Series : 3EGFH **SET~3**

प्रश्न-पत्र कोड
Q.P. Code **31/3/3**

रोल नं.
Roll No.

परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें।
Candidates must write the Q.P. Code on the title page of the answer-book.

	नोट		NOTE
(I)	कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **27** हैं।	(I)	Please check that this question paper contains **27** printed pages.
(II)	प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।	(II)	Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
(III)	कृपया जाँच कर लें कि इस प्रश्न-पत्र में **39** प्रश्न हैं।	(III)	Please check that this question paper contains **39** questions.
(IV)	**कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में यथा स्थान पर प्रश्न का क्रमांक अवश्य लिखें।**	(IV)	**Please write down the Serial Number of the question in the answer-book at the given place before attempting it.**
(V)	इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक परीक्षार्थी केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे। #	(V)	15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.

विज्ञान
SCIENCE

*निर्धारित समय : **3** घण्टे*
*Time allowed : **3** hours*

*अधिकतम अंक : **80***
*Maximum Marks : **80***

सामान्य निर्देश :

निम्नलिखित निर्देशों को बहुत सावधानी से पढ़िए और उनका सख़्ती से पालन कीजिए :

(i) *इस प्रश्न-पत्र में कुल **39** प्रश्न हैं। **सभी** प्रश्न **अनिवार्य** हैं।*

(ii) *यह प्रश्न-पत्र **पाँच** खण्डों में विभाजित किया गया है – **क, ख, ग, घ** एवं **ङ**।*

(iii) ***खण्ड क** – प्रश्न संख्या **1** से **20** तक बहुविकल्पीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न **1** अंक का है।*

(iv) ***खण्ड ख** – प्रश्न संख्या **21** से **26** तक अति लघु-उत्तरीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न **2** अंकों का है। इन प्रश्नों के उत्तर **30** से **50** शब्दों में दिए जाने चाहिए।*

(v) ***खण्ड ग** – प्रश्न संख्या **27** से **33** तक लघु-उत्तरीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न **3** अंकों का है। इन प्रश्नों के उत्तर **50** से **80** शब्दों में दिए जाने चाहिए।*

(vi) ***खण्ड घ** – प्रश्न संख्या **34** से **36** तक दीर्घ-उत्तरीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न **5** अंकों का है। इन प्रश्नों के उत्तर **80** से **120** शब्दों में दिए जाने चाहिए।*

(vii) ***खण्ड ङ** – प्रश्न संख्या **37** से **39** तक **3** स्रोत-आधारित/प्रकरण-आधारित इकाइयों के मूल्यांकन के **4** अंकों के प्रश्न (उप-प्रश्नों सहित) हैं।*

(viii) *प्रश्न-पत्र में समग्र विकल्प नहीं दिया गया है। यद्यपि, कुछ खण्डों में आंतरिक विकल्प दिए गए हैं। इस प्रकार के प्रश्नों में केवल एक ही विकल्प का उत्तर दीजिए।*

खण्ड क

*प्रश्न संख्या **1** से **20** तक के प्रत्येक प्रश्न में दिए गए चार विकल्पों में से सबसे उचित विकल्प चुनिए और लिखिए। ग़लत उत्तर के लिए कोई ऋणात्मक अंकन नहीं है।* *20×1=20*

1. ऑक्साइड अयस्कों से धातुओं के निष्कर्षण की सर्वसामान्य विधि है :

(A) कार्बन के साथ अपचयन

(B) हाइड्रोजन के साथ अपचयन

(C) ऐलुमिनियम के साथ अपचयन

(D) विद्युत-अपघटनी अपचयन

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper comprises **39** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** sections – **A**, **B**, **C**, **D** and **E**.*

(iii) ***Section A** – Questions No. **1** to **20** are Multiple Choice Questions. Each question carries **1** mark.*

(iv) ***Section B** – Questions No. **21** to **26** are Very Short Answer type questions. Each question carries **2** marks. Answer to these questions should be in the range of **30** to **50** words.*

(v) ***Section C** – Questions No. **27** to **33** are Short Answer type questions. Each question carries **3** marks. Answer to these questions should in the range of **50** to **80** words.*

(vi) ***Section D** – Questions No. **34** to **36** are Long Answer type questions. Each question carries **5** marks. Answer to these questions should be in the range of **80** to **120** words.*

(vii) ***Section E** – Questions No. **37** to **39** are of **3** source-based/case-based units of assessment carrying **4** marks each with sub-parts.*

(viii) *There is no overall choice. However, an internal choice has been provided in some sections. Only one of the alternatives has to be attempted in such questions.*

SECTION A

*Select and write the most appropriate option out of the four options given for each of the questions no. **1** to **20**. There is no negative marking for incorrect response.* *20×1=20*

1. The most common method of extraction of metals from their oxide ores is :

(A) Reduction with carbon

(B) Reduction with hydrogen

(C) Reduction with aluminium

(D) Electrolytic reduction

2. निम्नलिखित रासायनिक समीकरण पर विचार कीजिए :

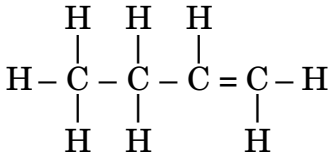
$p\ Al + q\ H_2O \longrightarrow r\ Al_2O_3 + s\ H_2$

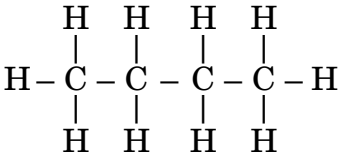
इस रासायनिक समीकरण को संतुलित करने के लिए, 'p', 'q', 'r' और 's' के मान क्रमश: होने चाहिए :

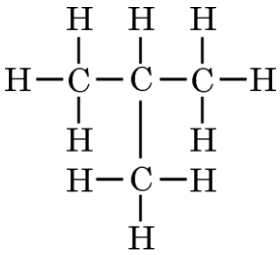
(A) 3, 2, 2, 1 (B) 2, 3, 3, 1

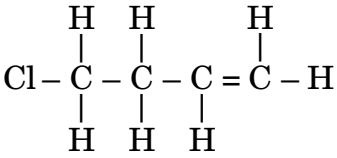
(C) 2, 3, 1, 3 (D) 3, 1, 2, 2

3. नीचे कुछ हाइड्रोकार्बनों की संरचनाएँ दी गयी हैं। दिए गए विकल्पों में से उन दो संरचनाओं को चुनिए जो एक दूसरे से संबंधित हैं :

(i) 

(ii) 

(iii) 

(iv) 

(A) (i) और (iv) (B) (ii) और (iv)

(C) (ii) और (iii) (D) (i) और (iii)

4. वनस्पति तेलों के हाइड्रोजनीकरण में प्रयुक्त सामान्य अभिक्रिया के विषय में ***ग़लत*** कथन चुनिए।

(A) यह कोई संकलन अभिक्रिया है।

(B) यह अभिक्रिया निकैल अथवा पैलेडियम उत्प्रेरक की उपस्थिति में होती है।

(C) उत्पाद में कार्बन परमाणुओं के बीच केवल एकल आबंध होते हैं।

(D) यह अम्ल उत्प्रेरक की उपस्थिति में होने वाली संकलन अभिक्रिया है।

5. निम्नलिखित में से कौन-से एक विकल्प में लवणों के परिवार का निरूपण किया गया है ?

(A) $NaCl, Na_2SO_4, CaSO_4$ (B) $K_2SO_4, Na_2SO_4, CaSO_4$

(C) $NaNO_3, CaCO_3, Na_2CO_3$ (D) $MgSO_4, CuSO_4, MgCl_2$

2. Consider the following chemical equation :

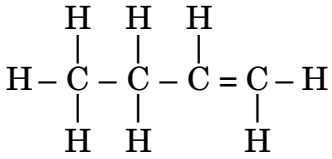
$p\ Al + q\ H_2O \longrightarrow r\ Al_2O_3 + s\ H_2$

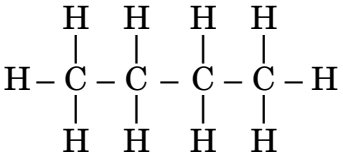
To balance this chemical equation, the values of 'p', 'q', 'r' and 's' must be respectively :

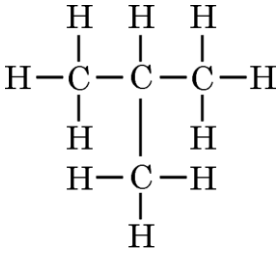
(A) 3, 2, 2, 1 (B) 2, 3, 3, 1

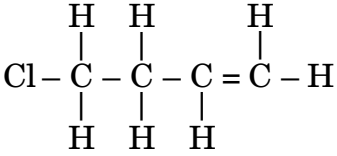
(C) 2, 3, 1, 3 (D) 3, 1, 2, 2

3. Given below are the structures of some hydrocarbons. Select the two structures which are related to each other from the given options :

(i) 

(ii) 

(iii) 

(iv) 

(A) (i) and (iv) (B) (ii) and (iv)

(C) (ii) and (iii) (D) (i) and (iii)

4. Choose the ***incorrect*** statement about the common reaction used in hydrogenation of vegetable oils.

(A) It is an addition reaction.

(B) It takes place in the presence of nickel or palladium catalyst.

(C) The product contains only single bonds between carbon atoms.

(D) It is an addition reaction which occurs in the presence of an acid catalyst.

5. Which of the given option represents a family of salts ?

(A) $NaCl, Na_2SO_4, CaSO_4$ (B) $K_2SO_4, Na_2SO_4, CaSO_4$

(C) $NaNO_3, CaCO_3, Na_2CO_3$ (D) $MgSO_4, CuSO_4, MgCl_2$

6. निम्नलिखित में से उभयलिंगी पुष्पों का युगल (जोड़ा) चुनिए :

(A) पपीता और सरसों (B) *गुड़हल* और सरसों

(C) *गुड़हल* और पपीता (D) *गुड़हल* और तरबूज

7. परागनली की अण्डाशय की ओर वृद्धि निम्नलिखित में से किस एक का उदाहरण है ?

(A) प्रकाशानुवर्तन (B) जलानुवर्तन

(C) गुरुत्वानुवर्तन (D) रसायनानुवर्तन

8. कॉलम-I का कॉलम-II के साथ मिलान कीजिए तथा दिए गए विकल्पों में से सही विकल्प को चुनिए :

कॉलम-I		*कॉलम-II*	
a.	अण्ड का शुक्राणु के साथ निषेचन का स्थल	(i)	योनि
b.	भ्रूण के स्थापित होने का स्थल	(ii)	गर्भाशय
c.	शुक्राणु का मादा जनन क्षेत्र में प्रवेश का स्थल	(iii)	अण्डवाहिका
d.	वह स्थल जिसके द्वारा विकासशील भ्रूण के अपशिष्ट पदार्थों का निपटारा होता है	(iv)	प्लैसेन्टा
		(v)	ग्रीवा

(A) a-(ii), b-(i), c-(v), d-(iv) (B) a-(iii), b-(i), c-(v), d-(iv)

(C) a-(iv), b-(ii), c-(iii), d-(i) (D) a-(iii), b-(ii), c-(i), d-(iv)

9. तीव्र कोशिका विभाजन के क्षेत्रों में अधिक सांद्रता में पाया जाने वाला पादप हॉर्मोन है :

(A) ऑक्सिन (B) साइटोकाइनिन

(C) जिब्बेरेलिन (D) एब्सिसिक अम्ल

10. पोषण की परजीवी विधा का प्रेक्षण निम्नलिखित में से किसमें होता है ?

(A) *ब्रायोफिलम* (B) *गुड़हल*

(C) *अमरबेल* (D) *सूरजमुखी*

11. फोकस दूरी 'f' के किसी उत्तल दर्पण के परावर्ती पृष्ठ के सामने कोई मोमबत्ती की ज्वाला रखी है। यदि ज्वाला की दर्पण के ध्रुव से दूरी 'f' है, तो इसका प्रतिबिंब कहाँ बनेगा ?

