Series CABD5/5

Set-1

प्रश्न-पत्र कोड
Q.P. Code **31/5/1**

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.

विज्ञान
SCIENCE

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

	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)	कृपया जाँच कर लें कि इस प्रश्न-पत्र में **39** प्रश्न हैं ।	(II)	Please check that this question paper contains **39** questions.
(III)	प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।	(III)	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.
(IV)	**कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।**	(IV)	**Please write down the serial number of the question in the answer-book 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 छात्र 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 students will read the question paper only and will not write any answer on the answer-book during this period.

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 प्रश्नों में दिए गए चार विकल्पों में से सबसे उचित विकल्प चुनिए और लिखिए ।* *20×1=20*

1. निम्नलिखित रासायनिक समीकरण को संतुलित करने के लिए गुणांकों x, y और z के मान क्रमश: होने चाहिए :

$$x\ Zn(NO_3)_2 \xrightarrow{\Delta} y\ ZnO + z\ NO_2 + O_2$$

(A) 4, 2, 2 (B) 4, 4, 2

(C) 2, 2, 4 (D) 2, 4, 2

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**.* *20×1=20*

1. To balance the following chemical equation, the values of the coefficients x, y and z must be respectively :

$$x\ Zn(NO_3)_2 \xrightarrow{\Delta} y\ ZnO + z\ NO_2 + O_2$$

(A) 4, 2, 2 (B) 4, 4, 2

(C) 2, 2, 4 (D) 2, 4, 2

2. निम्नलिखित में से कौन-सी अभिक्रिया रेडॉक्स अभिक्रिया तो है, परन्तु संयोजन अभिक्रिया *नहीं* है ?

(A) $C + O_2 \rightarrow CO_2$ (B) $2\ H_2 + O_2 \rightarrow 2\ H_2O$

(C) $2\ Mg + O_2 \rightarrow 2\ MgO$ (D) $Fe_2O_3 + 3\ CO \rightarrow 2\ Fe + 3\ CO_2$

3. दाँतों के इनैमल (दन्तवल्क) में उपस्थित लवण है :

(A) कैल्सियम फॉस्फेट (B) मैग्नीशियम फॉस्फेट

(C) सोडियम फॉस्फेट (D) ऐलुमिनियम फॉस्फेट

4. सोडियम क्लोराइड का जलीय विलयन आसुत जल में बनाया गया है । इस विलयन का pH है :

(A) 6 (B) 8

(C) 7 (D) 3

5. किसी धातु 'X' का उपयोग थर्मिट प्रक्रम में किया जाता है । जब 'X' को ऑक्सीजन के साथ गर्म किया जाता है, तो यह कोई ऑक्साइड 'Y' देता है, जिसकी प्रकृति उभयधर्मी है । 'X' और 'Y' क्रमश: हैं :

(A) Mn, MnO_2 (B) Al, Al_2O_3

(C) Fe, Fe_2O_3 (D) Mg, MgO

6. वह प्रक्रिया जिसमें पादपों में प्रकाश-संश्लेषण के घुलनशील (विलेय) उत्पादों का वहन (परिवहन) होता है, कहलाती है :

(A) वाष्पोत्सर्जन (B) वाष्पन

(C) चालन (D) स्थानान्तरण

7. अनजाने में किसी गर्म वस्तु को हाथ से छूने पर होने वाली घटनाओं का सही क्रम है :

(A) त्वचा में ग्राही → प्रेरक तंत्रिका कोशिका → प्रतिसारण तंत्रिका कोशिका → संवेदी तंत्रिका कोशिका → हाथ में प्रभावक (कार्यकर) पेशी

(B) त्वचा में ग्राही → प्रतिसारण तंत्रिका कोशिका → संवेदी तंत्रिका कोशिका → प्रेरक तंत्रिका कोशिका → हाथ में प्रभावक (कार्यकर) पेशी

(C) त्वचा में ग्राही → संवेदी तंत्रिका कोशिका → प्रतिसारण तंत्रिका कोशिका → प्रेरक तंत्रिका कोशिका → हाथ में प्रभावक (कार्यकर) पेशी

(D) त्वचा में ग्राही → संवेदी तंत्रिका कोशिका → हाथ में प्रभावक (कार्यकर) पेशी → प्रेरक तंत्रिका कोशिका → प्रतिसारण तंत्रिका कोशिका

2. Which of the following is a redox reaction, but ***not*** a combination reaction ?

(A) $C + O_2 \rightarrow CO_2$ (B) $2\ H_2 + O_2 \rightarrow 2\ H_2O$

(C) $2\ Mg + O_2 \rightarrow 2\ MgO$ (D) $Fe_2O_3 + 3\ CO \rightarrow 2\ Fe + 3\ CO_2$

3. The salt present in tooth enamel is :

(A) Calcium phosphate (B) Magnesium phosphate

(C) Sodium phosphate (D) Aluminium phosphate

4. An aqueous solution of sodium chloride is prepared in distilled water. The pH of this solution is :

(A) 6 (B) 8

(C) 7 (D) 3

5. A metal 'X' is used in thermit process. When 'X' is heated with oxygen, it gives an oxide 'Y', which is amphoteric in nature. 'X' and 'Y' respectively are :

