



# CBSE

## ADDITIONAL PRACTICE QUESTIONS - MARKING SCHEME SCIENCE (086)

Class X | 2023–24

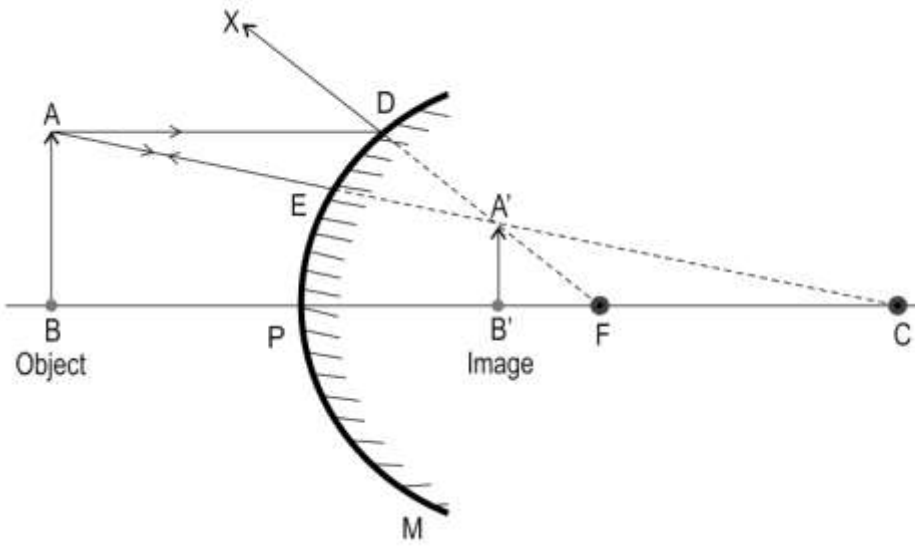
Time Allowed: 3 hours

Max. Marks: 80

Q. Nos	Answers	Marks
Section A		
1	(c) C	1.0
2	(d) P and S	1.0
3	(b) baking soda	1.0
4	(d) S	1.0
5	(d) only Q and R	1.0
6	(d) Metal ions gain electrons to become neutral metal atoms	1.0
7	(b) sodium	1.0
8	(b) Water enters the roots due to osmosis.	1.0
9	(b) Q	1.0
10	(c) only P, Q and S	1.0
11	(d) One parent is heterozygous.	1.0



12	(b) eating a diet with low-fat content	1.0
13	(b) anywhere between the pole and principal focus	1.0
14	(c) black, as there is no atmosphere on Moon to scatter sunlight	1.0
15	(a) only growth	1.0
16	(b) sunlight	1.0
17	(c) A is true, but R is false.	1.0
18	(d) A is false and R is true.	1.0
19	(b) Both A and R are true, and R is not the correct explanation of A.	1.0
20	(c) A is true but R is false.	1.0
<b>Section B</b>		
21	(a) $4\text{K} + \text{O}_2 \rightarrow 2\text{K}_2\text{O}$ [1 mark] (b) combination reaction OR oxidation reaction [1 mark]	2.0
22	1 mark each for the following: - Ravi made the bisexual flower unisexual thereby encouraging cross-pollination instead of self-pollination. - Cross-pollination will increase variation and thereby the chances of having more disease-free offspring. <i>[Accept any other valid answer.]</i>	2.0
23	1 mark each for the following: - Plant X - Due to respiration of the lizard, the amount of carbon dioxide will increase leading to a higher amount of photosynthesis. <b>OR</b> 1 mark each for the following: - Filtration OR selective reabsorption by the nephron may not be functioning properly.	2.0