(A) दर्पण से अनन्त दूरी पर

(B) दर्पण के पीछे इसके मुख्य फोकस पर

(C) दर्पण के पीछे 2f दूरी पर

(D) दर्पण के पीछे $\frac{f}{2}$ दूरी पर

6. Select a pair of bisexual flowers from the following :

(A) Papaya and mustard (B) *Hibiscus* and mustard

(C) *Hibiscus* and papaya (D) *Hibiscus* and watermelon

7. The growth of the pollen tubes towards ovules is an example of :

(A) Phototropism (B) Hydrotropism

(C) Geotropism (D) Chemotropism

8. Match Column-I with Column-II and select the correct option from the choices provided.

	Column-I		*Column-II*
a.	Site of fertilisation of egg with the sperm	(i)	Vagina
b.	Site of implantation of embryo	(ii)	Uterus
c.	Site of entry of sperm into the female reproductive tract	(iii)	Oviduct
d.	Site through which the waste materials generated by the developing embryo are removed	(iv)	Placenta
		(v)	Cervix

(A) a-(ii), b-(i), c-(v), d-(iv) (B) a-(iii), b-(i), c-(v), d-(iv)

(C) a-(iv), b-(ii), c-(iii), d-(i) (D) a-(iii), b-(ii), c-(i), d-(iv)

9. The plant hormone present in greater concentration in the areas of rapidly dividing cells is :

(A) Auxin (B) Cytokinins

(C) Gibberellins (D) Abscisic acid

10. Parasitic mode of nutrition is observed in :

(A) *Bryophyllum* (B) *Hibiscus*

(C) *Cuscuta* (D) *Helianthus*

11. A candle flame is placed in front of the reflecting surface of a convex mirror of focal length f. If the distance of the flame from the pole of the mirror is 'f', its image is formed :

(A) at infinite distance from the mirror

(B) behind the mirror at the principal focus

(C) behind the mirror at a distance 2f

(D) behind the mirror at a distance $\frac{f}{2}$

12. निम्नलिखित में से सही कथन चुनिए :

(A) वायु के अणुओं का साइज़ दृश्य प्रकाश की तरंगदैर्घ्य से बड़ा होता है।

(B) नीले प्रकाश की तरंगदैर्घ्य लाल प्रकाश की तरंगदैर्घ्य की लगभग 1·8 गुनी होती है।

(C) जब सूर्य का प्रकाश वायु में सूक्ष्म कणों से गुजरता है, तो ये कण दृश्य प्रकाश के नीले वर्ण को लाल वर्ण की तुलना में अधिक प्रबलता से प्रकीर्ण करते हैं।

(D) लाल वर्ण का प्रकाश कुहरे अथवा धुएँ से सबसे अधिक प्रकीर्ण होता है।

13. घरेलू विद्युत परिपथों में विद्युत इस्तरी/विद्युत टोस्टर के केबलों के तारों के विद्युतरोधी आवरणों का रंग सामान्यत: कैसा होता है ?

(A) विद्युन्मय तार का लाल, उदासीन तार का हरा तथा भू-संपर्क तार का काला

(B) विद्युन्मय तार का लाल, उदासीन तार का काला तथा भू-संपर्क तार का हरा

(C) विद्युन्मय तार का हरा, उदासीन तार का काला तथा भू-संपर्क तार का लाल

(D) विद्युन्मय तार का हरा, उदासीन तार का लाल तथा भू-संपर्क तार का काला

14. किसी लंबी सीधी धारावाही परिनालिका के भीतर उत्पन्न चुंबकीय क्षेत्र की तीव्रता निम्नलिखित में से किस पर निर्भर ***नहीं*** करती है ?

(A) परिनालिका में फेरों की संख्या

(B) परिनालिका में प्रवाहित धारा की दिशा

(C) परिनालिका के भीतर भरे क्रोड का पदार्थ

(D) परिनालिका की कुण्डली की त्रिज्या

15. किसी छड़ चुंबक के लिए निम्नलिखित में से कौन-सा एक कथन सही ***नहीं*** है ?

(A) मुक्त रूप से निलंबित किए जाने पर यह स्वयं को उत्तर-दक्षिण दिशा में रख लेता है।

(B) इसमें लौह चूर्ण को आकर्षित करने की शक्ति होती है।

(C) यह चुंबकीय क्षेत्र रेखाएँ उत्पन्न करता है।

(D) छड़ चुंबक के भीतर चुंबकीय क्षेत्र रेखाओं की दिशा इसके उत्तर ध्रुव से दक्षिण ध्रुव की ओर होती है।

12. Select the correct statement from the following :

(A) The size of the molecules of air is larger than the wavelength of visible light.

(B) The blue light has a wavelength about 1·8 times greater than that of red light.

(C) When sunlight passes through the fine particles in air, they scatter the blue colour of visible light more strongly than red.

(D) The light of red colour is scattered the most by fog or smoke.

13. In domestic electric circuits, the colour of insulation covers of wires in the cables of electric iron/electric toaster is generally :

(A) red for live wire, green for neutral wire and black for earth wire

(B) red for live wire, black for neutral wire and green for earth wire

(C) green for live wire, black for neutral wire and red for earth wire

(D) green for live wire, red for neutral wire and black for earth wire

14. The strength of magnetic field produced inside a long straight current carrying solenoid does ***not*** depend upon :

(A) number of turns in the solenoid

(B) direction of current flowing through the solenoid

(C) material of the core filled inside the solenoid

(D) radius of the coil of the solenoid

15. Which one of the following statements is ***not*** true about a bar magnet ?

(A) It sets itself in north-south direction when suspended freely.

(B) It has attractive power for iron filings.

(C) It produces magnetic field lines.

(D) The direction of magnetic field lines inside a bar magnet is from its north pole to its south pole.

16. छोटी शाकाहारी मछलियों सहित किसी जलजीवशाला को कोई स्वपोषी तंत्र बनाने के लिए अजैव घटकों के अतिरिक्त नीचे दिए गए किन-किन जैव घटकों की आवश्यकता ***नहीं*** होती है ?

(i) जलीय पादप और जलीय जंतु

(ii) स्थलीय पादप और स्थलीय जंतु

(iii) जीवाणु और कवक जैसे अपघटक

(iv) क्लाउन मछलियाँ और समुद्री अर्चिन्स (जलसाही) जैसे उपभोक्ता

(A) (i) और (iv) (B) (ii) और (iii)

(C) (i) और (iii) (D) (ii) और (iv)

प्रश्न संख्या 17 से 20 के लिए, दो कथन दिए गए हैं – जिनमें एक को अभिकथन (A) तथा दूसरे को कारण (R) द्वारा अंकित किया गया है। इन प्रश्नों के सही उत्तर नीचे दिए गए कोडों (A), (B), (C) और (D) में से चुनकर दीजिए।

(A) अभिकथन (A) और कारण (R) दोनों सही हैं और कारण (R), अभिकथन (A) की सही व्याख्या करता है।

(B) अभिकथन (A) और कारण (R) दोनों सही हैं, परन्तु कारण (R), अभिकथन (A) की सही व्याख्या ***नहीं*** करता है।

(C) अभिकथन (A) सही है, परन्तु कारण (R) ग़लत है।

(D) अभिकथन (A) ग़लत है, परन्तु कारण (R) सही है।

17. *अभिकथन (A) :* पीतल को बनाते समय पहले कॉपर को पिघलाया जाता है और फिर किसी निश्चित अनुपात में इसमें टिन को विलीन किया जाता है।

कारण (R) : पीतल की प्राथमिक धातु कॉपर है।

18. *अभिकथन (A) :* खरीदारी करते समय जूट के थैलों का उपयोग प्रदूषण को घटाता है।

कारण (R) : जूट जैव निम्नीकरणीय है तथा इसके थैलों का आवश्यकतानुसार पुन:उपयोग किया जा सकता है।

19. *अभिकथन (A) :* हमारी लिखने अथवा बातचीत करने की क्रियाओं में हमारा तंत्रिका तंत्र पेशियों तक संदेश भेजता है।

कारण (R) : परिधीय तंत्रिका तंत्र कपाल तंत्रिकाओं और मेरु तंत्रिकाओं से बना होता है।

20. *अभिकथन (A) :* किसी छड़ चुंबक के चारों ओर की चुंबकीय क्षेत्र रेखाएँ कभी भी एक-दूसरे का परिच्छेद नहीं करती हैं।

कारण (R) : छड़ चुंबक द्वारा उत्पन्न चुम्बकीय क्षेत्र ऐसी राशि है जिसमें परिमाण और दिशा दोनों होती हैं।

16. Other than the abiotic components, which of the given biotic components are ***not*** required to make an aquarium with small herbivorous fishes a self-sustaining system ?

(i) Aquatic plants and aquatic animals

(ii) Terrestrial plants and terrestrial animals

(iii) Decomposers as bacteria and fungi

(iv) Consumers as clown fishes and sea urchins

(A) (i) and (iv) (B) (ii) and (iii)

(C) (i) and (iii) (D) (ii) and (iv)

For Questions number 17 to 20, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

17. *Assertion (A) :* Brass is prepared by first melting copper and then dissolving tin into it in a definite proportion.

Reason (R) : The primary metal of brass is copper.

18. *Assertion (A) :* Use of jute bags for shopping reduces pollution.

Reason (R) : Jute is biodegradable and its bag may be reused as and when needed.

19. *Assertion (A) :* In our actions of writing or talking, our nervous system communicates with the muscles.

Reason (R) : Cranial nerves and spinal nerves form the peripheral nervous system.

20. *Assertion (A) :* Magnetic field lines around a bar magnet never intersect each other.

Reason (R) : Magnetic field produced by a bar magnet is a quantity that has both magnitude and direction.

खण्ड ख

*प्रश्न संख्या **21** से **26** अति लघु-उत्तरीय प्रकार के प्रश्न हैं।*

21. (क) वियोजन (अपघटन) अभिक्रियाओं के लिए आवश्यक संभावित ऊर्जा के स्रोतों की सूची बनाइए। किसी एक का उचित उदाहरण देकर स्पष्टीकरण कीजिए। *2*

अथवा

(ख) क्या प्रेक्षण किया जाता है जब किसी शुष्क क्वथन नली में फैरस सल्फेट के जलयोजित क्रिस्टलों को गर्म किया जाता है ? होने वाली अभिक्रिया/अभिक्रियाओं के संतुलित रासायनिक समीकरण दीजिए। *2*

22. किसी रासायनिक यौगिक 'X' का उपयोग लौंड्री में धुले कपड़ों के विरंजन के लिए तथा पीने के जल को रोगाणुओं से मुक्त करने के लिए किया जाता है। 'X' को पहचानिए। इस यौगिक को किस प्रकार निरूपित किया जाता है ? इसके विरचन की विधि का वर्णन होने वाली अभिक्रिया का रासायनिक समीकरण देकर लिखिए। *2*

23. मानव परिसंचरण तंत्र में शिराओं के मुख्य कार्य का उल्लेख कीजिए। उन्हें मोटी भित्तियों की आवश्यकता क्यों नहीं होती है ? *2*

24. "बच्चों के लिंग का निर्धारण पिता द्वारा वंशानुगत लिंग गुणसूत्र के प्रकार द्वारा किया जाता है।" इस कथन की पुष्टि कीजिए। *2*

25. (क) किसी छात्र को अपनी पाठ्य-पुस्तकें पढ़ने में कठिनाई होती है परंतु वह कक्षा की अंतिम पंक्ति में बैठकर भी श्यामपट्ट पर लिखे अक्षरों को सुस्पष्ट पढ़ सकता है। उस छात्र के दृष्टि दोष का नाम लिखिए। उन दो कारणों की सूची बनाइए जिनसे यह दोष उत्पन्न होता है। इस दोष के संशोधन के लिए आवश्यक लेंस की प्रकृति लिखिए। *2*

अथवा

(ख) किसी काँच के त्रिभुजाकार प्रिज़्म के एक अपवर्ती फलक पर तिर्यकत: आपतित किसी प्रकाश किरण का पथ दर्शाने के लिए किरण आरेख खींचिए और उस पर विचलन कोण अंकित कीजिए। *2*

SECTION B

Questions no. ***21*** *to* ***26*** *are Very Short Answer Type questions.*

21. (a) List the possible sources of energy required in decomposition reactions. Illustrate any one with a suitable example. *2*

OR

(b) What is observed when hydrated ferrous sulphate crystals are heated in a dry boiling tube ? Give balanced chemical equation(s) of the reactions(s) that occur(s). *2*

22. A chemical compound 'X' is used to bleach washed clothes in laundry as well as to make drinking water free from germs. Identify 'X'. How is this compound represented ? Write the method of its preparation along with the chemical equation for the reaction that occurs. *2*

23. State the main function of veins in human circulatory system. Why do they not need thick walls ? *2*

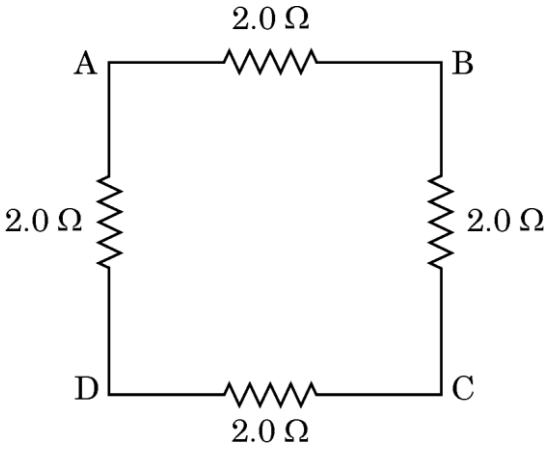
24. "Sex of the children is determined by type of sex chromosome which they inherit from their father." Justify the statement. *2*

25. (a) A student has difficulty in reading his textbooks but can read the blackboard clearly while sitting in the last row. Name the defect of vision the student is suffering from. List two reasons due to which this defect arises. Write the nature of the lenses required to correct this defect. *2*

OR

(b) Draw a ray diagram to show the path of a ray of light falling obliquely on one of the refracting faces of a triangular glass prism and mark the angle of deviation on it. *2*