(A) Mn, MnO_2 (B) Al, Al_2O_3

(C) Fe, Fe_2O_3 (D) Mg, MgO

6. The process in which transport of soluble products of photosynthesis takes place in plants is known as :

(A) Transpiration (B) Evaporation

(C) Conduction (D) Translocation

7. The correct sequence of events when someone's hand touches a hot object unconsciously :

(A) Receptors in skin → Motor neuron → Relay neuron → Sensory neuron → Effector muscle in arm

(B) Receptors in skin → Relay neuron → Sensory neuron → Motor neuron → Effector muscle in arm

(C) Receptors in skin → Sensory neuron → Relay neuron → Motor neuron → Effector muscle in arm

(D) Receptors in skin → Sensory neuron → Effector muscle in arm → Motor neuron → Relay neuron

8. वह ज्ञानेन्द्री (संवेदी अंग) जिसमें घ्राणग्राही उपस्थित होते हैं, कौन-सी है ?

(A) नाक

(B) त्वचा

(C) जिह्वा (जीभ)

(D) आन्तरिक कर्ण (कान)

9. प्लैसेन्टा के बारे में ***असत्य*** कथन है :

(A) यह एक तश्तरी (डिस्क) है जो गर्भाशय की भित्ति में धँसी होती है ।

(B) इसमें भ्रूण की ओर के ऊतक में प्रवर्ध होते हैं ।

(C) यह माता से भ्रूण को ग्लूकोज और ऑक्सीजन के स्थानान्तरण के लिए एक बहुत छोटा पृष्ठीय क्षेत्र प्रदान करता है ।

(D) इससे होकर भ्रूण माता के रुधिर से पोषण प्राप्त करता है ।

10. निम्नलिखित में से डबल रोटी (ब्रेड) के टुकड़े पर ब्रेड-फफूँदी के तीव्रता से फैलने के लिए उत्तरदायी परिस्थितियाँ चुनिए :

(i) अधिक संख्या में बीजाणुओं का बनना

(ii) ब्रेड में नमी और पोषकों की उपस्थिति

(iii) निम्न ताप

(iv) कवक तंतु की उपस्थिति

(A) (i) और (ii)

(B) (ii) और (iv)

(C) (ii) और (iii)

(D) (iii) और (iv)

11. यदि किसी उत्तल लेंस के ऊपरी आधे भाग को काले कागज़ से ढक दिया जाए, तो उस लेंस द्वारा बने प्रतिबिम्ब पर क्या प्रभाव पड़ेगा ?

(A) पूरे लेंस द्वारा बने प्रतिबिम्ब के साइज़ की तुलना में प्रतिबिम्ब का साइज़ आधा होगा ।

(B) बिम्ब के ऊपरी आधे भाग का प्रतिबिम्ब नहीं बनेगा ।

(C) प्रतिबिम्ब की चमक कम हो जाएगी ।

(D) उल्टे प्रतिबिम्ब का निचला आधा भाग नहीं बनेगा ।

8. Sense organ in which olfactory receptors are present is :

(A) Nose

(B) Skin

(C) Tongue

(D) Inner ear

9. The ***incorrect*** statement about placenta is :

(A) It is a disc embedded in the uterine wall.

(B) It contains villi on the embryo's side of the tissue.

(C) It has a very small surface area for glucose and oxygen to pass from mother to the embryo.

(D) The embryo gets nutrition from the mother's blood through it.

10. Select from the following the conditions responsible for the rapid spread of bread mould on a slice of bread :

(i) Formation of large number of spores

(ii) Presence of moisture and nutrients in bread

(iii) Low temperature

(iv) Presence of hyphae

(A) (i) and (ii)

(B) (ii) and (iv)

(C) (ii) and (iii)

(D) (iii) and (iv)

11. How will the image formed by a convex lens be affected, if the upper half of the lens is wrapped with a black paper ?

(A) The size of the image formed will be one-half of the size of the image due to complete lens.

(B) The image of upper half of the object will not be formed.

(C) The brightness of the image will reduce.

(D) The lower half of the inverted image will not be formed.

12. इन्द्रधनुष के बनने में सम्मिलित प्रकाश की परिघटनाएँ हैं :

(A) अपवर्तन, परावर्तन और परिक्षेपण (विक्षेपण)

(B) अपवर्तन, परिक्षेपण (विक्षेपण) और आन्तरिक परावर्तन

(C) परावर्तन, परिक्षेपण (विक्षेपण) और आन्तरिक परावर्तन

(D) अपवर्तन, परिक्षेपण (विक्षेपण), प्रकीर्णन और पूर्ण आन्तरिक परावर्तन

13. प्रकाश के किस वर्ण (रंग) के लिए काँच का अपवर्तनांक सबसे कम है ?

(A) लाल (B) पीला

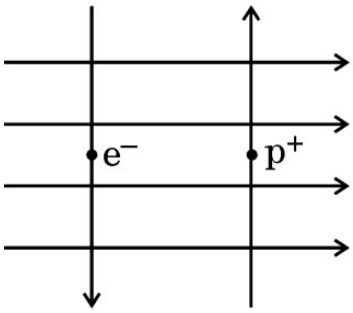
(C) हरा (D) बैंगनी

14. दंड चुम्बक के समान चुम्बकीय क्षेत्र उत्पन्न करने वाली धारावाही युक्ति है :

(A) सीधा चालक (B) वृत्ताकार पाश

(C) परिनालिका (D) वृत्ताकार कुण्डली

15.



