

Strictly Confidential: (For Internal and Restricted use only)
Secondary School Compartmental Examination July 2019
Marking Scheme
SCIENCE (SUBJECT CODE 086)
(PAPER CODE – 31/1/3)

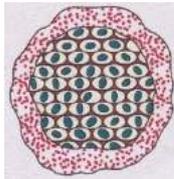
General Instructions: -

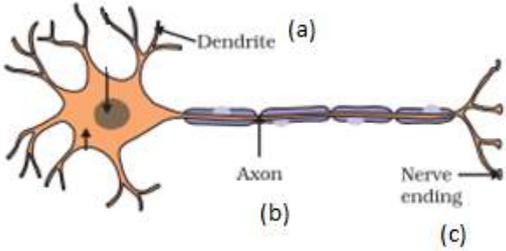
1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested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

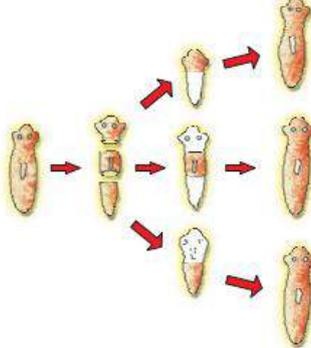
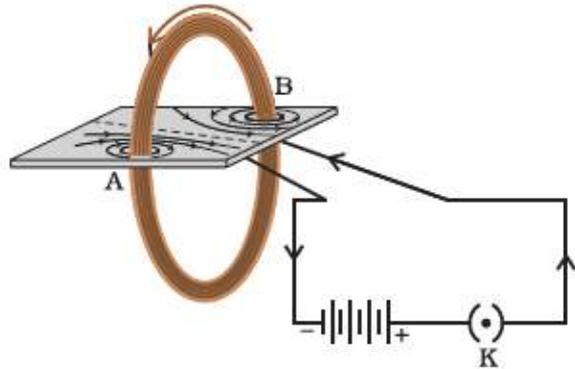
14. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
15. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and 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.

MARKING SCHEME (COMPARTMENTAL) 2019

CODE NO : 31/1/3

Q. NO	EXPECTED ANSWER / VALUE POINTS	VALUE	TOTAL MARKS
SECTION – ‘A’			
1	<ul style="list-style-type: none"> Peristaltic movement/ Rhythmic contraction of muscles of alimentary canal. 	1	1
2	<ul style="list-style-type: none"> Use in agriculture / gardening / horticulture. Use in cleaning automobiles – cars/ scooters/tractors/buses etc. 	½ ½	1
SECTION – ‘B’			
3	<ul style="list-style-type: none"> Sodium hydrogen carbonate is a salt formed by the neutralization reaction between a strong base and a weak acid. i) Used in medicine as antacids ii) As a constituent of baking powder iii) In fire extinguishers <p align="right"><i>(any two)</i></p>	1 1	2
4	<ul style="list-style-type: none"> <u>Multiple fission</u> : It is a process of reproduction in which the single celled body of the organisms divides to produce many daughter cells. This type of reproduction is observed in Plasmodium.(malarial parasite) Multiple fission in Plasmodium. <div align="center">  </div>	1 1	2
5	<ul style="list-style-type: none"> Two laws of refraction of light : <ol style="list-style-type: none"> The incident ray, the refracted ray and the normal to the surface of separation of two media at the point of incidence, all lie in the same plane. The ratio of sine of angle of incidence to the sine of angle of refraction is a constant , for the given pair of two media and for a given colour of light. <p align="center">OR</p> $n_{21} = \frac{v_1}{v_2} = \frac{\text{speed of light in medium 1}}{\text{speed of light in medium 2}}$ $n_{21} = \frac{v_1}{v_2}$ $1.6 = \frac{2 \times 10^8}{v_2} \text{ m/s}$ $v_2 = 1.25 \times 10^8 \text{ m/s}$	1 1 1	2

14	Diagram : Structure of a neuron		
	 <p>a) End of the dendritic tip b) Axon c) Nerve ending</p> <p style="text-align: center;">OR</p> <p>a) Gibberellins help in the growth of the stem. b) Auxins help the cells to grow longer. c) Abscisic acid inhibits growth.</p>	<p style="text-align: center;">1 ½</p> <p style="text-align: center;">½ ½ ½</p> <p style="text-align: center;">1 1 1</p>	3
15	<p>Method used by plants to get rid of excretory products :</p> <ul style="list-style-type: none"> • Excess water by transpiration. • By storing cellular wastes in the cellular vacuoles. • Resins and gums are stored in old xylem tissue which became nonfunctional. • Some waste products are stored in dead cells of barks and leaves which are lost when leaves fall off. • Some metabolic wastes are lost through roots of plant into the soil. • Oxygen produced during photosynthesis is also a waste product of plants which plants leave in the surrounding atmosphere. 	½ × 6	3
SECTION – ‘D’			
16	<p>a) Because in sexual reproduction, two different individuals are involved whereas in asexual reproduction only single individual is involved.</p> <p>Explanation : DNA copying is not absolutely accurate which leads to many variations. Accumulation of favourable variations results in greater diversity and origin of new species. Therefore sexual reproduction is a basis for evolution.</p> <p>b)</p> <ul style="list-style-type: none"> • No • In females sex chromosomes are present as a perfect pair (XX) chromosomes. In males they are present as a mismatched pair of (XY) chromosomes. • The sex of the child depends on the type of chromosome contributed by the father. The mother can only pass on X chromosome, but if the child receives X chromosome from father also, a girl is born. When child receives Y chromosome from father and X chromosome from mother a boy is born. 	<p style="text-align: center;">1</p> <p style="text-align: center;">1+1</p> <p style="text-align: center;">½ ½</p> <p style="text-align: center;">½</p> <p style="text-align: center;">½</p>	5
17	a) Mode of asexual reproduction in Amoeba and Leishmania is Binary Fission.	½	