26. आरेख में दर्शाए अनुसार चार प्रतिरोधकों, जिनमें प्रत्येक का प्रतिरोध 2·0 Ω है, को एक दूसरे के सिरों को संयोजित करके वर्ग ABCD बनाया गया है। उपयुक्त सूत्र का उपयोग करके इस संयोजन के दो सिरों A और B के बीच तुल्य प्रतिरोध निर्धारित कीजिए। *2*



खण्ड ग

*प्रश्न संख्या **27** से **33** लघु-उत्तरीय प्रकार के प्रश्न हैं।*

27. प्रेक्षण करने पर पाए जाने वाले उस परिवर्तन का उल्लेख कीजिए जो कॉपर चूर्ण में तब होता है जब उसे चायना डिश में बर्नर की ज्वाला पर तप्त किया जाता है। इस परिवर्तन के लिए उत्तरदायी परिघटना का नाम तथा होने वाली रासायनिक अभिक्रिया का संतुलित समीकरण लिखिए। यह अभिक्रिया उस अभिक्रिया से किस प्रकार भिन्न है जिसमें खुली वायु में कॉपर के बर्तनों/वस्तुओं को खुला छोड़ने पर उनके भूरे चमकदार पृष्ठ की चमक धीरे-धीरे समाप्त हो जाती है और उन पर कोई सतह बन जाती है ? इस सतह का रंग और इसका रासायनिक नाम लिखिए। *3*

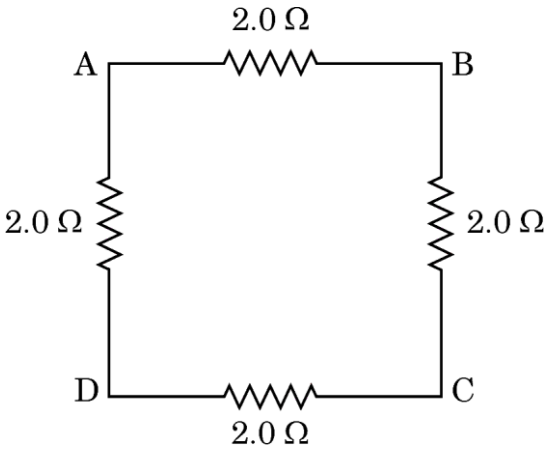
28. (क) साधारण नमक हमारे दैनिक उपयोग के कई रसायनों (पदार्थों) के लिए एक महत्त्वपूर्ण कच्चा पदार्थ है। साधारण नमक से (i) सोडियम हाइड्रॉक्साइड, और (ii) सोडियम हाइड्रोजन कार्बोनेट बनाने की विधि का संक्षेप में उल्लेख कीजिए। होने वाली अभिक्रियाओं के संतुलित रासायनिक समीकरण लिखिए। *3*

अथवा

(ख) यह निदर्शित करने के लिए किसी प्रायोगिक व्यवस्था की अभिकल्पना कीजिए कि "ऐल्कोहॉल और ग्लूकोज़ दोनों में ही हाइड्रोजन होती है परंतु इन्हें अम्लों में वर्गीकृत नहीं किया जाता है"। इस तथ्य की पुष्टि के लिए कारण भी दीजिए। *3*

29. कशेरुकी में रुधिर परिसंचरण को "दोहरा परिसंचरण" क्यों कहा जाता है ? प्रवाह आरेख के रूप में इसका पथ दर्शाइए। *3*

26. Four resistors, each of resistance 2·0 Ω, are joined end to end to form a square ABCD as shown. Using appropriate formula, determine the equivalent resistance of the combination between its two ends A and B. *2*



SECTION C

Questions no. ***27*** *to* ***33*** *are Short Answer Type questions.*

27. State the change that is observed when a China dish containing copper powder is heated over the flame of a burner. Name the phenomenon responsible for the change and write balanced equation for the chemical reaction that occurs. How is this reaction different from the reaction that occurs when copper wares kept in open air slowly lose their shiny brown surface and gain a coat ? Write chemical name of the coating and state its colour. *3*

28. (a) Common salt is an important raw material for various chemicals of daily use. State in brief the method of preparation of (i) Sodium hydroxide, and (ii) Sodium hydrogen carbonate from common salt. Write balanced chemical equations of the reactions that occur. *3*

OR

(b) Design an experimental set-up to demonstrate that "Alcohol and glucose contain hydrogen but are not categorised as acids". Also give the reason to justify this fact. *3*

29. Why is blood circulation in vertebrates known as "double circulation"? Trace its path in the form of a flow chart. *3*

30. किसी शुद्ध गोल (R), पीले (Y) बीजों वाले मटर के पौधे का किसी अन्य शुद्ध झुर्रीदार (r), हरे (y) बीजों वाले मटर के पौधे के साथ संकरण कराया गया। बाद में F_1 संतति का स्वपरागण करके F_2 संतति प्राप्त की गयी।

(क) F_1 संतति के बीज कैसे दिखाई देते हैं ?

(ख) F_2 संतति के बीजों में संभावित लक्षणों के संयोजन दीजिए। इनके अनुपात भी दीजिए।

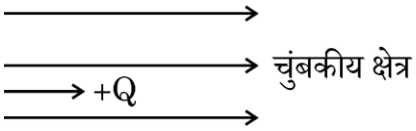
(ग) F_2 संतति में लक्षणों के नए संयोजनों वाले बीजों के प्राप्त होने के कारण का उल्लेख कीजिए। *3*

31. कोई व्यक्ति किसी ऐसे दृष्टि दोष से पीड़ित है जिसमें उसके नेत्र का दूर बिन्दु अनन्त पर न होकर बहुत निकट है। उस दृष्टि दोष का नाम लिखिए जिससे वह व्यक्ति पीड़ित है। इस दोष के दो प्रमुख कारणों की सूची बनाइए। इसके संशोधक लेंसों के प्रकार का नाम लिखिए और इन संशोधक लेंसों की कार्यविधि को दर्शाने के लिए किरण आरेख खींचिए। *3*

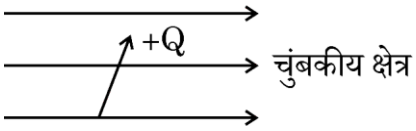
32. (क) किसी एकसमान चुम्बकीय क्षेत्र में स्थित किसी धारावाही चालक पर लगने वाले बल की दिशा निर्धारित करने वाले नियम का नाम लिखिए और उसका उल्लेख भी कीजिए।

(ख) निम्नलिखित तीन आरेखों पर विचार कीजिए जिसमें किसी धनावेश (+Q) को किसी चुम्बकीय क्षेत्र में प्रवेश करते दर्शाया गया है। कारण सहित उस प्रकरण की पहचान कीजिए जिसमें आवेश पर चुंबकीय क्षेत्र द्वारा आरोपित बल (i) अधिकतम, तथा (ii) निम्नतम है। *3*

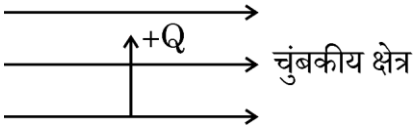
I.



II.



III.



33. (क) "किसी आहार श्रृंखला में ऊर्जा प्रवाह एकदिशिक होता है।" इस कथन की पुष्टि के लिए दो कारण दीजिए।

(ख) यदि 10,000 J ऊर्जा उत्पादक स्तर पर उपलब्ध है, तो द्वितीय उपभोक्ताओं को कितनी ऊर्जा उपलब्ध होगी ? अपने उत्तर की कारण सहित पुष्टि कीजिए। *3*

30. A pure pea plant having round (R), yellow (Y) seeds is crossed with another pure pea plant having wrinkled (r), green (y) seeds. Subsequently F_1 progeny is self-pollinated to obtain F_2 progeny.

(a) What do the seeds of F_1 generation look like ?

(b) Give the possible combinations of traits in seeds of F_2 generation. Also give their ratio.

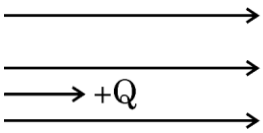
(c) State the reason of obtaining seeds of new combination of traits in F_2 generation. *3*

31. A person is suffering from an eye defect in which the far point of the eye is much nearer than infinity. Name the defect of vision the person is suffering from. List two main causes of this defect. Write the type of the corrective lens and draw a ray diagram to show the function of the corrective lens. *3*

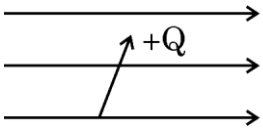
32. (a) Name and state the rule which determines the force on a current carrying conductor placed in a uniform magnetic field.

(b) Consider the following three diagrams in which the entry of a positive charge (+Q) in a magnetic field is shown. Identify giving reason the case in which the force experienced by the charge is (i) maximum, and (ii) minimum. *3*

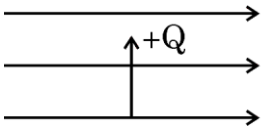
I.



II.



III.



33. (a) "In a food chain energy flow is unidirectional." Give two reasons for the given statement.

(b) If 10,000 J energy is available at the producer level, how much energy will be available to the secondary consumers ? Give reason to justify your answer. *3*

*प्रश्न संख्या **34** से **36** दीर्घ-उत्तरीय प्रकार के प्रश्न हैं।*

34. (क) (i) निम्नलिखित धातुओं पर विचार कीजिए :

K, Ca, Al, Cu, Ag, Fe

उपर्युक्त धातुओं में से उस धातु को चुनिए जो/जिसका

I. उच्च ताप पर भी ऑक्सीजन से अभिक्रिया नहीं करती है।

II. सामान्य ताप पर ऑक्सीजन से अभिक्रिया करके ऑक्साइड का संरक्षी परत चढ़ा लेती है जो उस धातु को पुन: ऑक्सीकरण से सुरक्षित रखती है।

III. खुले में रखे जाने पर आग पकड़ लेती है।

IV. ऑक्सीजन में दहन तो नहीं होता परंतु गर्म धातु पर धातु के ऑक्साइड की काले रंग की परत चढ़ जाती है।

(ii) उभयधर्मी ऑक्साइड किसे कहते हैं ? संतुलित रासायनिक समीकरणों की सहायता से यह दर्शाइए कि ऐलुमिनियम ऑक्साइड उभयधर्मी ऑक्साइड है।

(iii) क्षार किसे कहते हैं ? एक उदाहरण दीजिए। *5*

अथवा

(ख) (i) संतुलित रासायनिक समीकरणों की सहायता से (I) मर्करी को उसके सिन्नाबार नामक अयस्क से, तथा (II) कॉपर को उसके सल्फाइड अयस्क से निष्कर्षित करने की प्रक्रिया का उल्लेख कीजिए।

(ii) वायु में खुला छोड़ देने (उद्भासित होने) पर सिल्वर तथा कॉपर की वस्तुओं के पृष्ठों की चमक धीरे-धीरे समाप्त हो जाती है। परत के रूप में (I) सिल्वर की वस्तुओं, तथा (II) कॉपर की वस्तुओं पर बनने वाले यौगिकों का नाम लिखिए। *5*

SECTION D

Questions no. ***34*** *to* ***36*** *are Long Answer Type questions.*

34. (a) (i) Consider the following metals :

K, Ca, Al, Cu, Ag, Fe

Select from the above metals, a metal which

I. does not react with oxygen even at high temperature.

II. reacts with oxygen at ordinary temperature and forms a protective oxide layer which prevents the metal from further oxidation.

III. catches fire when kept in the open.

IV. does not burn in oxygen but the hot metal is coated with a black coloured oxide layer.

(ii) What are amphoteric oxides ? With the help of balanced chemical equations show that aluminium oxide is an amphoteric oxide.

(iii) What are alkalis ? Give one example. *5*

OR

(b) (i) With the help of balanced chemical equations state the process of extracting (I) mercury from its ore called cinnabar, and (II) copper from its sulphide ore.