एकसमान चुम्बकीय क्षेत्र

आरेख में दर्शाए अनुसार कागज़ के तल में कोई एकसमान चुम्बकीय क्षेत्र उपस्थित है । इस क्षेत्र में, कोई इलेक्ट्रॉन (e^-) और कोई पॉज़िट्रॉन (p^+) दर्शाए अनुसार प्रवेश करते हैं । इलेक्ट्रॉन तथा पॉज़िट्रॉन पर लगने वाले बलों की दिशा होगी :

(A) दोनों पर कागज़ के तल के भीतर की ओर ।

(B) दोनों पर कागज़ के तल के बाहर की ओर ।

(C) क्रमश: कागज़ के तल के भीतर की ओर तथा कागज़ के तल के बाहर की ओर ।

(D) क्रमश: कागज़ के तल के बाहर की ओर तथा कागज़ के तल के भीतर की ओर ।

16. निम्नलिखित में से कौन-सा प्राकृतिक पारितंत्र ***नहीं*** है ?

(A) तालाब पारितंत्र (B) घास का मैदान पारितंत्र

(C) वन (जंगल) पारितंत्र (D) फ़सल भूमि पारितंत्र

12. The phenomena of light involved in the formation of rainbow are :

(A) Refraction, reflection and dispersion

(B) Refraction, dispersion and internal reflection

(C) Reflection, dispersion and internal reflection

(D) Refraction, dispersion, scattering and total internal reflection

13. The colour of light for which the refractive index of glass is minimum, is :

(A) Red (B) Yellow

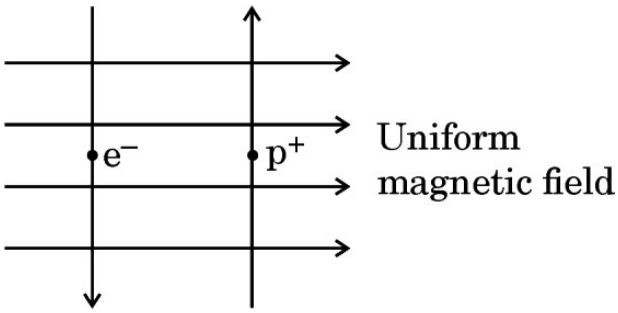
(C) Green (D) Violet

14. The current carrying device which produces a magnetic field similar to that of a bar magnet is :

(A) A straight conductor (B) A circular loop

(C) A solenoid (D) A circular coil

15.



A uniform magnetic field exists in the plane of paper as shown in the diagram. In this field, an electron (e^-) and a positron (p^+) enter as shown. The electron and positron experience forces :

(A) both pointing into the plane of the paper.

(B) both pointing out of the plane of the paper.

(C) pointing into the plane of the paper and out of the plane of the paper respectively.

(D) pointing out of the plane of the paper and into the plane of the paper respectively.

16. Which one of the following is ***not*** a natural ecosystem ?

(A) Pond ecosystem (B) Grassland ecosystem

(C) Forest ecosystem (D) Cropland ecosystem

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) :* कुछ वनस्पति तेल स्वास्थ्यवर्धक होते हैं ।

कारण (R) : सामान्यत: वनस्पति तेलों में लम्बी असंतृप्त कार्बन शृंखलाएँ होती हैं ।

18. *अभिकथन (A) :* बच्चों का लिंग इस बात से निर्धारित होता है कि वह अपनी माता से क्या वंशानुगत करते हैं ।

कारण (R) : महिलाओं में XX लिंग गुणसूत्र होते हैं ।

19. *अभिकथन (A) :* किसी चालक में इलेक्ट्रॉन कम विभव से अधिक विभव की ओर गति करते हैं ।

कारण (R) : कोई शुष्क सेल किसी चालक के सिरों पर विद्युत विभवान्तर बनाए रखता है ।

20. *अभिकथन (A) :* ओज़ोन परत पृथ्वी के पृष्ठ को हानिकारक पराबैंगनी विकिरणों से सुरक्षा प्रदान करती है ।

कारण (R) : क्लोरोफ्लुओरोकार्बन (CFCs) ओज़ोन परत के क्षय के लिए उत्तरदायी होते हैं ।

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 the Assertion (A).

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

Reason (R) : Vegetable oils generally have long unsaturated carbon chains.

18. *Assertion (A) :* Sex of the children will be determined by what they inherit from their mother.

Reason (R) : Women have XX sex chromosomes.

19. *Assertion (A) :* Electrons move from lower potential to higher potential in a conductor.

Reason (R) : A dry cell maintains electric potential difference across the ends of a conductor.

20. *Assertion (A) :* Ozone layer protects the surface of the Earth from harmful UV radiations.

Reason (R) : Chlorofluorocarbons (CFCs) are responsible for depletion of ozone layer.

