

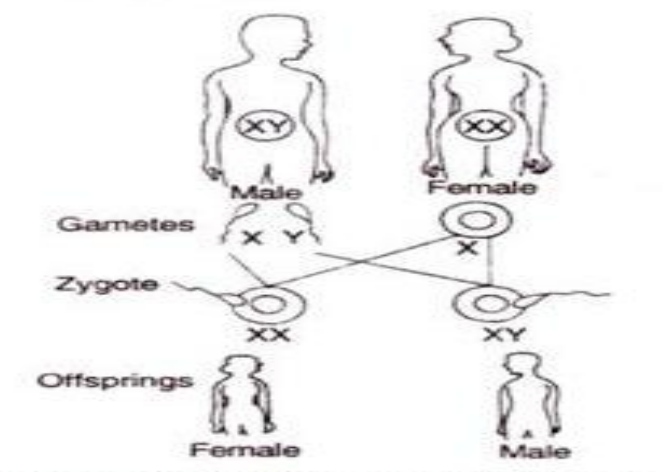
**Marking Scheme**  
**Strictly Confidential**  
**(For Internal and Restricted use only)**  
**Secondary School Examination, 2026 (X<sup>th</sup>)**  
**SUBJECT NAME SCIENCE (Q.P. CODE /Set No 31-B)**

**General Instructions: -**

<b>1</b>	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.
<b>2</b>	<b>“Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, evaluation done and several other aspects. Its leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in Newspaper/Website, etc. may invite action under various rules of the Board and IPC.”</b>
<b>3</b>	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. <b>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 due marks be awarded to them. In Class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.</b>
<b>4</b>	The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
<b>5</b>	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. If there is any variation, the same should be zero after deliberation and discussion. 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.
<b>6</b>	Evaluators will mark ( ✓ ) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. <b>This is most common mistake which evaluators are committing.</b>
<b>7</b>	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.
<b>8</b>	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.

9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note “ <b>Extra Question</b> ”.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
13	<p>Ensure that you do not make the following common types of errors committed by the Examiner in the past :-</p> <ul style="list-style-type: none"> <li>• Leaving answer or part thereof unassessed in an answer book.</li> <li>• Giving more marks for an answer than assigned to it.</li> <li>• Wrong totaling of marks awarded on an answer.</li> <li>• Wrong transfer of marks from the inside pages of the answer book to the title page.</li> <li>• Wrong question wise totaling on the title page.</li> <li>• Wrong totaling of marks of the two columns on the title page.</li> <li>• Wrong grand total.</li> <li>• Marks in words and figures not tallying/not same.</li> <li>• Wrong transfer of marks from the answer book to online award list.</li> <li>• 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.)</li> </ul> <p>Half or a part of answer marked correct and the rest as wrong, but no marks awarded.</p>
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.
15	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.
16	The Examiners should acquaint themselves with the guidelines given in the “ <b>Guidelines for Spot Evaluation</b> ” before starting the actual evaluation.
17	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.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

**MARKING SCHEME**  
**SCIENCE (Visual Impaired) (Subject Code-086)**  
**(PAPER CODE: 31B) (10-B-86K)**

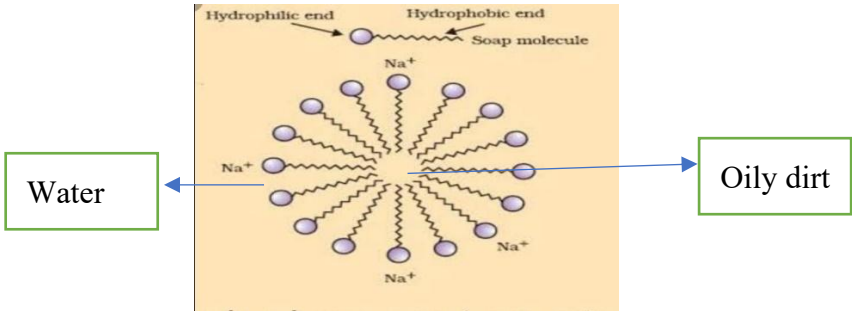
Q.No.	EXPECTED OUTCOMES/VALUE POINTS	Marks	Total Marks
	<b>SECTION A</b> <b>BIOLOGY</b>		
1.	(C) / Pancreas	1	1
2.	(C) / A cluster of thin-walled capillaries richly supplied with blood.	1	1
3.	(D) / Aorta takes oxygenated blood from heart to body parts.	1	1
4.	(D) / They have the ability to make food using sunlight by photosynthesis	1	1
5.	(A) / Convert simple substances into complex organic substances using radiant energy of the sun	1	1
6.	(B) / Round and yellow seeds	1	1
7.	(C) / Fragmentation	1	1
8.	(A) / Both Assertion (A) and Reason (R) are true, Reason (R) is the correct explanation of Assertion (A).	1	1
9.	(D) Assertion (A) is false, but Reason (R) is true.	1	1
10.	<p>A mother carries 'XX' while father carries 'XY' chromosome. All the children will inherit an 'X' chromosome from their mother and X or Y chromosome from father. So, the child carrying X chromosome from mother and X chromosome from father will be a girl and the child carrying X chromosome from mother and Y chromosome from father will be a boy.</p> <p style="text-align: center;">/</p>  <p style="text-align: center;"><b>Fig. Human sex-determination mechanism.</b></p>	2	2