(ii) Silver and copper articles slowly lose their shiny surfaces when exposed to air. Name the compounds formed on (I) silver articles, and (II) copper articles in the form of coating. *5*

35. (क) (i) ''काँच के आयताकार स्लैब से होकर गुजरने वाले प्रकाश के अपवर्तन में निर्गत किरण सदैव ही आपतित किरण की दिशा के समान्तर होती है।'' क्यों ? प्रकाश किरण आरेख की सहायता से व्याख्या कीजिए। क्या होता है जब कोई प्रकाश की किरण काँच के आयताकार प्रिज़्म के किसी एक फलक पर अभिलंबवत आपतन करती है ? आरेख खींचिए।

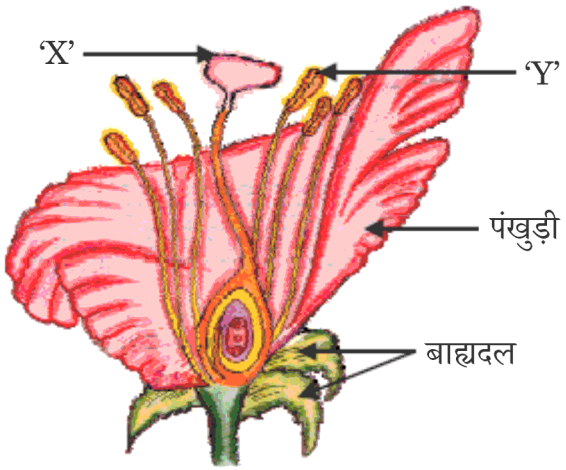
(ii) कोई बिंब 20 cm फोकस दूरी के किसी अवतल लेंस के प्रकाशिक केन्द्र से 30 cm की दूरी पर स्थित है। लेंस सूत्र का उपयोग करके बनने वाले प्रतिबिंब की स्थिति निर्धारित कीजिए। *5*

अथवा

(ख) (i) कोई छात्र मोमबत्ती की ज्वाला को बिम्ब के रूप में उपयोग करके किसी अवतल दर्पण द्वारा प्रतिबिंब बनने का अध्ययन करना चाहता है। दर्पण द्वारा बनने वाले प्रतिबिंब के प्रकार को लिखिए और यह भी उल्लेख कीजिए कि मोमबत्ती की ज्वाला को दर्पण के ध्रुव से धीरे-धीरे दूर ले जाने पर वह छात्र बनने वाले प्रतिबिंब में किन परिवर्तनों का प्रेक्षण करेगा। उस स्थिति में दर्पण द्वारा प्रतिबिंब बनना दर्शाने के लिए किरण आरेख खींचिए जब बिंब दूरी दर्पण की वक्रता त्रिज्या के लगभग बराबर है।

(ii) किसी ऑटोमोबाइल में पीछे का दृश्य देखने के लिए उपयोग होने वाले उत्तल दर्पण की फोकस दूरी 3·0 m है। यदि कोई बस इस दर्पण से 6·0 m की दूरी पर स्थित है, तो दर्पण सूत्र का उपयोग करके दर्पण में दिखाई देने वाले बस के प्रतिबिंब की स्थिति ज्ञात कीजिए। *5*

36. (क) (i) नीचे दिए गए आरेख में 'X' और 'Y' की पहचान कीजिए।



35. (a) (i) "In refraction of light through a rectangular glass slab, the emergent ray is always parallel to the direction of the incident ray." Why ? Explain with the help of a ray diagram. What happens when a ray of light falls normally on one of the faces of a rectangular glass prism ? Draw diagram.

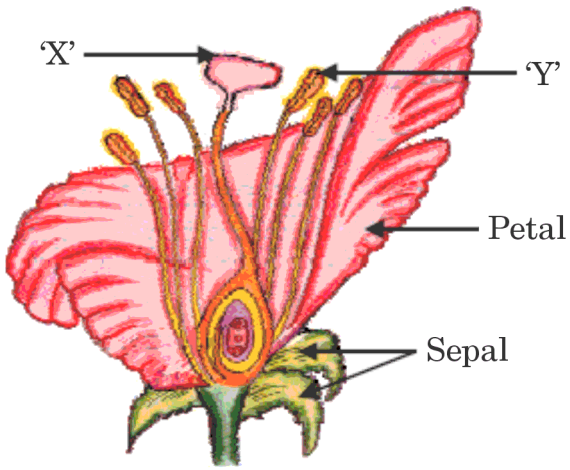
(ii) An object is placed at a distance of 30 cm from the optical centre of a concave lens of focal length 20 cm. Use Lens formula to determine the position of the image formed in this case. *5*

OR

(b) (i) A student wishes to study the image formation by a concave mirror using candle flame as object. State the type of the image formed by the mirror and mention the change in the image formed, if any, that he observes when the candle flame is gradually moved away from the pole of the mirror. Draw a ray diagram to show the image formation when the object distance is nearly equal to the radius of curvature of the mirror.

(ii) A convex mirror used for rear-view on an automobile has a focal length of 3·0 m. If a bus is located at 6·0 m from this mirror, use mirror formula to find the position of the image of the bus as seen in the mirror. *5*

36. (a) (i) Identify the parts 'X' and 'Y' in the figure given below :



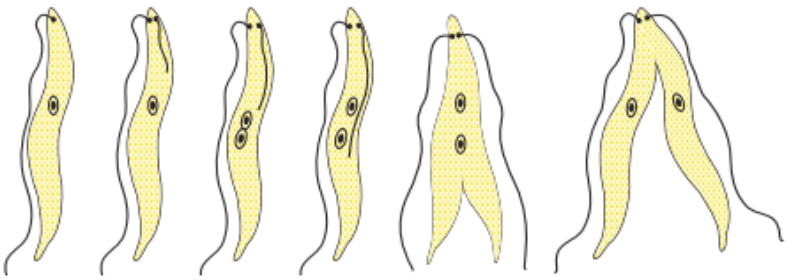
(ii) नामांकित भाग 'Y' द्वारा उत्पन्न पीले रंग की संरचनाओं के नाम लिखिए।

(iii) उस प्रक्रिया का नाम लिखिए जिसके द्वारा यह संरचनाएँ नामांकित भाग 'X' को स्थानान्तरित होती हैं।

(iv) किसी पुष्पी पादप में बीज बनने की प्रक्रिया की व्याख्या कीजिए। *5*

अथवा

(ख) (i) नीचे दिए गए आरेख में दर्शायी जनन की अलैंगिक विधा का नाम लिखिए।



(a) (b) (c) (d) (e) (f)

(ii) आरेख में एककोशिक जीव की पहचान कीजिए।

(iii) लैंगिक जनन की तुलना में अलैंगिक जनन के किन्हीं दो लाभों की सूची बनाइए।

(iv) *हाइड्रा* में प्रेक्षण की जाने वाली अलैंगिक जनन की किसी एक विधा का नाम लिखिए और उसकी व्याख्या कीजिए। *5*

खण्ड ङ

निम्नलिखित प्रश्न स्रोत-आधारित/केस-आधारित प्रश्न हैं। केस को सावधानीपूर्वक पढ़िए और दिए गए प्रश्नों के उत्तर दीजिए।

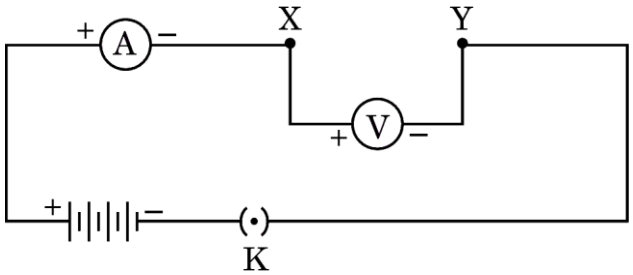
37. आरेख में दर्शाए अनुसार, कोई विद्युत परिपथ व्यवस्थित किया गया है जिसमें कोई ऐमीटर, कोई वोल्टमीटर, 4 सेल जिनमें प्रत्येक 1·5 V का है, कोई प्लग कुंजी तथा कोई अंतराल XY छोड़ा गया है। नीचे दी गयी चार व्यवस्थाओं के लिए ऐमीटर और वोल्टमीटर के पाठ्यांकों को प्रेक्षण तालिका में रिकॉर्ड किया गया है :

व्यवस्था 1 – XY अंतराल में केवल प्रतिरोधक R_1

व्यवस्था 2 – XY अंतराल में केवल प्रतिरोधक R_2

व्यवस्था 3 – XY अंतराल में प्रतिरोधक R_1 और R_2 का श्रेणीक्रम संयोजन

व्यवस्था 4 – XY अंतराल में प्रतिरोधक R_1 और R_2 का पार्श्वक्रम संयोजन



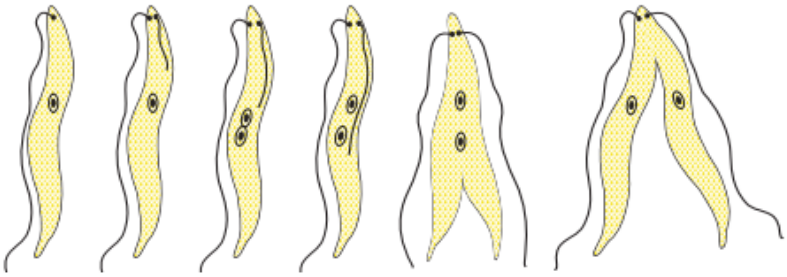
(ii) Name the yellowish coloured structures produced by the part labelled as 'Y'.

(iii) Write the name of the process by which these are transferred to the part labelled as 'X'.

(iv) Explain the process of seed formation in a flowering plant. *5*

OR

(b) (i) Name the type of asexual mode of reproduction shown in the given figure.



(a) (b) (c) (d) (e) (f)

(ii) Identify the unicellular organism in the diagram.

(iii) List any two advantages of asexual reproduction over sexual reproduction.

(iv) Name and explain any one mode of asexual reproduction observed in *Hydra*. *5*

SECTION E

The following questions are Source-based / Case-based questions. Read the case carefully and answer the questions that follow.

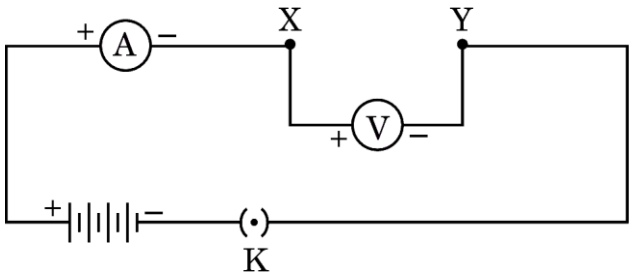
37. As shown in the diagram, an electric circuit consisting of an ammeter, a voltmeter, 4 cells of 1·5 V each, a plug key with a gap XY was set up. Voltmeter and ammeter readings were recorded in the observation table for four arrangements as given below :

Arrangement No. 1 – only resistor R_1 in gap XY

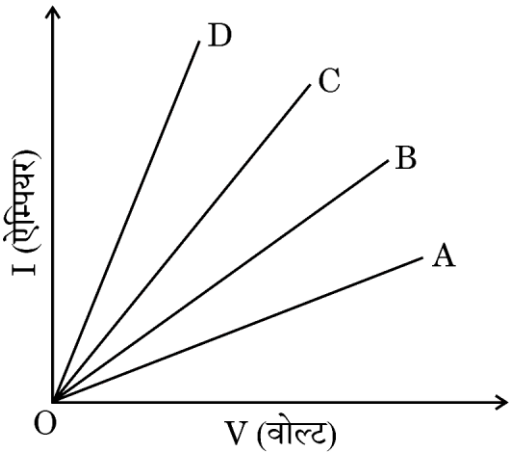
Arrangement No. 2 – only resistor R_2 in gap XY

Arrangement No. 3 – Resistors R_1 and R_2 in series in gap XY

Arrangement No. 4 – Resistors R_1 and R_2 in parallel in gap XY



प्रेक्षणों के आधार पर, आरेख में दर्शाए अनुसार चार V – I ग्राफ A, B, C और D खींचे गए। इन ग्राफों का अध्ययन कीजिए।



(क) इनमें से कौन-सा एक ग्राफ R_1 और R_2 श्रेणीक्रम संयोजन का निरूपण करता है ? *1*

(ख) इनमें से कौन-सा एक ग्राफ R_1 और R_2 के पार्श्वक्रम संयोजन का निरूपण करता है ? *1*

(ग) (i) तीन प्रतिरोधकों, जिनमें प्रत्येक का प्रतिरोध 10 Ω है, को इस प्रकार संयोजित कीजिए कि संयोजन का कुल प्रतिरोध 15 Ω हो। अपने उत्तर की पुष्टि कीजिए। *2*

अथवा

(ग) (ii) किसी 6 V की बैटरी को 0·1 Ω, 0·2 Ω, 0·3 Ω, 0·4 Ω और 0·5 Ω के पाँच प्रतिरोधकों के श्रेणीक्रम संयोजन से संयोजित किया गया है। 0·3 Ω के प्रतिरोधक से कितनी धारा प्रवाहित होगी ? अपने उत्तर की पुष्टि कीजिए। *2*

38. 'A' और 'B' दो लवण हैं जिनका उपयोग धोने के लिए किया जाता है। लवण 'A' का उपयोग नहाने में भी किया जाता है। नीचे दिए अनुसार चार परखनलियाँ I, II, III तथा IV ली गयी हैं।

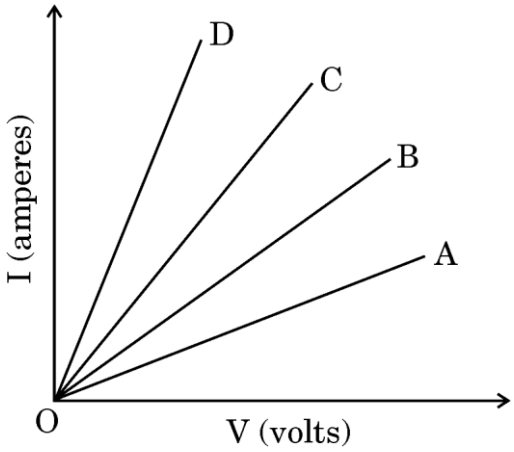
I. वर्षा का जल + लवण 'A' का विलयन

II. वर्षा का जल + लवण 'B' का विलयन

III. ट्यूबवैल का जल + लवण 'A' का विलयन

IV. ट्यूबवैल का जल + लवण 'B' का विलयन

Based on the observations, four V – I graphs A, B, C and D as shown in figure were drawn. Study these graphs.