खण्ड ख

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

21. (a) किसी चायना डिश में कॉपर चूर्ण लेकर उसे बर्नर से गर्म किया गया है । बनने वाले उत्पाद के नाम और उसके रंग का उल्लेख कीजिए । होने वाली अभिक्रिया का रासायनिक समीकरण लिखिए । *2*

अथवा

(b) बेरियम क्लोराइड और सोडियम सल्फेट के जलीय विलयनों के बीच होने वाली रासायनिक अभिक्रिया का रासायनिक समीकरण लिखिए । इस अभिक्रिया में अवक्षेपित होने वाले यौगिक में उपस्थित आयनों के प्रतीक लिखिए । *2*

22. कार्बन के यौगिकों के गलनांक और क्वथनांक सामान्यत: निम्न होते हैं और उनमें अधिकांश विद्युत के कुचालक होते हैं । इन दो गुणों के आधार पर दो निष्कर्षों का उल्लेख कीजिए । *2*

23. (a) कभी-कभी दौड़ते समय, खिलाड़ियों की पेशियों में ऐंठन (क्रैम्प) हो जाती है । ऐसा क्यों होता है ? इस प्रकरण में होने वाला श्वसन वायवीय श्वसन से किस प्रकार भिन्न होता है ? *2*

अथवा

(b) लसीका का अन्य नाम लिखिए । इसके दो कार्यों का उल्लेख कीजिए । *2*

24. कुछ एककोशिकीय जीव जैसे प्लैज़्मोडियम और लेस्मानिया की जनन की विधियों में अन्तर होता है । इनमें होने वाली जनन प्रक्रियाओं के नाम लिखिए और उनकी व्याख्या कीजिए । *2*

25. किसी उत्तल लेंस द्वारा सूर्य के प्रकाश को किसी बिन्दु पर केन्द्रित करने के कारण उत्पन्न ऊष्मा से कागज़ जल जाता है ।

(a) व्याख्या कीजिए ऐसा क्यों होता है ।

(b) जिस बिन्दु पर कागज़ जलना शुरू होता है (उपयोग किए गए लेंस के संदर्भ में) उस बिन्दु (पद) का नाम लिखिए । कागज़ पर बना यह चमकदार बिन्दु (स्पॉट) किसका निरूपण करता है ? *2*

26. कोई विद्युत स्रोत 500 कूलॉम आवेश की आपूर्ति कर सकता है । यदि कोई युक्ति 25 mA धारा लेती है, तो ज्ञात कीजिए कि यह विद्युत स्रोत कितने समय में पूर्ण रूप से अनावेशित (डिस्चार्ज) हो जाएगा । *2*

SECTION B

Questions no. ***21*** *to* ***26*** *are very short answer type questions.*

21. (a) Copper powder is taken in a china dish and heated over a burner. Name the product formed and state its colour. Write the chemical equation for the reaction involved. *2*

OR

(b) Write chemical equation for the chemical reaction which occurs when the aqueous solutions of barium chloride and sodium sulphate react together. Write the symbols of the ions present in the compound precipitated in the reaction. *2*

22. The melting and boiling points of carbon compounds are generally low and they are largely non-conductors of electricity. State two conclusions based on these two properties. *2*

23. (a) Sometimes while running, the athletes suffer from muscle cramps. Why ? How is the respiration in this case different from aerobic respiration ? *2*

OR

(b) Write the other name given to lymph. State its two functions. *2*

24. Some unicellular organisms such as Plasmodium and Leishmania differ in the manner in which they reproduce. Name and explain the reproductive process taking place in them. *2*

25. The heat produced at a point due to concentration of sunlight by a convex lens burns a paper.

(a) Explain why it happens.

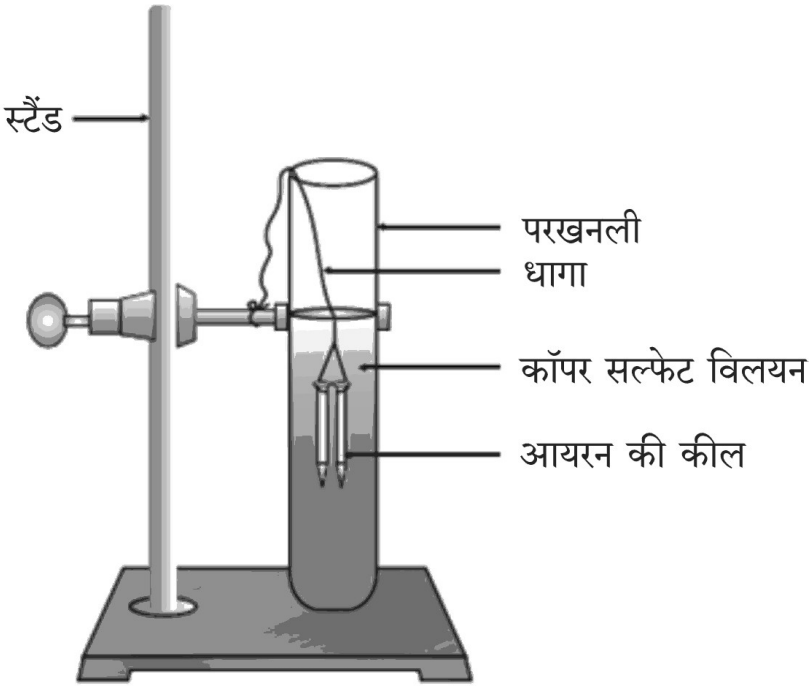
(b) Name the term (in the context of the lens used) given to the point at which the paper starts burning. What does the bright spot formed on the paper represent ? *2*

26. An electric source can supply a charge of 500 coulomb. If the current drawn by a device is 25 mA, find the time in which the electric source will be discharged completely. *2*

खण्ड ग

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

27.