	<p>In Amoeba, during division splitting of the two cells can take place in any plane.</p> <p>In Leishmania, binary fission occurs in a definite orientation in relation to the whip like structures present at one end of the cell.</p> <p>b) Regeneration is a process in which an organism is broken/ cut into pieces, these pieces may grow into separate individuals.</p> <p>Diagram :</p>  <p>c) Spores are formed in Sporangia. Spores grow into a new individual under moist conditions.</p> <p style="text-align: center;">OR</p> <p>a) Two bacterial infections : i) Gonorrhoea ii) Syphilis</p> <p>Prevention: Using a covering called condom, for the penis, during sex helps in prevention of such infections.</p> <p>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.</p> <p>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)</p>	<p>½</p> <p>½</p> <p>1</p> <p>1 ½</p> <p>½</p> <p>½</p> <p>½</p> <p>½</p> <p>1</p> <p>½</p> <p>½</p> <p>½</p> <p>½</p> <p>½</p> <p>½</p> <p>½</p>	<p>5</p>
18	<p>a)</p> 	1	

	<p>It is clear from the diagram that the magnetic field lines are circular near the loop but straight and parallel near the center of the loop.</p> <ul style="list-style-type: none"> Each turn produces its own magnetic field which adds up to the total. <p>b)</p> <ul style="list-style-type: none"> Direction of current <u>Right hand thumb rule</u> finds the direction of magnetic field associated with a current carrying conductor. <u>Fleming's left hand rule</u> finds the direction of motion or force experienced by a current carrying conductor placed in a strong magnetic field. 	<p>½</p> <p>1</p> <p>½</p> <p>1</p> <p>1</p>	<p>5</p>										
<p>19</p>	<p>a) Ciliary muscles relax and contract to adjust/modify the focal length of eye lens.</p> <p>b) Eye Defects and corrective measures:</p> <table border="1" data-bbox="193 674 1249 875"> <thead> <tr> <th>EYE DEFECTS</th> <th>CORRECTIVE MEASURES</th> </tr> </thead> <tbody> <tr> <td>i. Cataract</td> <td>Operation/Surgery</td> </tr> <tr> <td>ii. Myopia</td> <td>Suitable concave lens</td> </tr> <tr> <td>iii. Hypermetropia</td> <td>Suitable convex lens</td> </tr> <tr> <td>iv Presbyopia</td> <td>Suitable bifocal lens</td> </tr> </tbody> </table> <p style="text-align: center;">OR</p> <p>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.</p> <div data-bbox="483 1182 884 1391" data-label="Image"> </div> <p>b) Atmospheric Refraction: It is the refraction of light by the earth's atmospheric layers having varying refractive indices.</p> <p>Two natural phenomena:</p> <ol style="list-style-type: none"> Twinkling of stars, Advanced sunrise and delayed sunset 	EYE DEFECTS	CORRECTIVE MEASURES	i. Cataract	Operation/Surgery	ii. Myopia	Suitable concave lens	iii. Hypermetropia	Suitable convex lens	iv Presbyopia	Suitable bifocal lens	<p>1</p> <p>½ + ½</p> <p>½ + ½</p> <p>½ + ½</p> <p>½ + ½</p> <p>2</p> <p>1</p> <p>1</p> <p>2 × ½</p>	<p>5</p>
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<p>20</p>	<p>a) Electron dot structure of Methane</p> <div data-bbox="572 1787 798 2011" data-label="Chemical-Block"> </div> <p>b) i) Alcohol / -OH</p>	<p>1</p> <p>1</p>											