(a) Which one of the graphs represents the series combination of R_1 and R_2 ? *1*

(b) Which one of these graphs represents the parallel combination of R_1 and R_2 ? *1*

(c) (i) Show an arrangement of three resistors, each of resistance 10 Ω, so that the combination has a resistance of 15 Ω. Give justification for your answer. *2*

OR

(c) (ii) A battery of 6 V is connected with a series combination of five resistors of 0·1 Ω, 0·2 Ω, 0·3 Ω, 0·4 Ω and 0·5 Ω. How much current would flow through the 0·3 Ω resistor ? Justify your answer. *2*

38. 'A' and 'B' are two salts used for washing purposes. Salt 'A' is used for bathing also. Four test tubes I, II, III and IV as mentioned below are taken.

I. Rain water + solution of salt 'A'

II. Rain water + solution of salt 'B'

III. Tubewell water + solution of salt 'A'

IV. Tubewell water + solution of salt 'B'

सभी परखनलियों को एक-एक करके समान समय तक लगभग एक ही प्रकार से हिलाया गया और प्रत्येक परखनली में बने झाग की लंबाई (मात्रा) को नोट किया गया।

(क) चार परखनलियों में से किस परखनली में बने झाग की मात्रा सबसे कम है ? *1*

(ख) लवण 'A' और लवण 'B' में अंतर स्पष्ट कीजिए। *1*

(ग) (i) एस्टर क्या होते हैं ? क्या होता है जब कोई एस्टर किसी ऐल्कली (जैसे सोडियम हाइड्रॉक्साइड) से अभिक्रिया करता है ? अभिक्रिया का रासायनिक समीकरण लिखिए। *2*

अथवा

(ग) (ii) जल की कठोरता का क्या कारण है ? कभी-कभी यह प्रेक्षण किया जाता है कि नहाते समय झाग बनने में कठिनाई होती है और एक अविलेय पदार्थ बन जाता है। इस पदार्थ का नाम और इसके बनने का कारण लिखिए। *2*

39. कोई व्यक्ति किसी चट्टानी पर्वत पर चढ़ते समय भयभीत हो जाता है और उसे डर लगने लगता है। उसका शरीर ऐसी तनावपूर्ण और भयानक परिस्थितियों में ''लड़ते रहने अथवा वापस लौटने'' के लिए तैयारी करने लगता है।

उपर्युक्त तथ्यों के आधार पर नीचे दिए गए प्रश्नों के उत्तर दीजिए।

(क) (i) इस स्थिति में व्यक्ति के रुधिर में स्रावित हॉर्मोन का नाम लिखिए। *2*

अथवा

(क) (ii) इस स्थिति में स्रावित हॉर्मोन की स्रोत ग्रंथि का नाम लिखिए। *2*

(ख) इस हॉर्मोन के स्राव के परिणामस्वरूप व्यक्ति के शरीर में कोई दो अनुक्रियाएँ लिखिए। *1*

(ग) हॉर्मोनों के द्वारा उत्पन्न रासायनिक संकेत की क्रिया तंत्रिका कोशिकाओं द्वारा उत्पन्न विद्युत आवेगों से किस प्रकार भिन्न होती है ? *1*

The test tubes are shaken one by one almost identically for the same time and the lengths of foam formed in each test tube is noted.

(a) In which one of the four test tubes is the foam formed the minimum ? *1*

(b) Differentiate between salt A and salt B. *1*

(c) (i) What are esters ? What happens when an ester reacts with an alkali (say sodium hydroxide) ? Give chemical equation for the reaction. *2*

OR

(c) (ii) What is the cause of hardness of water ? Sometimes it is observed that while bathing foam is formed with difficulty and an insoluble substance is formed. Name this substance and write the cause of its formation. *2*

39. A person while climbing up a rocky hill comes into a panic state and fear. His body starts reacting in a "flight-or-flight" condition to adjust to the dangerous and stressful situation.

Based on the above facts, answer the questions that follow.

(a) (i) Name the hormone secreted in the blood of the person in this situation. *2*

OR

(a) (ii) Name the source gland of the hormone secreted in this condition. *2*

(b) State any two responses in the body of the person as a result of the secretion of this hormone. *1*

(c) How does the action of the chemical signal in terms of hormones differ from the electrical impulses via nerve cells ? *1*

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2025
SUBJECT NAME SCIENCE (Q.P. CODE 31/3/1)

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.
2	**"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."**
3	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 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.**
4	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.
5	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.
6	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. **This is most common mistake which evaluators are committing.**
7	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.
8	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 **"Extra Question"**.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

	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	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 totaling of marks awarded on an answer. ● 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/not same. ● 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.
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 "**Guidelines for Spot Evaluation**" 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 totalled 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.

SECONDARY SCHOOL EXAMINATION, 2025

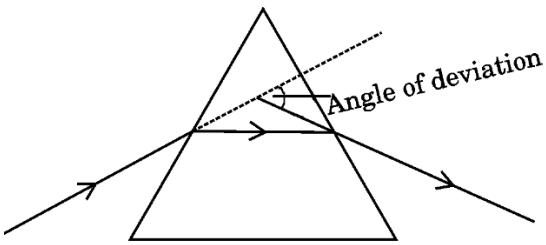
MARKING SCHEME

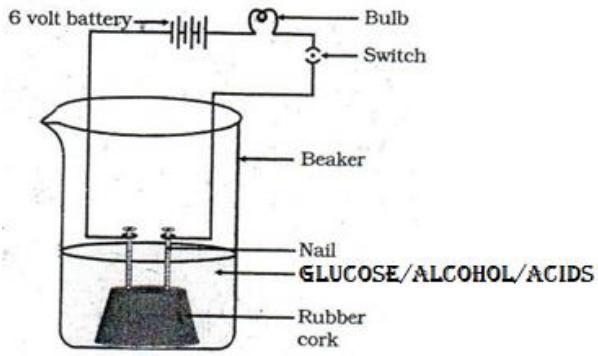
CLASS: X SCIENCE (Subject Code–086)

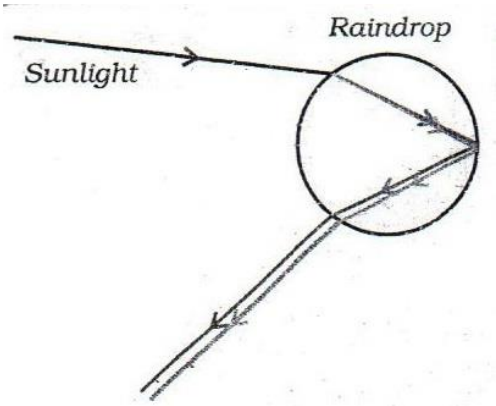
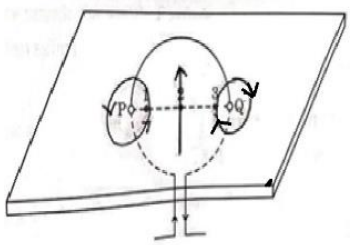
[Paper Code: 31/3/1]

Maximum Marks: 80

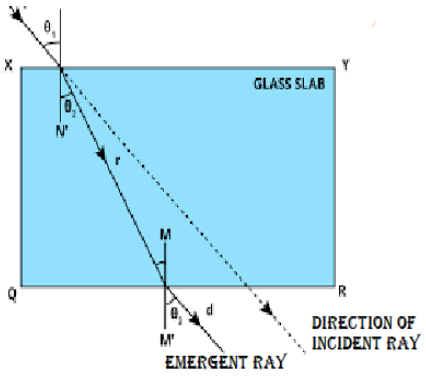
Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(C) / 2, 3, 1, 3	1	1
2	(B) / $K_2SO_4, Na_2SO_4, CaSO_4$	1	1
3	(A) / Reduction with carbon	1	1
4	(C) /(ii) and (iii)	1	1
5	(D) / It is an addition reaction which occurs in the presence of an acid catalyst.	1	1
6	(D) / a-(iii), b-(ii), c-(i), d-(iv)	1	1
7	(C) / Cerebellum	1	1
8	(B) / Cytokinins	1	1
9	(B) / *Hibiscus* and mustard	1	1
10	(C) / Mucus and Pepsin	1	1
11	**NOTE: - Full credit of one mark to all the students**.	1	1
12	(C) /Blue	1	1
13	(C) /9R	1	1
14	(D) /The direction of magnetic field lines inside a bar magnet is from its north pole to its south pole.	1	1
15	(D) / Radius of the coil of the solenoid	1	1
16	(D) /(ii) and (iv)	1	1
17	(C) / Assertion (A) is true, but Reason (R) is false.	1	1
18	(B) / Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
19	(B) / Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
20	(A) /Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
	SECTION B		
21	(a)Heat, light, electricity $2\,AgBr(s) \xrightarrow{Sunlight} 2\,Ag(s) + Br_2(g)$ (or any other example or statement) **OR** (b) Observation: Water droplets on upper part of the test tube/Colour changes from green to white/White to brown on heating strongly/Pungent smell of burning Sulphur.	1 1 ½	

22	(a) (i) H^+ / H_3O^+ (ii) OH^- (b) Dry HCl does not dissociate into hydrogen ions in absence of water.	½ ½ 1	2
23	• Veins carry deoxygenated blood from different organs and bring it back to the heart. • Because blood flows at low pressure inside veins.	1 1	2
24	(a) Tallness depends on the amount of plant hormone, synthesis of plant hormone depends on the efficiency of enzymes (proteins), synthesis of enzymes (proteins) depends on specific DNA sequence(gene). More the synthesis of hormone, more the pea plant will be taller. (b) Gene	1 1	2
25	(a) Hypermetropia /Farsightedness/Longsightedness. Reasons: (i) Focal length of the eye lens is too long (ii) Eyeball becomes too small. Correction Convex lens /Converging lens **OR** (b)  DIAGRAM DIRECTION OF RAYS MARKING OF ANGLE	½ ½ ½ ½ 1 ½ ½	2
26	P = 1000 W, V = 230 V; Formula = $P = \frac{V^2}{R}$ $R = \frac{V^2}{P}$ $(230)^2$	½	

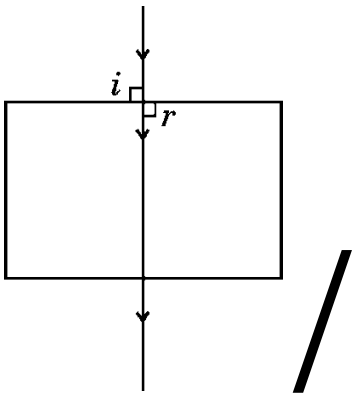
	SECTION C		
27	(a) • A series of metals arranged in the order of their decreasing reactivity/ activity. • By performing displacement reactions • Calcium, Aluminium, Lead, Copper (b) $Fe_2O_3 + 2\,Al \longrightarrow Al_2O_3 + 2\,Fe + Heat$	½ ½ 1 1	3
28	(a) (i) Electricity is passed through an aqueous solution of NaCl (brine), it decomposes to form NaOH. / Chlor-Alkali Process $2\,NaCl(aq) + 2\,H_2O \longrightarrow 2\,NaOH(aq) + Cl_2 + H_2$ (ii) When brine reacts with carbon dioxide and ammonia, sodium hydrogen carbonate and ammonium chloride are formed $2\,NaCl + H_2O + CO_2 + NH_3 \longrightarrow NaHCO_3 + NH_4Cl$ (b) **OR**  Bulb does not glow when solution of alcohol and glucose are taken but glows when acids solution are taken. (Award marks if explained in words) **Reason:-** Acidic solutions liberate ions but glucose and alcohol do not liberate ions .Hence bulb only glows for acidic solutions.	½ 1 ½ 1 2 1	3
29	(a) Aerobic – carbon dioxide+water Anaerobic - Lactic Acid (b) Respiration –carbon dioxide Photosynthesis – oxygen (c) Terrestrial Animals – lungs / skin Fish– Gills	½ ½ ½ ½ ½ ½	3
30	(a) Round, yellow	1	

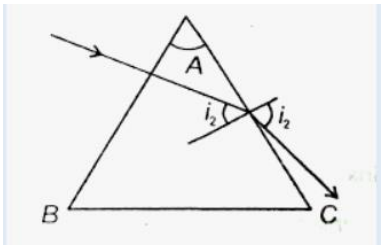
	wrinkled green : 1 (c) Traits are inherited independently/Independent assortment of the traits.	1	3
31	A rainbow is a natural spectrum appearing in the sky after a rain shower.  (Deduct half mark if arrows are not marked)	1 2	3
32	(a)  Marking magnetic lines for points 1,2 and 3 (b) • Strength of the current in the loop • No. of turns of loop (c) Right hand thumb rule	½x3 ½x2 ½	3
33	(a) • The energy captured by plants does not revert to solar input and the energy which passes to the herbivores does not revert back to autotrophs. • As energy moves progressively through the various trophic levels it is no longer available to the previous level. • The energy available at each trophic level gets diminished progressively due to loss of energy at each level. **(any two)** (b) 100 J • Autotrophs ⟶ Primary consumer ⟶ secondary	1x2 ½	