आरेख में दर्शाई गई प्रायोगिक व्यवस्था का अध्ययन करके होने वाली रासायनिक अभिक्रिया का रासायनिक समीकरण लिखिए । इस अभिक्रिया के प्रकार का नाम और इसकी परिभाषा लिखिए । आयरन के स्थान पर ऐसी दो अन्य धातुओं के नाम लिखिए जिनका उपयोग कॉपर सल्फेट विलयन के साथ इसी प्रकार की अभिक्रिया को दर्शाने के लिए किया जा सकता है । *3*

28. मर्करी के अयस्क का नाम लिखिए । यह प्रकृति में जिस रूप में पाया जाता है उसका उल्लेख कीजिए । मर्करी को अपने अयस्क से निष्कर्षित करने में होने वाली अभिक्रियाओं के रासायनिक समीकरण परिस्थिति को दर्शाते हुए लिखिए । *3*

29. किन्हीं दो जन्तु हॉर्मोनों और उनको स्रावित करने वाली ग्रंथियों का उदाहरण लेते हुए व्याख्या कीजिए कि यह हॉर्मोन शरीर में (i) वृद्धि और विकास तथा (ii) उपापचय का नियमन करने में किस प्रकार सहायता करते हैं । *3*

30. मेंडल ने शुद्ध मटर के लम्बे पौधों (TT) और शुद्ध मटर के बौने पौधों (tt) का संकरण कराकर F_1 संतति के पौधे प्राप्त किए । जब F_1 संतति के पौधों का स्व-परागण कराया गया, तो F_2 संतति के पौधे प्राप्त हुए ।

(a) F_1 संतति के पौधे किस प्रकार के दिखते थे ? उनका जीन संयोजन लिखिए ।

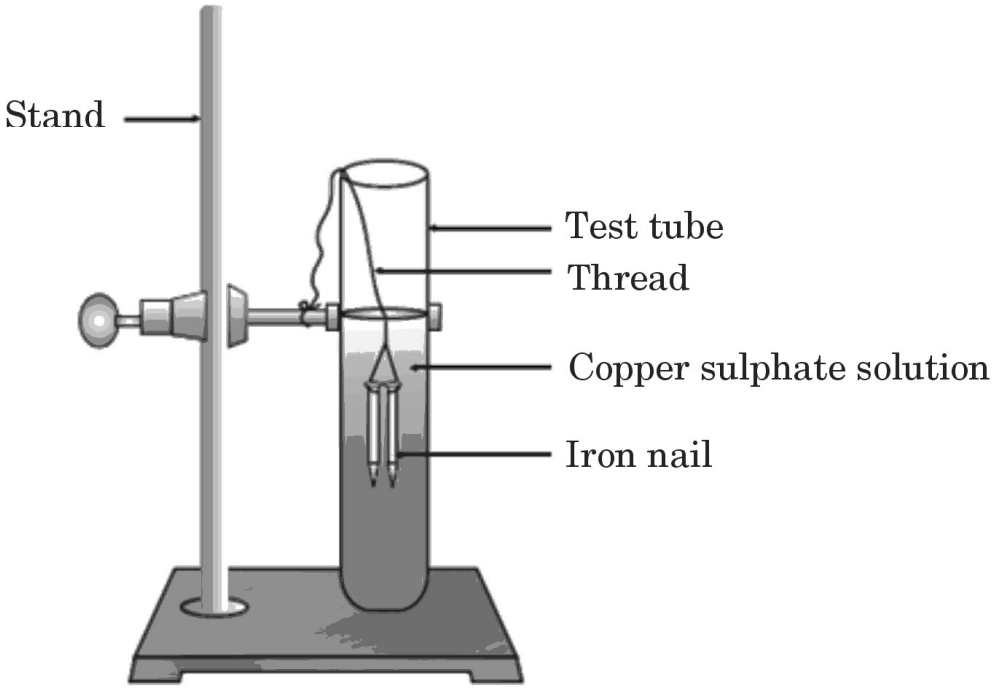
(b) F_1 संतति के पौधों में बौनेपन के जीन क्यों व्यक्त नहीं हुए ?

(c) F_2 संतति में प्राप्त पौधों का अनुपात लिखिए और इस प्रयोग के निष्कर्ष का उल्लेख कीजिए । *3*

SECTION C

Questions no. ***27*** *to* ***33*** *are short answer type questions.*

27.



Study the experimental set-up shown in the diagram and write chemical equation for the chemical reaction involved. Name and define the type of reaction. List two other metals which can be used in place of iron to show the same type of reaction with copper sulphate solution. *3*

28. Name the ore of mercury and state the form in which it is found in nature. Write the chemical equations along with the condition required for the reactions involved in the extraction of mercury from its ore. *3*

29. Taking the example of any two animal hormones along with their gland of secretion, explain how these hormones help (i) in growth and development and (ii) regulate metabolism, in the body. *3*

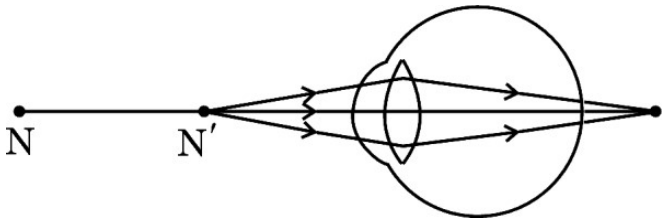
30. Mendel crossed pure tall pea plants (TT) with pure short pea plants (tt) and obtained F_1 progeny. When the plants of F_1 progeny were self-pollinated, plants of F_2 progeny were obtained.