	<p>- Improper filtration will lead to proteins getting filtered even though they are not waste.</p> <p><b>OR</b></p> <p>After filtration, useful substances such as proteins may not be getting reabsorbed.</p>	
24	<p>(a) convex mirror [0.5 marks] (b)</p> <p>- 0.5 marks for any two of the following: virtual, erect and diminished - 1 mark for the ray diagram</p> 	2.0
25	<p>- From Ohm's law we have  <math>V = IR</math>  <math>I = V/R</math>  given <math>V = 12\text{ V}</math> and <math>R_1 = 2\text{ ohm}</math>, <math>R_2 = 8\text{ ohm}</math> and <math>R_3 = 4\text{ ohm}</math>  Therefore,  net resistance <math>R = R_1 + (R_2 \times R_3) / (R_2 + R_3)</math>  <math>= 2 + (8 \times 4 / 8 + 4)</math>  <math>= 2 + 32/12</math>  <math>= 2 + 2.66</math>  <math>R = 4.66\text{ ohm}</math> [1 mark]</p> <p><math>I = 12/4.66</math>  <math>I = 2.58\text{ A}</math> [0.5 marks]</p> <p>- She can use ammeter S to measure the current in the circuit. [0.5 marks]</p>	2.0



	<p><b>OR</b></p> <ul style="list-style-type: none"><li>- The magnetic field at P and Q is the same. <i>[0.5 marks]</i></li><li>- because the magnetic field lines inside the helical coil of wire which behaves like a solenoid is uniform/in the form of parallel straight lines. <i>[0.5 marks]</i></li></ul> <p><i>[Accept any other valid another answer.]</i></p> <p>(b) 1 mark for any one of the following:</p> <ul style="list-style-type: none"><li>- increasing/decreasing the number of turn in the coil</li><li>- increasing/decreasing the current through the coil</li></ul>	
26	<p>(a) 0.5 marks each for the following:</p> <ul style="list-style-type: none"><li>- phytoplankton</li><li>- Producers will still have the highest amount of energy captured from sunlight which will continue to reduce as we move towards the top of the pyramid.</li></ul> <p><i>[Accept any other valid answer.]</i></p> <p>(b) Since the total mass in the lower trophic level is lesser there will be lesser food available to higher trophic levels causing organisms to die sooner than usual. <i>[1 mark]</i></p> <p><i>[Accept any other valid answer.]</i></p>	2.0
<b>Section C</b>		
27	<ul style="list-style-type: none"><li>- The iron bar will corrode till the level marked by the line first. <i>[1 mark]</i></li><li>- Iron gets oxidised on exposure to air and moisture. The layer of rust formed on the surface allows air and moisture to pass through and reach the metal, causing corrosion to continue. <i>[1 mark]</i></li><li>- Aluminium gets oxidised on exposure to air. The layer of oxide formed on the surface forms a protective coating that prevents air from reaching the metal and thus prevents further corrosion. <i>[1 mark]</i></li></ul>	3.0
28	<p>(a) 1 mark each for any two correct pairs of elements identified such as:</p> <ul style="list-style-type: none"><li>- Q and R</li><li>- Q and U</li><li>- T and R</li><li>- T and U</li></ul>	3.0

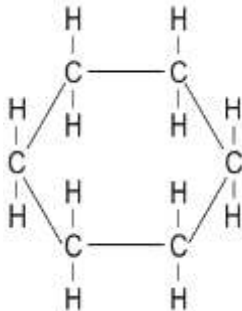
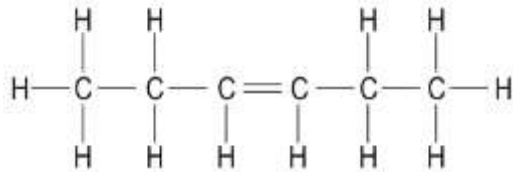


	<p>(b) 0.5 marks each for the formula for two compounds such as:</p> <ul style="list-style-type: none"><li>- <math>Q_2R</math></li><li>- <math>QU</math></li><li>- <math>TR</math></li><li>- <math>TU_2</math></li></ul> <p><b>OR</b></p> <p>(a) - bottom section [1 mark] - Metals at the bottom of the reactivity series are the least reactive. They occur in their free state; their compounds are unstable and hence easily converted to metal. [1 mark]</p> <p>(b) photolytic decomposition [1 mark]</p>	
29	<p>1 mark each for the following:</p> <ul style="list-style-type: none"><li>- Adrenaline induces the sweat glands to produce more sweat.</li><li>- It acts on the heart to increase the contraction of its muscles/pumping causing improved oxygen delivery.</li><li>- It acts on blood vessels of the digestive system constricting them.</li></ul> <p><i>[Accept any other valid answer.]</i></p>	3.0
30	<p>1 mark each for the following:</p> <p>(a) 50% (b) 50% (c) 75%</p>	3.0
31	<p>(a) <math>n_P = (\text{Speed of light in vacuum} / \text{speed of light in medium P})</math> <math>n_Q = (\text{Speed of light in vacuum} / \text{speed of light in medium Q})</math> [0.5 marks]</p> <p>Therefore, <math>n_P / n_Q = V_Q / V_P</math> <math>= 1.33 / 2.52 = V_Q / 2 \times 10^8</math> [0.5 marks]</p> <p><math>V_Q = (1.33 \times 2 \times 10^8) / 2.52</math> <math>= 1.056 \times 10^8 \text{ m/s}</math> [1 mark for the calculation and arriving at the correct answer.]</p>	3.0