	/ Only 10% energy of the organic matter of previous trophic level is transferred to next trophic level. /10% law		3
	SECTION-D		
34	(a) (i) (I) Ag, (II) Al, (III) K, (IV) Cu	½ ½ ½ ½	
	(ii) Metal oxides which react with both acids as well as bases to produce salts and water are called amphoteric oxides.	1	
	$Al_2O_3 + 6\,HCl \longrightarrow 2\,AlCl_3 + 3\,H_2O$	½	
	$Al_2O_3 + 2\,NaOH \longrightarrow 2\,NaAlO_2 + H_2O$ (Do not deduct marks if equation is not balanced)	½	
	(iii) Water soluble bases are called Alkalis. NaOH / KOH / Sodium Hydroxide / Potassium Hydroxide **(any one)**	½ ½	
	OR		
	(b) (i) (I) $2\,HgS(s) + 3\,O_2(g) \xrightarrow{Heat} 2\,HgO(s) + 2\,SO_2(s)$ (cinnabar)	1	
	$2\,HgO(s) \xrightarrow{Heat} 2\,Hg(l) + O_2(g)$	1	
	(II) $2\,CuS + 3\,O_2(g) \xrightarrow{Heat} 2\,Cu_2O(s) + 2\,SO_2(g)$	1	
	$2\,Cu_2O + Cu_2S \xrightarrow{Heat} 6\,Cu(s) + SO_2(g)$ (Deduct half mark each for unbalanced equation)	1	
	(ii) (I) Silver sulphide /Ag_2S (II) Basic Copper carbonate/ $Cu(OH)_2$. $CuCO_3$	½ ½	5
35	(a) (i) 'X' – Stigma 'Y' – Anther (ii) Pollen grains (iii) Pollination	½+ ½ 1 1	

	female germ cell to form a zygote which divides several times to form an embryo within the ovule. The ovule develops a tough coat and is gradually converted into a seed. **OR** (b) (i) Binary fission (ii) *Leishmania* (iii) Produces a greater number of offsprings within a short period of time /Ensures better chances of survival of organisms in unfavorable conditions/Formation of genetically similar organisms /gamete formation is not required. **(any two)** (iv) Budding A bud develops as an outgrowth due to repeated cell division at a specific site, develop into tiny individuals, and after being matured, detach from parent body and become new independent individuals. **(Award marks if explained through labelled diagram)** **(or any other mode of reproduction)**	2 ½ ½ 1+1 1 1	5
36	(a) (i) The extent of bending of the ray of light at the opposite parallel faces of the rectangular glass slab is equal and opposite. This is why the ray emerges parallel to the incident ray.  	1 1	

NORMAL INCIDENCE





1

(ii) u = – 30 cm , f = – 20 cm

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \quad \text{or} \quad \frac{1}{v} = \frac{1}{u} + \frac{1}{f}$$ ½

$$\frac{1}{v} = \frac{1}{-30\ \text{cm}} + \frac{1}{-20\ \text{cm}}$$ ½

$$= \frac{1}{-12\ \text{cm}} \text{ or } v = -12\ \text{cm}$$ 1

The image is at – 12 cm on the same side of the lens.

OR

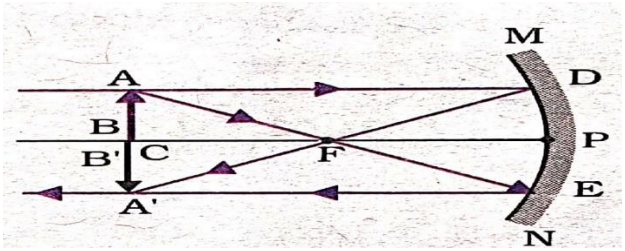
(b)

(i)

Type of Image

Real and Inverted (when candle is beyond F)/ Virtual and Erect (when candle is between P and F) 1

As the object is moved gradually away from the pole of the mirror, the image gets diminished. 1



1

(ii) Object distance, u = – 6·00 m

Image distance, v = ?

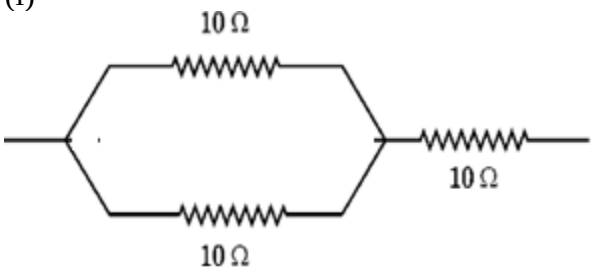
Focal length, f = 3·00 m

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f} \quad \text{or} \quad \frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$ ½

	$\frac{1}{v} = \frac{1}{+3{\cdot}00\ \text{m}} - \frac{1}{(-6{\cdot}00\ \text{m})}$ $= \frac{1}{+3{\cdot}00\ \text{m}} + \frac{1}{6{\cdot}00\ \text{m}} = \frac{2+1}{6\ \text{m}}$ or $v = \frac{6}{3} = 2{\cdot}0\ \text{m}$	½ ½ ½	5
	SECTION E		
37	(a) (III) /Tubewell water +Solution of Salt A (b)	1	
	(c) (i) • Esters are sweet smelling substances used in making perfumes and flavoring agents. / Formed when alcohol and carboxylic acid react in presence of acid to form ester. • It is converted back to alcohol and a salt of carboxylic acid. $CH_3COOC_2H_5 + NaOH \longrightarrow C_2H_5OH + CH_3COONa$	1 ½ ½	
	OR (c) (ii) • Presence of Ca and Mg salts in water • Scum • Soap reacts with calcium and magnesium salts to form insoluble substance.	½ ½ 1	4
38	(a) (i) Adrenaline **OR** (ii) Adrenal Gland (b) Heart beat becomes faster to supply more oxygen to the muscles / blood supply to the digestive system is reduced / blood supply to the skin is reduced / blood is diverted to the skeletal muscles / breathing rate increases/increased contractions of diaphragm and rib muscles.	2	

Salt A	Salt B
Soap	Detergent
Na/K salt of long chain carboxylic acids	sodium salt of sulphonic acids or ammonium salts with chloride or bromide ions.
Does not form lather with hard water	Forms lather even with hard water

(Any one)

	Electrical signal – travels through a nerve cell. **(Any other)**	1	4
39	(a) Graph A (b) Graph D, (c) (i)  $R = \frac{R_1 R_2}{R_1 + R_2} + R_3$ $R = \left(\frac{10 \times 10}{10 + 10} + 10\right)\Omega = 5\ \Omega + 10\ \Omega = 15\ \Omega$ **OR** (c) (ii) • $I = \frac{V}{R} = \frac{6\ V}{(0{\cdot}1 + 0{\cdot}2 + 0{\cdot}3 + 0{\cdot}4 + 0.5)\ \Omega} = \frac{6\ V}{1.5\ \Omega} = 4{\cdot}0\ A$ • same current flows when resistors are connected in series.	1 1 1 ½ ½ 1 1	4

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2025
SUBJECT NAME SCIENCE (Q.P. CODE 31/3/2)

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.
2	**"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."**
3	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 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.**
4	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.
5	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.
6	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. **This is most common mistake which evaluators are committing.**
7	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.
8	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 **"Extra Question"**.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

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	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 totaling of marks awarded on an answer. ● 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/not same. ● 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.
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 "**Guidelines for Spot Evaluation**" 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 totalled 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.

SECONDARY SCHOOL EXAMINATION, 2025

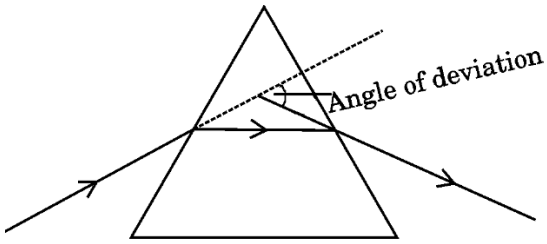
MARKING SCHEME

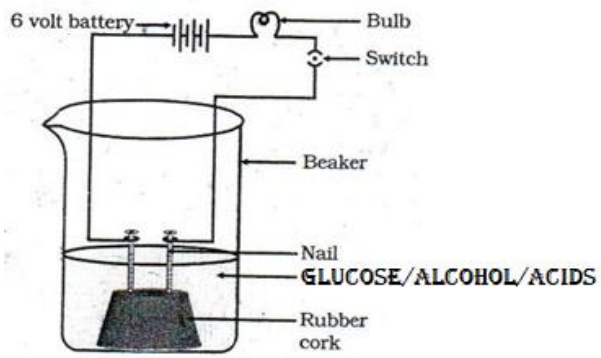
CLASS: X [SCIENCE (Subject Code–086)]

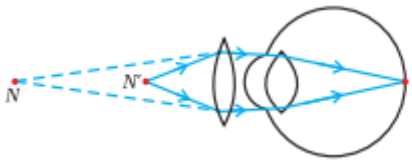
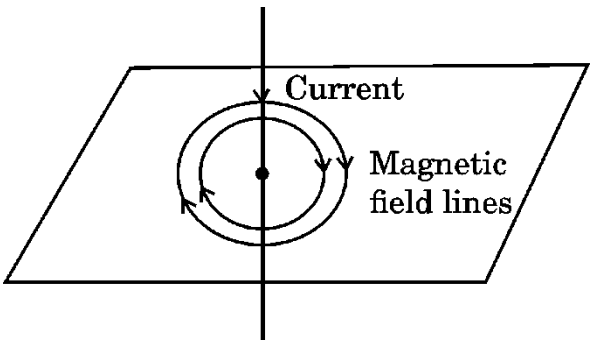
[Paper Code: 31/3/2]

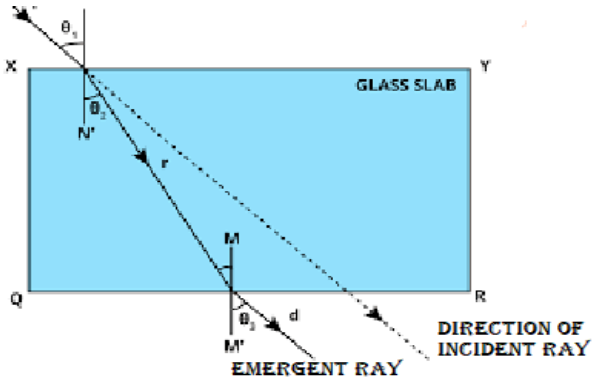
Maximum Marks: 80

Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(C)/(ii)and(iii)	1	1
2	(D) / It is an addition reaction which occurs in the presence of an acid catalyst	1	1
3	(C) / 2, 3, 1, 3	1	1
4	(C) / (i) and (iv)	1	1
5	(B) / $K_2SO_4, Na_2SO_4, CaSO_4$	1	1
6	(D) / a-(iii), b-(ii), c-(i), d-(iv)	1	1
7	(D) / Medulla	1	1
8	(B) /*Hibiscus* and mustard	1	1
9	(B) /Cytokinins	1	1
10	(B) /*Amoeba*	1	1
11	(C) / 9R	1	1
12	(D) /The direction of magnetic field lines inside a bar magnet is from its north pole to its south pole.	1	1
13	**NOTE: - Full credit of one mark to all the students.**	1	1
14	(C) /Blue	1	1
15	(C) /Direction of current flowing through the coil of the solenoid	1	1
16	(D) /(ii) and (iv)	1	1
17	(B) /Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
18	(A) /Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
19	(C) /Assertion (A) is true, but Reason (R) is false.	1	1
20	(B) /Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
	SECTION B		
21	(a) Heat,light,electricity $2\ AgBr(s) \xrightarrow{Sunlight} 2\ Ag(s) + Br_2(g)$ **(or any other example or statement)** **OR** (b) Observation: Water droplets on upper part of the test tube/Colour changes from green to white/White to brown on heating strongly/Pungent smell of burning Sulphur	1 1 ½	