(a) What did the plants of F_1 progeny look like ? Give their gene combination.

(b) Why could the gene for shortness not be expressed in plants of F_1 progeny ?

(c) Write the ratio of the plants obtained in F_2 progeny and state the conclusion that can be drawn from this experiment. *3*

31. (a) नीचे दिए गए आरेख का अध्ययन करके संबंधित प्रश्नों के उत्तर दीजिए :



(i) इस आरेख में दर्शाए गए दृष्टि-दोष का नाम लिखिए और इस स्थिति (दोष) के लिए उत्तरदायी नेत्र के भाग का उल्लेख कीजिए ।

(ii) इस दोष के दो कारणों की सूची बनाइए ।

(iii) इस दोष के संशोधन के लिए उपयोग किए जाने वाले लेंस के प्रकार का नाम लिखिए तथा इस प्रकरण में उसकी भूमिका का उल्लेख कीजिए । *3*

अथवा

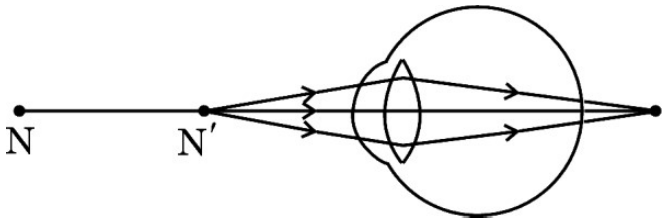
(b) श्वेत प्रकाश का विक्षेपण (परिक्षेपण) किसे कहते हैं ? इसके होने के कारण का उल्लेख कीजिए । काँच के प्रिज़्म द्वारा श्वेत प्रकाश पुंज के विक्षेपण को दर्शाने के लिए आरेख खींचिए । *3*

32. (a) क्या होता है जब किसी परिनालिका की कुंडली, जिससे कोई स्थायी धारा प्रवाहित हो रही है, के भीतर नर्म लोहे के तारों के बण्डल को रख दिया जाता है ? प्राप्त होने वाली युक्ति का नाम लिखिए । इसे यह नाम क्यों दिया गया है ?

(b) किसी धारावाही परिनालिका के भीतर उत्पन्न चुम्बकीय क्षेत्र रेखाओं को आरेखित कीजिए । चुम्बकीय क्षेत्र रेखाओं का यह पैटर्न क्या इंगित करता है ? *3*

33. आहार शृंखला और आहार जाल के बीच विभेदन कीजिए । यदि हिरण, घास और शेर की किसी आहार शृंखला में हिरणों की संख्या घट जाए, तो प्रथम पोषी स्तर और तृतीय पोषी स्तर के जीवों की जीव-संख्या का क्या होगा ? *3*

31. (a) Study the diagram given below and answer the questions that follow :



(i) Name the defect of vision depicted in this diagram stating the part of the eye responsible for this condition.

(ii) List two causes of this defect.

(iii) Name the type of lens used to correct this defect and state its role in this case. *3*

OR

(b) What is dispersion of white light ? State its cause. Draw a diagram to show dispersion of a beam of white light by a glass prism. *3*

32. (a) What happens when a bundle of wires of soft iron is placed inside the coil of a solenoid carrying a steady current ? Name the device obtained. Why is it called so ?

(b) Draw the magnetic field lines inside a current carrying solenoid. What does this pattern of magnetic field lines indicate ? *3*

33. Differentiate between food chain and food web. In a food chain consisting of deer, grass and tiger, if the population of deer decreases, what will happen to the population of organisms belonging to the first and third trophic levels ? *3*

खण्ड घ

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

34. (a) एक शुष्क क्वथन नली में फेरस सल्फेट के कुछ क्रिस्टलों को लेकर गर्म किया गया । कुछ समय पश्चात् नली में जल की छोटी-छोटी बूँदें दिखाई दीं ।

(i) जल की यह बूँदें कहाँ से दृष्टिगोचर हुईं ? व्याख्या कीजिए ।

(ii) गर्म करते समय रंग में क्या परिवर्तन दिखाई देगा ?

(iii) प्रत्येक फेरस सल्फेट ($FeSO_4$) क्रिस्टल के अणु के साथ जल के कितने अणु जुड़े होते हैं ? (I) कॉपर सल्फेट, और (II) सोडियम कार्बोनेट के क्रिस्टलीय रूपों के आण्विक सूत्र लिखिए ।

(iv) उल्लेख कीजिए कि जिप्सम से प्लास्टर ऑफ पेरिस किस प्रकार प्राप्त किया जाता है । प्लास्टर ऑफ पेरिस के दो उपयोग लिखिए । *5*

अथवा

(b) जब इमली में उपस्थित अम्ल 'X' को 'Y' में मिलाया जाता है, तो 'Z' मिश्रण उत्पन्न होता है । 'Z' को गुँथे हुए आटे में मिलाकर गर्म करने पर बने केक मुलायम और स्पंजी हो जाते हैं । 'Y' को साधारण नमक से बनाया जाता है और इसका उपयोग खाने को शीघ्रता से पकाने के लिए भी किया जाता है ।