	<ul style="list-style-type: none"><li>Adrenaline hormone is secreted directly into the blood and carried to different body parts. This makes heart beat fast resulting in supply of more oxygen to our muscles. The breathing rate also increases because of the contractions of the diaphragm and the rib muscles. These responses together enable the animal body to be ready to deal with scary situation.</li></ul> <p style="text-align: center;"><b>OR</b></p> <p>(ii) The blood to the digestive system and skin is reduced due to contraction of muscles around small arteries in these organs to divert the blood to our skeletal muscles for more energy.</p> <p>(b) Iodised salt contains iodine which is necessary for the thyroid gland to make thyroxin hormone.</p> <p>(c) Because they are suffering from diabetes i.e. having high sugar level in their blood causing harmful effects / Insulin secretion is less.</p>	1½										
		2										
		1										
		1	4									
16.	<p>(a) (i) Reproduction in which plant parts like root, stem and leaves develop into new plants under appropriate conditions is called as vegetative propagation.</p> <p>(ii) <u>Advantages of vegetative propagation:</u> -</p> <ul style="list-style-type: none"><li>Plants raised by this method can bear flowers and fruits earlier than those produced from seeds.</li><li>All the plants produced are genetically similar to the parent plant to have all its characteristics.</li><li>Propagation of plants such as banana, orange, rose and jasmine that have lost the capacity to produce seeds.</li></ul> <p style="text-align: center;"><b>(any two or any other suitable advantage)</b></p> <p>(iii)</p> <table border="1"><thead><tr><th></th><th><u>Unisexual flower</u></th><th><u>Bisexual flower</u></th></tr></thead><tbody><tr><td>1</td><td>Contains either Stamens (male reproductive part) or Pistil (female reproductive part).</td><td>Contains both Stamens (male reproductive part) and Pistil (female reproductive part)</td></tr><tr><td>2</td><td>Eg - Papaya or watermelon</td><td>Eg – Hibiscus or mustard</td></tr></tbody></table> <p style="text-align: center;"><b>(any other suitable difference or example)</b></p>		<u>Unisexual flower</u>	<u>Bisexual flower</u>	1	Contains either Stamens (male reproductive part) or Pistil (female reproductive part).	Contains both Stamens (male reproductive part) and Pistil (female reproductive part)	2	Eg - Papaya or watermelon	Eg – Hibiscus or mustard	1	
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		1+1										
		1										
		1										

	OR														
(b)															
(i)															
	<table><tr><td></td><td>Self-pollination</td><td>Cross-pollination</td></tr><tr><td>1</td><td>Transfer of pollens from stamens to stigma occur in the same flower.</td><td>Transfer of pollens from stamens to stigma occur from one flower to another.</td></tr><tr><td>2</td><td>Polling agents may or may not be required.</td><td>Polling agents like wind, water or animals are always required.</td></tr><tr><td>3</td><td>Genetic variation may or may not occur.</td><td>Genetic variation always occur.</td></tr></table>		Self-pollination	Cross-pollination	1	Transfer of pollens from stamens to stigma occur in the same flower.	Transfer of pollens from stamens to stigma occur from one flower to another.	2	Polling agents may or may not be required.	Polling agents like wind, water or animals are always required.	3	Genetic variation may or may not occur.	Genetic variation always occur.	1	
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	(ii) After pollination, the pollen lands on a suitable stigma, a tube grows out of the pollen grains and travels through the style to reach the ovary. A female germ cell present inside ovary fuses with a male germ cell to form zygote and this process leads to fertilization.	1													
	(iii) End products of sexual reproduction-	1													
	<ul style="list-style-type: none"><li>Seed.</li><li>Fruit.</li></ul>	½													
		½		5											
	SECTION-B CHEMISTRY														
17.	(D)/ Decomposition of calcium carbonate to calcium oxide and carbon dioxide.	1		1											
18.	(D)/ Electrolytic decomposition reaction	1		1											
19.	(C)/ Methanoic acid	1		1											
20.	(A) /Bromine	1		1											
21.	(C) /Zinc amalgam	1		1											
22.	(A) /CO <sub>2</sub>	1		1											
23.	(D)/ Propyne	1		1											
24.	(C)/ Assertion (A) is true, but Reason (R) is false.	1		1											
25.	(a)Because HCl does not ionize in dry state/does not give H <sup>+</sup> ions in dry state. (b)Because of loss of 5 molecules of water of crystallization.	1 1		2											
26.	(a)Silver chloride decomposes to form silver / white silver chloride turns grey in sunlight / <div><math display="block">2\text{AgCl} \xrightarrow{\text{Sunlight}} 2\text{Ag} + \text{Cl}_2</math></div>	1													