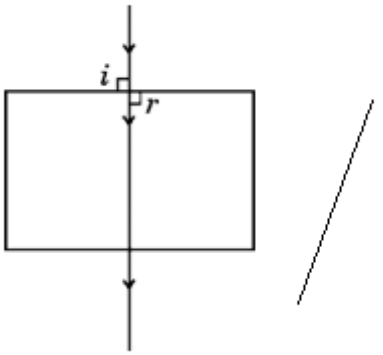
22	Baking powder contains mild edible acid like tartaric acid/liberates carbon dioxide easily/ neutralizes the sodium carbonate produced on heating baking soda/ removes the bitter taste / $NaHCO_3 + H^+ \rightarrow CO_2 + H_2O$ + Sodium salt of acid	2	2
23	• To carry oxygenated blood away from the heart to various organs of the body. • Because blood flows in Arteries under high pressure.	1 1	2
24	a) Plant height depends on the amount of plant hormone produced, synthesis of plant hormone depends on the efficiency of enzymes (proteins), whose synthesis depends upon the specific DNA sequence(gene). Lesser the hormone formed, shorter will be the height of the plant. (b) DNA/ Deoxyribonucleic acid/ Cellular DNA	½ x3 ½	2
25	(a) Hypermetropia /Farsightedness/Longsightedness. Reasons: (i) Focal length of the eye lens is too long (ii) Eyeball becomes too small. **Correction** Convex lens /Converging lens **OR** (b)  DIAGRAM DIRECTION OF RAYS MARKING OF ANGLE	½ ½ ½ ½ 1 ½ ½	2

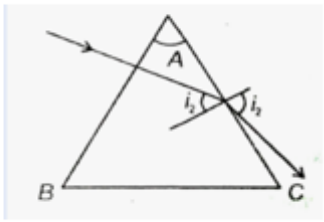
	$= (2A)^2 \times 40\ \Omega \times 300\ s$	1	
	$= 48000\ J$	½	2
	SECTION C		
27	In a double displacement reaction, an exchange of ions takes place between the reactants whereas in a displacement reaction a more reactive element displaces a less reactive element from its compound.	1	
	• $Na_2SO_4 + BaCl_2 \longrightarrow BaSO_4 + 2\,NaCl$ (Double displacement Reaction)	1	
	• $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$ (Displacement reaction) (Any other example)	1	3
28	(a) (i) Electricity is passed through an aqueous solution of NaCl (brine), it decomposes to form NaOH. / Chlor-Alkali Process	½	
	$2\,NaCl(aq) + 2\,H_2O \longrightarrow 2\,NaOH(aq) + Cl_2 + H_2$	1	
	(ii) When brine reacts with carbon dioxide and ammonia, sodium hydrogen carbonate and ammonium chloride are formed	½	
	$2\,NaCl + H_2O + CO_2 + NH_3 \longrightarrow NaHCO_3 + NH_4Cl$	1	
	(b) **OR**  Bulb does not glow when solution of alcohol and glucose are taken but glows when acidic solutions are taken. (Award marks if explained in words)	2	
	Reason:- Acidic solutions liberate ions but glucose and alcohol do not		

	(b) Glomerulus (c) (Kidney) → Ureter → Urinary bladder → (Urethra)	1 ½ x 2	3
30	(a) Round, yellow (b) round yellow : 9 round green : 3 wrinkled yellow : 3 wrinkled green : 1 (c) Traits are independently inherited/Independent assortment of the traits.	1 1 1	3
31	• Hypermetropia/ far-sightedness • (i) Focal length of the eye lens is too long (ii) Eye ball has become too small/shortened  • Convergent of light	½ ½x2 1 ½	3
32	*(a)* •  Diagram : 1 Labelling : 1 (b) Right hand thumb rule : Imagine that you are holding a current-carrying straight conductor in your right hand such that the thumb points	2 1	

33	(a) • The energy captured by plants does not revert to solar input and the energy which passes to the herbivores does not come back to autotrophs. • As energy moves progressively through the various trophic levels it is no longer available to the previous level. • The energy available at each trophic level gets diminished progressively due to loss of energy at each level. **(any two)** (b) 100 J • Autotrophs ⟶ Primary consumer ⟶ secondary consumer 10000 J (1000 J) (100 J) /Only 10% energy of the organic matter of previous trophic level is transferred to next trophic level. /10% law	1x2 ½ ½	3
	SECTION D		
34	(a) (i) The extent of bending of the ray of light at the opposite parallel faces of the rectangular glass slab is equal and opposite. This is why the ray emerges parallel to the incident ray.  	1 1	

NORMAL INCIDENCE





1

(ii)u = – 30 cm , f = – 20 cm

$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ or $\frac{1}{v} = \frac{1}{u} + \frac{1}{f}$ ½

$$\frac{1}{v} = \frac{1}{-30\ cm} + \frac{1}{-20\ cm}$$ ½

$$= \frac{1}{-12\ cm} \text{ or } V = -12\ cm$$ ½

The image is at – 12 cm behind the lens. ½

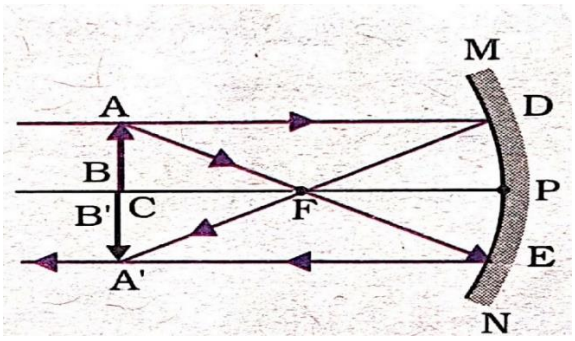
(b)

(i)

Type of Image

Real and Inverted (when candle is beyond F)/ Virtual and Erect (when candle is between P and F) 1

As the object is moved gradually away from the pole of the mirror, the image gets diminished 1



1

(ii) Object distance, u = – 6·00 m

Image distance, v = ?

Focal length, f = 3·00 m

	$\frac{1}{v} = \frac{1}{+3{\cdot}00\ \text{m}} - \frac{1}{(-6{\cdot}00\ \text{m})}$ $= \frac{1}{+3{\cdot}00\ \text{m}} + \frac{1}{6{\cdot}00\ \text{m}} = \frac{2+1}{6\ \text{m}}$ or $v = \frac{6}{3} = 2{\cdot}0\ \text{m}$	½ ½ ½	5
35	(a) (i) (I) Ag, (II) Al, (III) K, (IV) Cu	½ ½ ½ ½	
	(ii) Metal oxides which react with both acids as well as bases to produce salts and water are called amphoteric oxides.	1	
	$Al_2O_3 + 6\,HCl \longrightarrow 2\,AlCl_3 + 3\,H_2O$	½	
	$Al_2O_3 + 2\,NaOH \longrightarrow 2\,NaAlO_2 + H_2O$ (Do not deduct marks if equation is not balanced)	½	
	(iii) Water soluble bases are called Alkalis. NaOH/KOH Sodium Hydroxide / Potassium Hydroxide **(any one)**	½ ½	
	OR		
	(b) (i) (I) $2\,HgS(s) + 3\,O_2(g) \xrightarrow{Heat} 2\,HgO(s) + 2\,SO_2(s)$ (cinnabar)	1	
	$2\,HgO(s) \xrightarrow{Heat} 2\,Hg(l) + O_2(g)$	1	
	(II) $2\,CuS + 3\,O_2(g) \xrightarrow{Heat} 2\,Cu_2O(s) + 2\,SO_2(g)$	1	
	$2\,Cu_2O + Cu_2S \xrightarrow{Heat} 6\,Cu(s) + SO_2(g)$		

	(I) Silver sulphide /Ag_2S (II) Basic Copper carbonate/$Cu(OH)_2$. $CuCO_3$	½ ½	5
36	(a) (i) 'X' – Stigma 'Y' – Anther (ii) Pollen grains (iii) Pollination (iv) After the transfer of pollen grains from anther into stigma, a pollen tube grows out of the pollen grain and travels through the style to reach the ovary. Male germ cell fuses with the female germ cell to form a zygote which divides several times to form an embryo within the ovule. The ovule develops a tough coat and is gradually converted into a seed. OR (b) (i) Binary fission (ii) *Leishmania* (iii) Produces a greater number of offsprings within a short period of time /ensures better chances of survival of species within a population/ production of large no. of offsprings with similar genetic structure or clones /no need for both male and female parents for fertilization. (any two) (iv) Budding A bud develops as an outgrowth due to repeated cell division at a specific site, develop into tiny individuals, and after being matured, detach from parent body and become new independent individuals. **(or any other)**	½+½ 1 1 2 ½ ½ 1+1 1 1	5
	SECTION E		
37	(a) (III)/ Tubewell water+ Solution of Salt A (b)	1	

Salt A	Salt B
Soap	Detergent

		salts with chloride or bromide ions.		
	Does not form lather with hard water	Forms lather even with hard water	1	

(Any one)

(c) (i)

- Esters are sweet smelling substances used in making perfumes and flavoring agents. / Formed when alcohol and carboxylic acid in presence of acid to form ester. — 1
- It is converted back to alcohol and a salt of carboxylic acid. — ½

$CH_3COOC_2H_5 + NaOH \longrightarrow C_2H_5OH + CH_3COONa$ — ½

OR

(c) (ii)
- Presence of Ca and Mg salts in water — ½
- Scum — ½

Soap reacts with calcium and magnesium salts to form insoluble substance . — 1 — 4

38

(a)(i)Adrenaline — 2

OR

(ii)Adrenal Gland — 2

(b) Heart beat becomes faster / more supply of oxygen to the muscles / blood supply to the digestive system is reduced / blood supply to the skin is reduced / blood diverted to the skeletal muscles / breathing rate increases / increased alkalinity / increased sweating. — 1

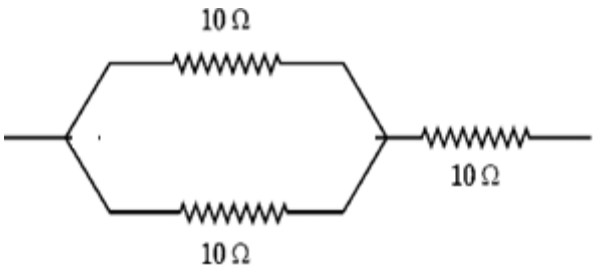
(Any two)

(c) Chemical signal – travel through bloodstream and reach a wide range of target cells across the body.
Electrical signal – travels through a nerve cell. (Any other) — 1 — 4

39

(a) Graph A — 1

(b) Graph D — 1

	(c) (i)  $R = \frac{R_1 R_2}{R_1 + R_2} + R_3$ $R = \left(\frac{10 \times 10}{10 + 10} + 10\right)\Omega = 5\ \Omega + 10\ \Omega = 15\ \Omega$ **OR** (c) (ii) • $I = \frac{V}{R} = \frac{6\ V}{(0{\cdot}1 + 0{\cdot}2 + 0{\cdot}3 + 0{\cdot}4 + 0.5)\ \Omega} = \frac{6\ V}{1.5\ \Omega} = 4{\cdot}0\ A$ • same current flows when resistors are connected in series.	1 ½ ½ 1 1	4

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2025
SUBJECT : SCIENCE (Q.P. CODE 31/3/3)

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.
2	**"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."**
3	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 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.**
4	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.
5	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.
6	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. **This is most common mistake which evaluators are committing.**
7	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.
8	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 **"Extra Question"**.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only

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	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 totaling of marks awarded on an answer. ● 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/not same. ● 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.
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 "**Guidelines for Spot Evaluation**" 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 totalled 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.

SECONDARY SCHOOL EXAMINATION, 2025

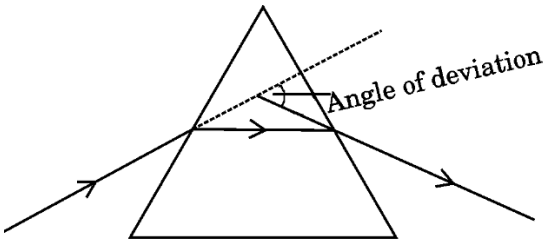
MARKING SCHEME

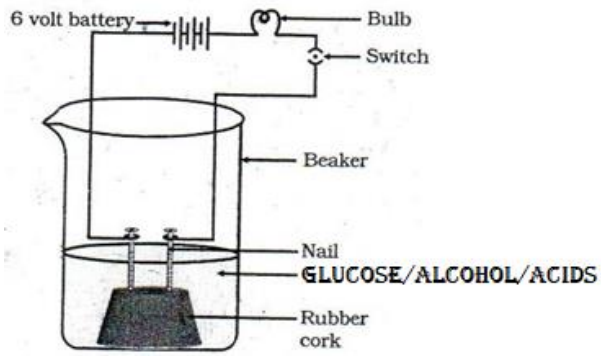
CLASS: X [SCIENCE (Subject Code–086)]

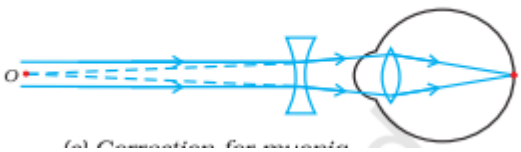
[Paper Code:30/3/3]

