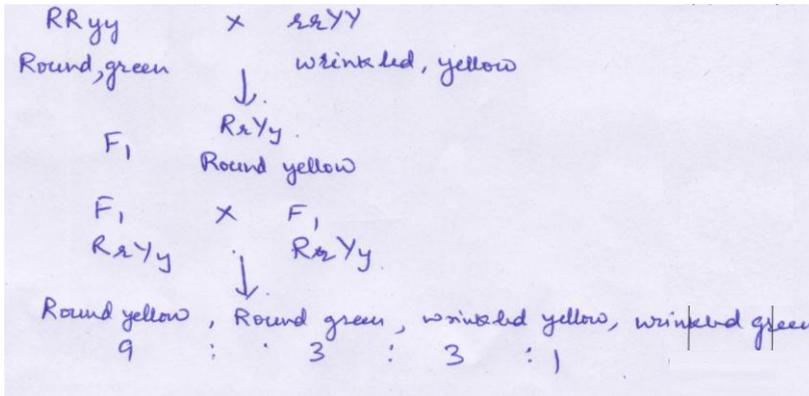
$4 \times \frac{1}{2}$

b) Birds and bats are more closely related because they have wings to fly, whereas squirrels and lizards do not.
The wings of birds and bats are analogous organs.

½

½

(either explanation or figure)

5

| 20. | a) Ciliary muscles relax and contract to adjust/modify the focal length of eye lens. | 1 | |

b) Eye Defects and corrective measures:

EYE DEFECTS	CORRECTIVE MEASURES	
i. Cataract	Operation/Surgery	½ + ½
ii. Myopia	Suitable concave lens	½ + ½
iii. Hypermetropia	Suitable convex lens	½ + ½
iv Presbyopia	Suitable bifocal lens	½ + ½

OR

a) Issac Newton was the first to use a glass prism to obtain the spectrum of white light. He tried to split various colours of the spectrum of white light by using another similar prism, he could not get any more colours. Thus he proved that sunlight is made of seven colours.

2

White light beam

Glass prism

White light R spectrum
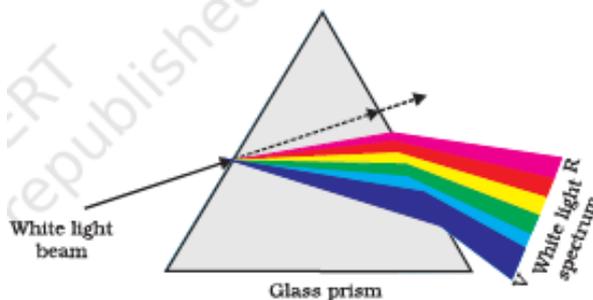
1

b) Atmospheric Refraction: It is the refraction of light by the earth's atmospheric layers having varying refractive indices.

1

Two natural phenomena:
  i) Twinkling of stars,
  ii) Advanced sunrise and delayed sunset

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

5

21.	a) Two magnetic field lines can never cross each other because it would mean that at the point of intersection the compass needle would point towards two directions simultaneously which is not possible.	1 ½	
	b) The magnetic field lines inside a current carrying solenoid are in the form of parallel straight lines. This indicates that the magnetic field is the same (uniform) at all points inside the solenoid.	1 ½	
	c) Fleming's left hand rule : Stretch the thumb, forefinger and middle finger of your left hand such that they are mutually perpendicular. If the first finger points in the direction of the magnetic field, the second finger in the direction of current, then the thumb will point in the direction of motion.	1	
	d) A*ny two factors* : i) Strength of electromagnet ii) Large number of coil/turns of the conducting wire iii) A soft iron core on which the coil is wound.	2 × ½	5
	SECTION 'E'		
22.	a) Y, X, Z	1	
	b) Z, because it is basic in nature and the bases turn phenolphthalein pink.	½ + ½	
	OR		
	i) Observation: The moist blue litmus paper will turn red. Inference: The gas liberated is acidic in nature.	½ ½	
	ii) Observation: Wet red litmus paper will remain red. Inference: The gas liberated is acidic in nature.	½ ½	2
23.	a) In test tube (II) as copper is less reactive than iron, so cannot displace Fe from its salt solution.	1	
	b) In test tubes (III) & (IV) both, because they both, i.e. Zn and Al are more reactive than Fe and will displace Fe from $FeSO_4$	1	2
24.	Steps involved in germinating dicot seeds: 1. Select healthy dicot seeds say channa or any other dicot seed. 2. Put the seeds in petridish and soak them in water. 3. Keep them overnight, drain excess water. 4. Leave them and observe.	½ ½ ½ ½	
	OR		
	Stomata A. Guard Cell B. Chloroplast C. Stoma	½ ½ ½ ½	2
25.	a) X- KOH pellets, Y - Wet germinating seeds	½ ½	
	b) Seeds use oxygen present in the flask and release carbon dioxide which is absorbed by potassium hydroxide. Thus, partial vacuum is created in the conical flask, as a result water from the beaker rises in the delivery tube.	1	2
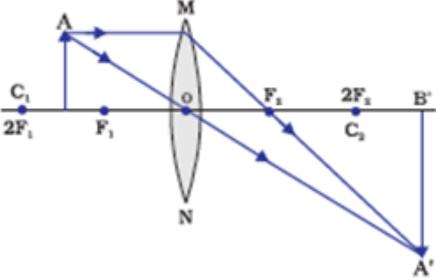
26.	a) Least count of ammeter $= \dfrac{0.5}{10} = 0.05$ A		
		1	
	Thus, value corresponding to 12 divisions = 0.05 ×12 = 0.6 A		
	b) An ammeter is connected in series and a voltmeter is connected in parallel in an electric circuit.	1	2
27.	• Rays no. 2, 3 and 4 follow the laws of refraction of light.	1	
	• This ray diagram is drawn using ray no. 2 and 3. (A candidate can select any two correct rays out of the three. He should use two chosen rays while drawing the ray diagram.)	1	
	OR		
	i) Select a suitable distant object. ii) Hold the lens between the object and the screen with its face parallel to the screen. iii) Adjust the position of the lens to form a sharp image. iv) Measure the distance between the lens and the screen which is the approximate focal length of the lens.	4 × ½	2