	(b) the ray will travel undeviated through the medium Q [1 mark] [Accept any other valid answer.]	
32	<p>(a) Given <math>V = 240 \text{ V}</math> and <math>R = 100 \text{ ohms}</math></p> <p>Therefore, Power (<math>P</math>) = <math>V^2/R</math> <math>= (240)^2/100</math> <math>= 576 \text{ W}</math> [0.5 marks]</p> <p>Energy consumed by bulb A = <math>P \times t</math> <math>E = 576 \times 4 \times 7 \times 60 \times 60</math> <math>E = 58,060.8 \text{ kJ}</math> [0.5 marks]</p> <p>[Marks to be awarded if the students use any other method to arrive at the correct answer.]</p> <p>(b) When bulbs A and B are connected in series:</p> <p><math>R_{\text{net}} = R_1 + R_2</math> <math>= 100 + 100</math> <math>R_{\text{net}} = 200 \text{ ohms}</math></p> <p>Total power consumed by bulb A when connected in series with bulb B <math>P_{\text{tot}} = V^2/R_{\text{net}} = (240)^2/200 = 288 \text{ W}</math> [0.5 marks] <math>P_A = P_{\text{tot}}/2 = 144 \text{ W}</math> [0.5 marks]</p> <p>Power consumed by bulb A when connected without bulb B to 240 V <math>P_A = V^2/R</math> <math>= (240)^2/100</math> <math>= 576 \text{ W}</math></p> <p>As <math>P_A &lt; P_A</math>, the brightness of the bulb A decreases when connected in series with bulb B. [1 mark]</p> <p>[Marks to be awarded if the students use any other method to arrive at the correct answer.]</p>	3.0
33	(a) The current will flow through the additional wire that connects the points L and M (avoiding the bulb) as it offers a path of least/lower resistance as compared with the bulb [1 mark]	3.0



	<p>(b)</p> $\frac{3}{10} = \frac{1}{R_1} + \frac{1}{R_2} \dots\dots\dots (1)$ $R_1 + R_2 = 15, R_1 = 15 - R_2$ <p>Substituting in (1)</p> $\frac{3}{10} = \frac{(15 - R_2 + R_2)}{(15 - R_2) R_2} [1 \text{ mark}]$ $15R_2 - R_2^2 = 150/3 = 50$ $R_2^2 - 15R_2 + 50 = 0$ $R_2 = 10 \text{ ohm}, R_1 = 5 \text{ ohm}$ <p>or</p> $R_1 = 10 \text{ ohm}, R_2 = 5 \text{ ohm}$ <p>[1 mark]</p> <p>[Accept any other correct method]</p>	
<b>Section D</b>		
34	<p>(a) Compound P may be either saturated or unsaturated. [1 mark]</p> <p>- saturated compound: cyclohexane [1 mark]</p>  <p>- unsaturated compound: 2-hexene [1 mark]</p>  <p>[Accept any correct structural isomer]</p> <p>(b) burning the compound in an excess of air will produce a sooty flame if it is unsaturated and a clean flame if it is saturated [1 mark]</p>	5.0