	<p>(b) A precipitate of lead (II) iodide is formed / yellow ppt of lead iodide is formed /</p> <div style="text-align: center;"> <math display="block">2\text{Pb}(\text{NO}_3)_2(\text{s}) \xrightarrow{\text{heat}} 2\text{PbO}(\text{s}) + 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})</math> <p> Lead nitrate                      Lead monoxide                      Nitrogen dioxide                      Oxygen  Colourless                      Yellow                      Reddish brown </p> </div> <p>(c) Fats and oils are oxidized, they become rancid, and their smell and taste change.</p>	1	
27.	<p>(a) (i) (A): Chlorine (B): Calcium oxychloride / Bleaching powder</p> <p>(ii) <math>\text{Ca}(\text{OH})_2 + \text{Cl}_2 \longrightarrow \text{CaOCl}_2 + \text{H}_2\text{O}</math> /  <math>2\text{Ca}(\text{OH})_2 + 2\text{Cl}_2 \longrightarrow \text{Ca}(\text{ClO})_2 + \text{CaCl}_2 + 2\text{H}_2\text{O}</math></p> <p>(iii) For bleaching cotton, linen in textile industry / for bleaching wood pulp in paper factories / for bleaching washed clothes in laundry / as an oxidizing agent in chemical industry.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) Substances whose odour changes in acidic or basic media.  <b>Example:</b> Onion, vanilla, clove <span style="float: right;">(any one)</span></p> <p>(ii) The fixed number of water molecules present in one formula unit of a salt.  <b>Example:</b> <math>\text{CuSO}_4 \cdot 5\text{H}_2\text{O}</math>, <math>\text{CaSO}_4 \cdot 2\text{H}_2\text{O}</math>, <math>\text{FeSO}_4 \cdot 7\text{H}_2\text{O}</math>,  <math>\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}</math> <span style="float: right;">(any one or any other)</span></p> <p>(iii) The salt formed by reaction between strong base and weak acid.  <b>Example:</b> <math>\text{Na}_2\text{CO}_3</math>, <math>\text{NaHCO}_3</math> <span style="float: right;">(any one or any other)</span></p>	$\frac{1}{2}$ $\frac{1}{2}$ 1 1 $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$	3
28.	<p>(a) Because of their high reactivity they react vigorously with air and water and catch fire if kept in open.</p> <p>(b) Copper combines with oxygen to form CuO or Copper (II) Oxide, a black oxide / <math>2\text{Cu}(\text{s}) + \text{O}_2 \rightarrow 2\text{CuO}(\text{s})</math></p> <p>(c) (i) Oxides which react with both acid and base to produce salt and water / metal oxide which shows both acidic as well as basic behaviour.  <b>Examples:</b> <math>\text{Al}_2\text{O}_3</math>, <math>\text{ZnO}</math></p> <p style="text-align: center;"><b>OR</b></p>	1 1 1 $\frac{1}{2} + \frac{1}{2}$	