Maximum Marks: 80

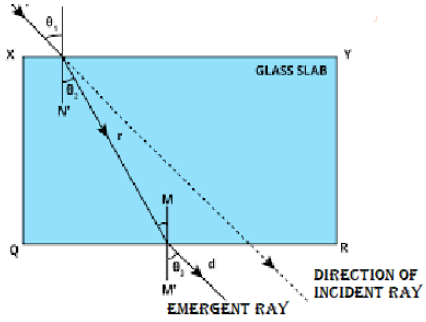
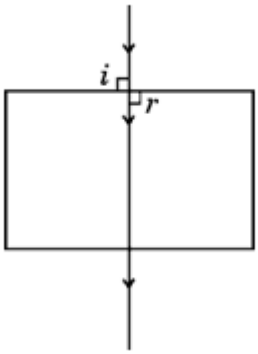
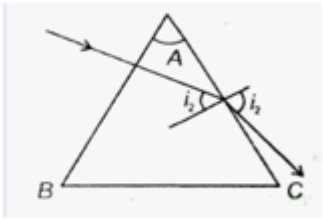
Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(A) / Reduction with carbon	1	1
2	(C) / 2, 3, 1, 3	1	1
3	(C) /(ii) and (iii)	1	1
4	(D) / It is an addition reaction which occurs in the presence of an acid catalyst.	1	1
5	(B) / $K_2SO_4, Na_2SO_4, CaSO_4$	1	1
6	(B) / *Hibiscus* and mustard	1	1
7	(D) / Chemotropism	1	1
8	(D) / a-(iii), b-(ii), c-(i), d-(iv)	1	1
9	(B) / Cytokinins	1	1
10	(C) / *Cuscuta*	1	1
11	(D) / Behind the mirror at a distance $\frac{f}{2}$	1	1
12	(C) / When sunlight passes through the fine particles in air, they scatter the blue colour of visible light more strongly than red.	1	1
13	(B) / Red for live wire, black for neutral wire and green for earth wire	1	1
14	(D) / Radius of the coil of the solenoid	1	1
15	(D) /The direction of magnetic field lines inside a bar magnet is from its north pole to its south pole.	1	1
16	(D) /(ii) and (iv)	1	1
17	(D)/ Assertion (A) is false, but Reason (R) is true.	1	1
18	(A) /Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
19	(B) / Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
20	(B) / Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
	SECTION B		
21	(a)Heat, light, electricity $2\,AgBr(s) \xrightarrow{Sunlight} 2\,Ag(s) + Br_2(g)$ (or any other example or statement) **OR** (b) Observation: Water droplets on upper part of the test tube/Colour changes from green to white/White to brown on heating strongly/Pungent smell of burning Sulphur.	1 1 ½	

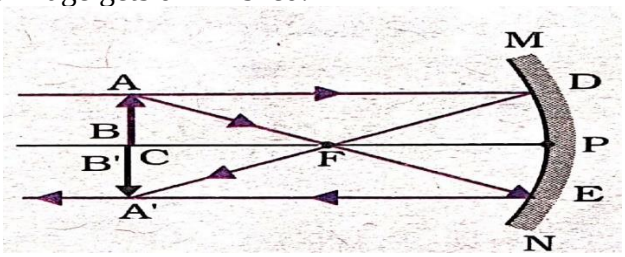
22	• Bleaching powder/Calcium oxychloride • $CaOCl_2$ • By the action of chlorine on dry slaked lime. • $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$	½ ½ ½ ½	2
23	• Veins carry deoxygenated blood from different organs and bring it back to the heart. • Because blood flows at low pressure inside veins.	1 1	2
24	Males have sex chromosomes XY while females have XX. If the male gamete with X chromosome fuses with the female gamete, then the offspring will be a female child and if the male gamete with Y chromosome fuses with the female gamete, then the offspring will be a male child. Hence, the sex of a child/ children will be determined by the chromosome inherited from the father. (Award marks if flow chart is drawn)	2	2
25	(a) Hypermetropia /Farsightedness/Longsightedness. Reasons: (i) Focal length of the eye lens is too long (ii) Eyeball becomes too small. Correction Convex lens /Converging lens **OR** (b)  DIAGRAM DIRECTION OF RAYS MARKING OF ANGLE	½ ½ ½ ½ 1 ½ ½	2
26	Between A and B, 3 resistors in series = AD + DC + CB in one branch Equivalent resistance, $R_S = 2\ \Omega + 2\ \Omega + 2\ \Omega = 6\ \Omega$ Now one resistor in arm AD is in parallel combination with the other three. Two branches:	½	

	$\therefore \frac{1}{R_p} = \frac{1}{6} + \frac{1}{2} = \frac{1+3}{6} = \frac{4}{6}$ $R_p = \frac{6}{4} = 1{\cdot}5\ \Omega$	½ ½	2
	SECTION C		
27	• Reddish brown to black • Oxidation/Redox reaction • $2\,Cu + O_2 \xrightarrow{Heat} 2\,CuO$ • Corrosion occurs in open air whereas oxidation occurs on heating. • Basic copper carbonate / $Cu(OH)_2.CuCO_3$ • Green	½ ½ ½ ½ ½ ½	3
28	(a)(i) Electricity is passed through an aqueous solution of NaCl (brine), it decomposes to form NaOH. / Chlor-Alkali Process $2\,NaCl(aq) + 2\,H_2O \longrightarrow 2\,NaOH(aq) + Cl_2 + H_2$ (ii)When brine reacts with carbon dioxide and ammonia, sodium hydrogen carbonate and ammonium chloride are formed $2\,NaCl + H_2O + CO_2 + NH_3 \longrightarrow NaHCO_3 + NH_4Cl$ (b) **OR**  Bulb does not glow when solution of alcohol and glucose are taken but glows when acidic solution are taken. (Award marks if explained in words) **Reason:-** Acidic solutions liberate ions but glucose and alcohol do not liberate ions .Hence bulb only glows for acidic solutions..	½ 1 ½ 1 2 1	

29	• Blood flows twice in the heart before it completes one complete round of the body. Lungs → Pulmonary vein → Left atrium → Left Ventricle ↑ Right Ventricle (Oxygenated Blood) ↓ ↑ Right Atrium ↑ Vena cava ← Veins ← Body Parts ← Aorta (Deoxygenated blood)	1 2	3
30	(a)Round, yellow (b) round yellow : 9 round green : 3 wrinkled yellow : 3 wrinkled green : 1 (c)Traits are inherited independently/Independent assortment of the traits.	1 1 1	3
31	• Myopia /Shortsightedness Causes : (i) Excessive curvature of the eye lens (ii) Elongation of the eye ball • Diverging lens/concave lens • 	½ ½ ½ ½ 1	3
32	(a) Fleming's Left hand rule Statement : Stretch the thumb, fore figure and the middle figure of your left hand such that they are mutually perpendicular. If the first finger points in the direction of field (F) and the second finger in the direction of current, then the thumb will point in the direction of the force acting	½ ½	

	(ii) Minimum in Case I – Magnetic field and current/motion of charge are parallel to each other.	½ ½	3
33	(a) • The energy captured by plants does not revert to solar input and the energy which passes to the herbivores does not come back to autotrophs. • As energy moves progressively through the various trophic levels it is no longer available to the previous level. • The energy available at each trophic level gets diminished progressively due to loss of energy at each level. **(ANY TWO)** (b) 100 J • Autotrophs ⟶ Primary consumer ⟶ Secondary Consumer 10000 J (1000 J) (100 J) /Only 10% energy of the organic matter of previous trophic level is transferred to next trophic level. /10% law	1x2 ½ ½	3
	SECTION D		
34	(a) (i) (I) Ag, (II) Al, (III) K, (IV) Cu (ii) Metal oxides which react with both acids as well as bases to produce salts and water are called amphoteric oxides. $Al_2O_3 + 6\,HCl \longrightarrow 2\,AlCl_3 + 3\,H_2O$ $Al_2O_3 + 2\,NaOH \longrightarrow 2\,NaAlO_2 + H_2O$ (Do not deduct marks if equation is not balanced) (iii) Water soluble bases are called Alkalis. NaOH / KOH (Sodium Hydroxide) / (Potassium Hydroxide) **(any one)** OR (b) (i) (I) $2\,HgS(s) + 3\,O_2(g) \xrightarrow{Heat} 2\,HgO(s) + 2\,SO_2(s)$ (cinnabar) $2\,HgO(s) \xrightarrow{Heat} 2\,Hg(l) + O_2(g)$	½ ½ ½ ½ 1 ½ ½ ½ ½ 1 1	

	$2\,Cu_2O + Cu_2S \xrightarrow{Heat} 6\,Cu(s) + SO_2(g)$ (Deduct half mark each for unbalanced equation) (ii) (I) Silver sulphide /Ag_2S (II) Basic Copper carbonate/$Cu(OH)_2$. $CuCO_3$	1 ½ ½	5
35	(a) (i) The extent of bending of the ray of light at the opposite parallel faces of the rectangular glass slab is equal and opposite. This is why the ray emerges parallel to the incident ray.  NORMAL INCIDENCE   	1 1 1	
	(ii) u = – 30 cm , f = – 20 cm $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ or $\frac{1}{v} = \frac{1}{u} + \frac{1}{f}$ $\frac{1}{v} = \frac{1}{-30\text{ cm}} + \frac{1}{-20\text{ cm}}$ $= \frac{1}{-12\text{ cm}}$ or v= – 12 cm The image is at – 12 cm on the same side of the lens.	½ ½ 1	
	OR		
	(b)		

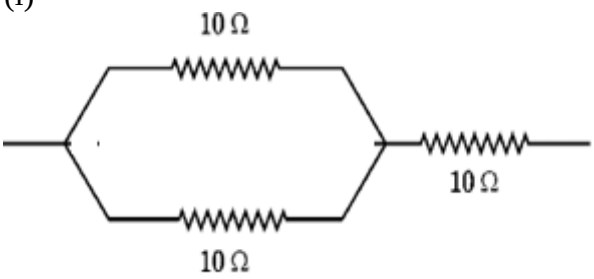
	As the object is moved gradually away from the pole of the mirror, the image gets diminished.  	1 1	
	(ii) Object distance, u = – 6·00 m Image distance, v = ? Focal length, f = 3·00 m $\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$ or $\frac{1}{v}=\frac{1}{f}-\frac{1}{u}$ $\frac{1}{v}=\frac{1}{+3\cdot00\ m}-\frac{1}{(-6\cdot00\ m)}$ $=\frac{1}{+3\cdot00\ m}+\frac{1}{6\cdot00\ m}=\frac{2+1}{6\ m}$ or $v=\frac{6}{3}=2\cdot0\ m$	½ ½ ½ ½	5
36	(a) (i) 'X' – Stigma 'Y' – Anther (ii) Pollen grains (iii) Pollination (iv)After the transfer of pollen grains from anther into stigma, a pollen tube grows out of the pollen grain and travels through the style to reach the ovary. Male germ cell fuses with the female germ cell to form a zygote which divides several times to form an embryo within the ovule. The ovule develops a tough coat and is gradually converted into a seed. **OR** (b) (i)Binary fission (ii) *Leishmania* (iii) Produces a greater number offsprings within a short period of time /Ensures better chances of survival of organisms in unfavorable conditions/ formation of genetically similar organisms /gamete formation is not required. **(any two)** (iv) Budding A bud develops as an outgrowth due to repeated cell division at on specific site, develop into tiny individuals,	½+ ½ 1 1 2 ½ ½ 1+1 1	

SECTION E

37 (a) Graph A — 1

(b) Graph D — 1

(c) (i)



1

$$R = \frac{R_1 R_2}{R_1 + R_2} + R_3$$ — ½

$$R = \left(\frac{10 \times 10}{10 + 10} + 10\right)\Omega = 5\ \Omega + 10\ \Omega = 15\ \Omega$$ — ½

OR

(c)

(ii) • $I = \frac{V}{R} = \frac{6\ V}{(0{\cdot}1 + 0{\cdot}2 + 0{\cdot}3 + 0{\cdot}4 + 0.5)\ \Omega} = \frac{6\ V}{1.5\ \Omega} =$ 4·0A — 1

•same current flows when resistors are connected in series. — 1

4

38 (a) (III)/ Tubewell water+ Solution of Salt A — 1

(b)

Salt A	Salt B
Soap	Detergent
Na/K salt of long chain carboxylic acids	sodium salt of sulphonic acids or ammonium salts with chloride or bromide ions.
Does not form lather with hard water	Forms lather even with hard water

1

(Any one)

(c)(i)

- Esters are sweet smelling substances used in making perfumes and flavoring agents. / Formed when alcohol and carboxylic acid in presence of acid to form ester. — 1
- It is converted back to alcohol and a salt of carboxylic acid. — ½

$CH_3COOC_2H_5 + NaOH \longrightarrow C_2H_5OH + CH_3COONa$ — ½

	•Scum Soap reacts with calcium and magnesium salts to form Insoluble substance.	½ 1	 4
39	(a)(i) Adrenaline **OR** (ii) Adrenal Gland (b) Heart beat becomes faster to supply more oxygen to the muscles / blood supply to the digestive system is reduced / blood supply to the skin is reduced / blood is diverted to the skeletal muscles / breathing rate increases/increased contractions of diaphragm and rib muscles. (**Any two)** (c)Chemical signal – travel through bloodstream and reach a wide range of target cells across the body. Electrical signal – travels through a nerve cell. (**Any other)**	2 2 1 1	 4