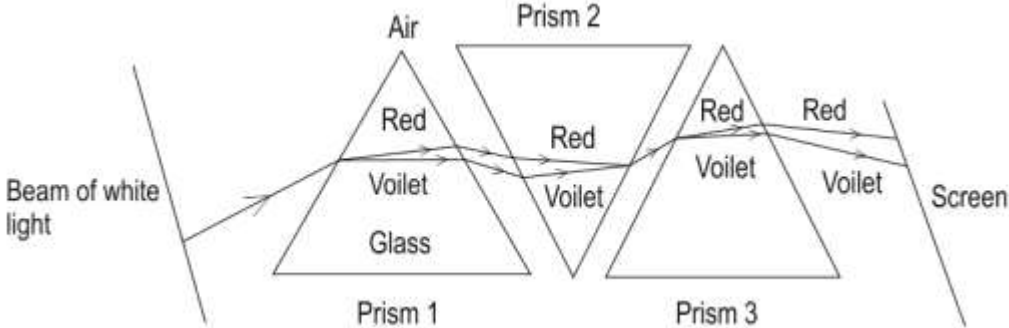


	<p>(c) carbon dioxide and water [1 mark] [No marks to be given for only one product]</p> <p><b>OR</b></p> <p>(a) <math>2\text{Na} + 2\text{CH}_3 - \text{CH}_2\text{OH} \rightarrow 2\text{CH}_3 - \text{CH}_2\text{O}^-\text{Na}^+ + \text{H}_2</math> [Marks to be given for writing the correct reaction of sodium metal with any alcohol.]</p> <p>(b) (i) <math>\text{CH}_3 - \text{CH}_2\text{OH} \rightarrow \text{CH}_2 = \text{CH}_2 + \text{H}_2\text{O}</math> [1 mark] (ii) Compound Q (ethylene) burns with a yellow flame with black smoke. [1 mark]</p> <p>(c) A compound with a fruity smell will be produced. [1 mark]</p> $\text{CH}_3\text{COOH} + \text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{H}_2\text{SO}_4} \text{CH}_3\text{COOCH}_2\text{CH}_3$	
35	<p>0.5 marks each for the name and 0.5 marks each for the explanation:</p> <ul style="list-style-type: none"><li>- Regeneration</li><li>- In this process, if an individual organism is cut or broken up into many pieces, many of these pieces grow into separate individuals.</li><li>- Budding</li><li>- In budding, a small outgrowth or bud forms on the parent organism, which eventually detaches and develops into a new individual.</li></ul> <p>[Accept any other valid answer.]</p> <p>(b)</p> <ul style="list-style-type: none"><li>- testes and ovaries [0.5 marks]</li><li>- Both structures perform the function of producing gametes and hormones crucial for reproduction [1 mark]</li><li>- vas deferens and fallopian tube [0.5 marks]</li><li>- Both structures are responsible for carrying the gamete to the site of fertilisation. [1 mark]</li></ul>	5.0





	<p><i>[No marks are to be allotted if the pair mentioned is incorrect.]</i></p> <p><b>OR</b></p> <p>(a) 1 mark for each point such as: Similarities: - In both cases, the signal is initiated by receptors located at the specific sense organ. - In both cases, neurotransmitters are released and accepted by neurons to carry the impulse.</p> <p>Differences: - The action of smelling the rose is voluntary whereas pulling the hand away is involuntary in nature. - While smelling the rose, the nerve impulse reaches the brain and back whereas on touching a thorn the nerve impulse travels only to the spinal cord and back.</p> <p><i>[Accept any other valid points.]</i></p> <p>(b) 0.5 marks each for the following: - No - Most involuntary actions do not require a stimulus to occur as is necessarily required in the case of a reflex action.</p> <p><i>[Accept any other valid answer.]</i></p>	
36	<p>(a) VIBGYOR [1 mark] - violet - indigo - blue - green - yellow - orange - red</p> <p>(b) 1 mark each for drawing the incident and emergent rays in the three prisms respectively. [Image not up to scale.]</p>	5.0

	 <p>(c) 0.5 marks each - dispersion - refraction</p> <p><b>OR</b></p> <p>(a) in front of the retina [1 mark] (b) concave lens [1 mark] (c) The person would not have the power of accommodation. [1 mark] (d) 0.5 marks each for the following: (i) R (ii) Q (iii) P (iv) S</p>	
<b>Section E</b>		
37	<p>(a) 1 mark each for the following:</p> <p>(i)</p> $\begin{array}{c} \text{CH}_3 \\   \\ \text{CH}_3 - \text{C} - \text{H} \\   \\ \text{CH}_3 \end{array}$	4.0