(i) 'X', 'Y' और 'Z' के सामान्य नाम तथा 'Y' का रासायनिक सूत्र लिखिए ।

(ii) 'Y' को किस प्रकार बनाया जाता है तथा यह केक को मुलायम और स्पंजी बनाने में किस प्रकार सहायता करता है ? उपयुक्त रासायनिक समीकरण देकर इस अभिक्रिया का स्पष्टीकरण कीजिए ।

(iii) 'Y' के अतिरिक्त किसी अन्य मृदु क्षारक का नाम और रासायनिक सूत्र लिखिए जिसका उपयोग प्रति-अम्ल (ऐन्टैसिड) के रूप में किया जाता है । *5*

SECTION D

Questions no. ***34*** *to* ***36*** *are long answer type questions.*

34. (a) A few crystals of ferrous sulphate were taken in a dry boiling tube and heated. Tiny water droplets were observed in the tube after some time.

(i) From where did these water droplets appear ? Explain.

(ii) What colour change will be observed during heating ?

(iii) How many molecules of water are attached per molecule of $FeSO_4$ crystal ? Write the molecular formula of crystalline forms of (I) Copper sulphate, and (II) Sodium carbonate.

(iv) State how is Plaster of Paris obtained from gypsum. Write two uses of Plaster of Paris. *5*

OR

(b) An acid 'X' present in tamarind when mixed with 'Y', produces a mixture 'Z'. 'Z' on addition to a dough when heated makes cakes soft and spongy. 'Y' is prepared from common salt and helps in faster cooking.

(i) Write the common names of 'X', 'Y' and 'Z', and the chemical formula of 'Y'.

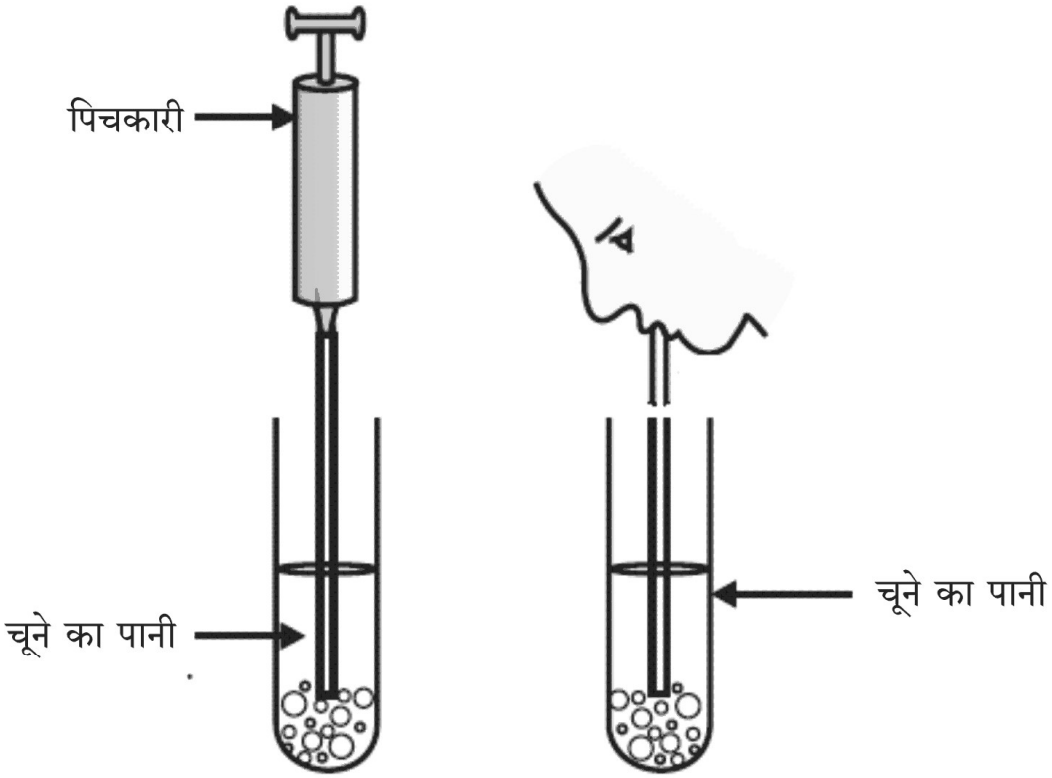
(ii) How is 'Y' prepared and how does it help in making cakes soft and spongy ? Illustrate the reaction with suitable chemical equation.

(iii) Write the name and chemical formula of a mild base other than 'Y' used as an antacid. *5*

35. (a) यह निदर्शित करने के लिए किसी प्रयोग की अभिकल्पना कीजिए कि प्रकाश-संश्लेषण के लिए कार्बन डाइऑक्साइड आवश्यक है । इस प्रयोग का प्रेक्षण और निष्कर्ष लिखिए । *5*

अथवा

(b) (i)



(I) (II)