	<p>(c) (ii) (I)</p> <ul style="list-style-type: none"> <li>• <math>\text{Na}_2\text{O}/\text{K}_2\text{O}/\text{CaO}/\text{Sodium oxide}/\text{Potassium oxide}/\text{Calcium oxide}</math></li> <li>• <math>\text{Na}_2\text{O} + \text{H}_2\text{O} \longrightarrow 2\text{NaOH}</math> / <math>\text{K}_2\text{O} + \text{H}_2\text{O} \longrightarrow 2\text{KOH}</math> /  <math>\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca(OH)}_2</math></li> </ul> <p>(II) Because of the least reactive nature of silver and gold.</p>	<p><math>\frac{1}{2}</math></p> <p>1</p> <p><math>\frac{1}{2}</math></p>	4
29	<p>(a) (i)</p> <ul style="list-style-type: none"> <li>• The unique ability of carbon to form bonds with other atoms of carbon giving rise to large molecules.</li> <li>• Because of strong and stable C-C bond.</li> </ul> <p>(ii)</p> <ul style="list-style-type: none"> <li>• A group of organic compounds with the same functional group and similar chemical properties / Series of compounds in which the same functional group substitutes for Hydrogen in a carbon chain / Compounds having same general formula, successive member differ by <math>\text{CH}_2</math> or 14u.</li> <li>• Example: - Methane-Ethane or any other.</li> </ul> <p>(iii) Because soap forms insoluble precipitates (scum) by reacting with calcium and magnesium salts present in hard water.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b)</p> <p>(i) Because of weak inter molecular forces of attraction.</p> <p>(ii) Alkaline <math>\text{KMnO}_4</math> / Acidified <math>\text{K}_2\text{Cr}_2\text{O}_7</math></p> <p>(iii) Ethanoic acid gives less <math>\text{H}^+</math> ions as compared to mineral acids /        Unlike mineral acids ethanoic acids does not ionize completely in water.</p> <p>(iv) Reaction of carboxylic acid and alcohol in presence of acid to form an ester.</p> <p>(v) A cluster of soap molecules in which ionic / hydrophilic end interacts with water on the surface and carbon / hydrophobic tail interacts with oil / dirt in the interior of the cluster /</p> <div style="text-align: center;">  </div>	<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>1</p> <p>1</p>	5
	<b>SECTION – C</b> <b>PHYSICS</b>		



30.	(B) / $-1.6 \times 10^{-19} \text{ J}$	1	1									
31.	(D) / Angle between the directions of incident ray and emergent ray.	1	1									
32.	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1									
33.	<table border="1"><thead><tr><th></th><th>Images formed by convex mirror</th><th>Images formed by plane mirror</th></tr></thead><tbody><tr><td>1</td><td>Size of image is always smaller than object.</td><td>Size of image is same as size of object.</td></tr><tr><td>2</td><td>Image distance is not equal to object distance.</td><td>Image distance is equal to object distance.</td></tr></tbody></table> <p style="text-align: center;">(any other suitable difference)</p>		Images formed by convex mirror	Images formed by plane mirror	1	Size of image is always smaller than object.	Size of image is same as size of object.	2	Image distance is not equal to object distance.	Image distance is equal to object distance.	1  1	2
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34.	<p>(a)</p> <ul style="list-style-type: none"><li>Dispersion of light</li><li>Different colours of light bend through different angle with respect to incident ray as they pass through prism.</li></ul> <p style="text-align: center;"><b>OR</b></p> <p>(b) (I) <math>\angle r</math> will be greater than <math>\angle i</math>.</p> <p>(II)</p> <ul style="list-style-type: none"><li><math>\angle r</math> will increase.</li><li>Limiting value of <math>\angle r</math> will be <math>90^\circ</math>.</li></ul>	1 1  1  $\frac{1}{2}$ $\frac{1}{2}$	2									
35.	<p>(a)</p> <ul style="list-style-type: none"><li>When a beam of light strikes fine particles like smoke, tiny water droplets, suspended particles of dust and molecules of air, the path of beam becomes visible. This phenomenon of scattering of light by colloidal particles is called Tyndall effect.</li><li>Examples: -<ul style="list-style-type: none"><li>➤ When sunlight passes through a canopy of a dense forest tiny water droplets in the mist scatter light.</li><li>➤ When a fine beam of sunlight enters a smoke-filled room through a small hole, scattering of light makes the particles visible.</li></ul></li></ul> <p style="text-align: center;">(Any one, any other suitable example)</p> <p>(b) (i) Blue light / light of shorter wavelength is visible.</p>	1  1  $\frac{1}{2}$										

	(ii) Red light/ Light of longer wavelength is visible.	$\frac{1}{2}$	<b>3</b>
<b>36.</b>	<p>For Convex lens</p> <ul style="list-style-type: none"> <li>Position:</li> </ul> $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{10} + \frac{1}{-20}$ $v = +20cm$ <ul style="list-style-type: none"> <li>Nature: real, inverted</li> </ul> <p>For Concave mirror</p> <ul style="list-style-type: none"> <li>Position:</li> </ul> $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ $\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$ $\frac{1}{v} = \frac{1}{-10} - \frac{1}{-30}$ $v = -15cm$ <ul style="list-style-type: none"> <li>Nature : real, inverted</li> </ul> <p style="text-align: center;">/</p> <p><b>Alternate answer</b></p> <p>Convex lens: -</p> <ul style="list-style-type: none"> <li>When object is placed at centre of curvature, the image is formed at centre of curvature.</li> <li>Nature of image is real and inverted.</li> </ul> <p>Concave Mirror: -</p> <ul style="list-style-type: none"> <li>When object is between infinity and centre of curvature the image is formed between focus and centre of curvature.</li> <li>Nature of image is real and inverted.</li> </ul>	<p><b>1</b></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p>	<b>3</b>
<b>37.</b>	<ul style="list-style-type: none"> <li>Fuse is a safety device which melts and breaks the electric circuit when unduly high electric current flows due to overloading and prevents damages to appliances and circuit.</li> <li>Earth wire provides a low resistance conducting path for current and ensures leakage of current from metallic body of appliances towards the earth and prevents severe electric shock.</li> </ul>	<p><b>1</b></p> <p><b>1</b></p>	