	<p>(ii)</p> $\begin{array}{c} \text{CH}_3 \\   \\ \text{CH}_2 = \text{C} \\   \\ \text{CH}_3 \end{array}$ <p>(b) 1 mark each for the following:  <math>\text{H}_3\text{C} - \text{CH}_2 - \text{CH} = \text{CH}_2</math>    <math>\text{H}_3\text{C} - \text{CH} = \text{CH} - \text{CH}_3</math></p> <p><b>OR</b></p> <p>(i) one or two [1 mark]          (no marks if both 1 or 2 not given)          (ii) six [1 mark]</p>																
38	<p>(a) (i) 0.5 marks each for the following:          - Yes, it is recessive.          - Since the trait does not express itself in all children, it is likely to be a recessive trait.</p> <p><i>[Accept any other valid reason.]</i></p> <p>(a) (ii) 0.5 marks each for the following:          - Yes, it is X-linked.          - Yes, since both male children received the X chromosome from the mother who is colour blind, it is likely to be linked to the X-chromosome.</p> <p><i>[Accept any other valid reason.]</i></p> <p>(b) 0.5 marks each for the genotypes:          - Ram - XY          - Asha - <math>\text{X}^c\text{X}^c</math></p> <p>Punnett square [1 mark]</p> <table border="1"> <tr> <td></td><td>X</td><td>Y</td></tr> <tr> <td><math>\text{X}^c</math></td><td><math>\text{X}^c\text{X}</math></td><td><math>\text{X}^c\text{Y}</math></td></tr> <tr> <td><math>\text{X}^c</math></td><td><math>\text{X}^c\text{X}</math></td><td><math>\text{X}^c\text{Y}</math></td></tr> </table> <p><b>OR</b></p> <p>Punnett square [1 mark]</p> <table border="1"> <tr> <td></td><td><math>\text{X}^c</math></td><td>Y</td></tr> <tr> <td><math>\text{X}^c</math></td><td><math>\text{X}^c\text{X}^c</math></td><td><math>\text{X}^c\text{Y}</math></td></tr> </table>		X	Y	$\text{X}^c$	$\text{X}^c\text{X}$	$\text{X}^c\text{Y}$	$\text{X}^c$	$\text{X}^c\text{X}$	$\text{X}^c\text{Y}$		$\text{X}^c$	Y	$\text{X}^c$	$\text{X}^c\text{X}^c$	$\text{X}^c\text{Y}$	4.0
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	X	X <sup>c</sup> X <sup>c</sup>	XY	
	50% possibility of the son being colour-blind [1 mark]			
39	<p>(a) The net resistance is: <math>R_1 + \{(R_2 R_3) / (R_2 + R_3)\} + R_4</math> [0.5 marks] <math>15 + \{(30 \times 15) / (15 + 30)\} + 15</math> <math>= 15 + 10 + 15</math> <math>R = 40 \Omega</math> [0.5 marks]</p> <p>(b) Voltage drop across <math>R_4 =</math> Net current <math>\times R_4</math> Total current <math>= V/R</math> <math>= 20/40</math> <math>= 0.5 \text{ A}</math> [1 mark]</p> <p>Power drop across <math>R_4 = 0.5 \times 15</math> <math>= 7.5 \text{ V}</math> [1 mark]</p> <p>OR</p> <p>Power dissipated by the resistor <math>R_1</math> is given by: <math>I = V/R</math> <math>= 20/40</math> <math>I = 0.5 \text{ A}</math> [1 mark] Therefore, <math>P = I^2 R_1</math> Power <math>= (0.5)^2 \times 15</math> <math>= 3.75 \text{ W}</math> [1 mark]</p> <p>(c) - net current will decrease [0.5 marks] - because <math>R_3</math> is connected in parallel and removing it will increase the net resistance in the circuit thereby reducing the net current. [0.5 marks]</p> <p>[Accept any other valid correct answer.]</p>			4.0