	<p>ii) Aldehyde / -CHO</p> <p>c) Due to incomplete combustion in air, high temperature required for welding is not achieved. Due to excessive soot formation, welding is hampered.</p> <p style="text-align: center;">OR</p> <p>a) i)</p> $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow[\text{or Acidified K}_2\text{Cr}_2\text{O}_7 + \text{heat}]{\text{Alkaline KMnO}_4 + \text{heat}} \text{CH}_3\text{COOH}$ <p>•</p> <p>ii)</p> $\text{C}_2\text{H}_4 + \text{H}_2 \xrightarrow{\text{Ni catalyst}} \text{C}_2\text{H}_6$ <p>•</p> <p>iii)</p> $\text{CH}_3 - \text{COOH} + \text{CH}_3 - \text{CH}_2\text{OH} \xrightleftharpoons{\text{Acid}} \text{CH}_3 - \underset{\text{O}}{\underset{ }{\text{C}}} - \text{O} - \text{CH}_2 - \text{CH}_3 + \text{H}_2\text{O}$ <p>•</p> <p>(Ethanoic acid) (Ethanol) (Ester)</p> <p>• Names of above reactions : Oxidation Reaction, Addition/Hydrogenation Reaction and Esterification Reaction <i>(1 mark even if two names are correct; 1/2 mark for one correct name)</i></p> <p>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. <i>(either of the three)</i></p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>5</p>						
21	<p>a) Copper (Cu) and Mercury (Hg)</p> <p>b)</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">CALCINATION</th> <th style="width: 50%;">ROASTING</th> </tr> </thead> <tbody> <tr> <td>Zinc carbonate is heated in limited supply of air</td> <td>Zinc sulphide is heated in excess of air.</td> </tr> <tr> <td style="text-align: center;"> $\text{ZnCO}_3 \xrightarrow{\Delta} \text{ZnO} + \text{CO}_2$ </td> <td style="text-align: center;"> $2\text{ZnS} + 3\text{O}_2 \xrightarrow{\Delta} 2\text{ZnO} + 2\text{SO}_2$ </td> </tr> </tbody> </table> <p>c) Thermit reaction between iron (III) oxide and aluminium powder/ $\text{Fe}_2\text{O}_3 (\text{s}) + 2\text{Al} (\text{s}) \rightarrow 2\text{Fe} (\text{l}) + \text{Al}_2\text{O}_3 (\text{s}) + \text{heat}$</p> <p>Significance:</p> <ul style="list-style-type: none"> It is a highly exothermic reaction. Iron is obtained in molten form. 	CALCINATION	ROASTING	Zinc carbonate is heated in limited supply of air	Zinc sulphide is heated in excess of air.	$\text{ZnCO}_3 \xrightarrow{\Delta} \text{ZnO} + \text{CO}_2$	$2\text{ZnS} + 3\text{O}_2 \xrightarrow{\Delta} 2\text{ZnO} + 2\text{SO}_2$	<p>1/2 + 1/2</p> <p>1/2 + 1/2</p> <p>1/2 + 1/2</p> <p>1</p> <p>1/2</p> <p>1/2</p>	<p>5</p>
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SECTION – ‘E’									
22	<p>a) X- KOH pellets, Y - Wet germinating seeds</p> <p>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.</p>	<p>1/2</p> <p>1/2</p> <p>1</p>	<p>2</p>						
23	Steps involved in germinating dicot seeds:								

	<p>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.</p> <p style="text-align: center;">OR</p> <p>Stomata A. Guard Cell B. Chloroplast C. Stoma</p>	<p>$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$</p> <p>$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$</p>	<p style="text-align: center;">2</p>
<p>24</p>	<ul style="list-style-type: none"> Rays no. 2, 3 and 4 follow the laws of refraction of light. <ul style="list-style-type: none"> This ray diagram is drawn using ray no. 2 and 3. <p>(A candidate can select any two correct rays out of the three. He should use two chosen rays while drawing the ray diagram.)</p> <p style="text-align: center;">OR</p> <p>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.</p>	<p>1</p> <p>1</p> <p>$4 \times \frac{1}{2}$</p>	<p style="text-align: center;">2</p>
<p>25</p>	<p>a) Least count of ammeter = $\frac{0.5}{10} = 0.05$ A</p> <p>Thus, value corresponding to 12 divisions = $0.05 \times 12 = 0.6$ A</p> <p>b) An ammeter is connected in series and a voltmeter is connected in parallel in an electric circuit.</p>	<p>1</p> <p>1</p>	<p style="text-align: center;">2</p>
<p>26</p>	<p>a) In test tube (II) as copper is less reactive than iron, so cannot displace Fe from its salt solution.</p> <p>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</p>	<p>1</p> <p>1</p>	<p style="text-align: center;">2</p>
<p>27</p>	<p>a) Y, X, Z</p> <p>b) Z, because it is basic in nature and the bases turn phenolphthalein pink.</p> <p style="text-align: center;">OR</p>	<p>1</p> <p>$\frac{1}{2} + \frac{1}{2}$</p>	

	<p>i) Observation: The moist blue litmus paper will turn red. Inference: The gas liberated is acidic in nature.</p> <p>ii) Observation: Wet red litmus paper will remain red. Inference: The gas liberated is acidic in nature.</p>	<p>$\frac{1}{2}$ $\frac{1}{2}$</p> <p>$\frac{1}{2}$ $\frac{1}{2}$</p>	<p>2</p>
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