	<b>Two precautions</b> (i) Use of fuse of appropriate rating. (ii) Avoid overloading. (iii) Metallic appliances should be earthed. <b>(Any two , Any other precautions)</b>	$\frac{1}{2} + \frac{1}{2}$   <b>3</b>	
<b>38.</b>	(a) <ul style="list-style-type: none"> <li>Inside - from south pole to north pole</li> <li>Outside - from north pole to south pole</li> </ul> (b) <ul style="list-style-type: none"> <li>Wire – C</li> <li>As wire -C is making angle of <math>90^\circ</math> (<math>360^\circ</math>-<math>270^\circ</math>) with magnetic field.</li> </ul> (c) (i) <ul style="list-style-type: none"> <li>Fleming’s left-hand rule</li> <li>Stretch the thumb, fore finger and middle finger of your left hand such that they are mutually perpendicular. If first finger points the direction of magnetic field and second finger in the direction of current then the thumb will point in the direction of motion or force on the conductor.</li> </ul> <p style="text-align: center;"><b>OR</b></p> (c) (ii) <ul style="list-style-type: none"> <li>Right hand thumb rule</li> <li>Imagine that you are holding a current carrying straight conductor in your right hand such that the thumb points towards the direction of current. Then your fingers wrap around the conductor in the direction of field lines of magnetic field.</li> </ul>	$\frac{1}{2}$ $\frac{1}{2}$  $\frac{1}{2}$ $\frac{1}{2}$  <b>1</b> <b>1</b>  <b>1</b> <b>1</b>  <b>4</b>	
<b>39.</b>	(a) (i) $E = P \times t$ $E \text{ (fan)} = 5 \times 100 \times 4$ $= 2000 \text{ Wh}$ $= 2 \text{ kWh}$  $E \text{ (heater)} = 1000 \times 5$ $= 5000 \text{ Wh}$ $= 5 \text{ kWh}$  Total energy, $E = E \text{ (fan)} + E \text{ (heater)}$ $= 2 + 5 = 7 \text{ kWh}$  Cost = $7 \times 30 \times 5 = \text{Rs } 1050$  (ii) $P = VI$	$\frac{1}{2}$  $\frac{1}{2}$  $\frac{1}{2}$  $\frac{1}{2}$ <b>1</b>  $\frac{1}{2}$	

	<p>Current required for heater</p> $I = \frac{P}{V}$ $I = \frac{2000}{220}$ $I = 9.09A$	$\frac{1}{2}$	
	<p>Current rating of Y wire is slightly greater than required value. Hence fuse wire Y will be used.</p> <p style="text-align: center;"><b>OR</b></p>	<b>1</b>	
(b)	(i)		
	<ul style="list-style-type: none"> <li><math>R = \rho \frac{l}{A}</math></li> </ul>	<b>1</b>	
	<ul style="list-style-type: none"> <li>Resistivity of a conductor is the resistance offered by a conductor of length 1 m and area of cross section 1 m<sup>2</sup></li> </ul>	<b>1</b>	
	(ii)		
	$H = I^2 R t$ $H = (2)^2 \times 40 \times 50$ $H = 8000J$	$\frac{1}{2}$	
		$\frac{1}{2}$	
	<p>Voltage applied across 40Ω , <math>V = I \times R</math></p> $= 2 \times 40 = 80V$	$\frac{1}{2}$	
	<p>Equivalent resistance <math>\frac{1}{R} = \frac{1}{40} + \frac{1}{40}</math></p> $R = 20\Omega$	$\frac{1}{2}$	
	<p>Current flowing through circuit</p> $I = \frac{V}{R}$ $I = \frac{80}{20}$ $I = 4A$	$\frac{1}{2}$	
	$H = I^2 R t$ $H = (4)^2 \times 20 \times 50$ $H = 16000J$	$\frac{1}{2}$	
			<b>5</b>