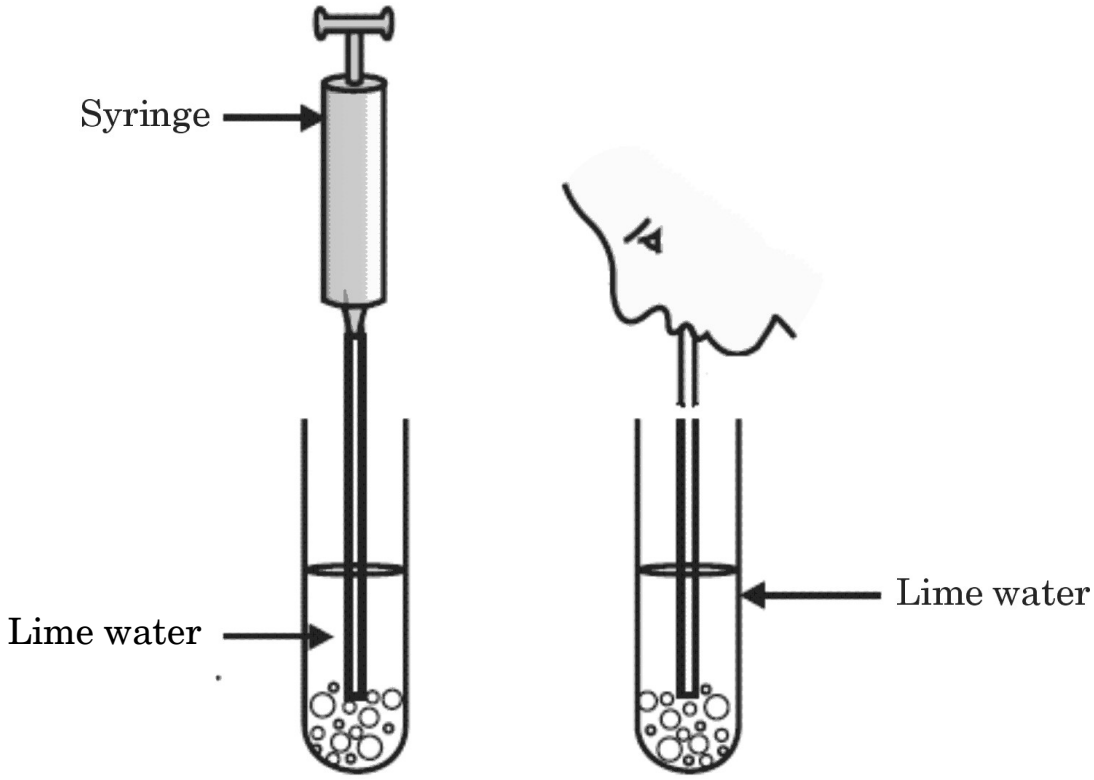
ऊपर दर्शाई गई प्रायोगिक व्यवस्था में आरेख (I) में वायुमंडलीय वायु को पिचकारी से चूने के पानी में प्रवाहित किया गया है जबकि आरेख (II) में नि:श्वास की वायु को चूने के पानी से प्रवाहित किया गया है । दोनों परखनलियों के चूने के पानी को दूधिया होने में भिन्न-भिन्न समय लगेगा । कारण दीजिए ।

(ii) खुले रंध्र के छिद्र का आरेख खींचिए और उस पर (I) द्वार कोशिकाएँ, और (II) हरितलवक (क्लोरोप्लास्ट) को नामांकित कीजिए । रंध्रों द्वारा निष्पादित दो कार्यों का उल्लेख कीजिए । *5*

35. (a) Design an experiment to demonstrate that carbon dioxide is essential for photosynthesis. Write the observation and conclusion of the experiment. *5*

OR

(b) (i)



(I) (II)

In the experimental set-up shown above in diagram (I) atmospheric air is being passed into lime water with a syringe while in diagram (II) air is being exhaled into lime water. The time taken for the lime water to turn milky in both the test tubes is different. Give reason.

(ii) Draw the diagram of an open stomatal pore and label (I) Guard cells, and (II) Chloroplast on it. Mention two functions performed by stomata. *5*

36. (a) (i) किसी परिपथ अवयव के दो सिरों पर विभवान्तर घटकर अपने प्रारम्भिक मान का एक-तिहाई रह जाता है, जबकि इसका प्रतिरोध नियत रहता है । इससे प्रवाहित धारा में क्या परिवर्तन दिखाई देगा ? उस नियम का नाम और वह नियम लिखिए जो इस प्रश्न का उत्तर देने में आपकी सहायता करता है ।

(ii) किसी परिपथ का व्यवस्था आरेख खींचिए जिसमें 1·5 V के चार सेलों की बैटरी, एक 5 Ω का प्रतिरोधक, एक 10 Ω का प्रतिरोधक और एक 15 Ω का प्रतिरोधक तथा एक प्लग कुंजी, सभी श्रेणी में संयोजित हैं । अब (I) परिपथ से होकर गुज़रने वाली विद्युत धारा, तथा (II) 10 Ω प्रतिरोधक के सिरों पर विभवान्तर ज्ञात कीजिए जबकि प्लग कुंजी बन्द है । *5*

अथवा

(b) (i) "दो बिन्दुओं के बीच विभवान्तर 1 वोल्ट है ।" यह कब कहा जाता है ?

(ii) किसी कॉपर के तार का व्यास 0·2 mm और प्रतिरोधकता $1{\cdot}6 \times 10^{-8}$ Ω m है । इस तार का प्रतिरोध 14 Ω बनाने के लिए कितने लम्बे तार की आवश्यकता होगी ? यदि तार का व्यास दुगुना कर दिया जाए, तो तार के प्रतिरोध में कितना परिवर्तन होगा ? *5*

खण्ड ङ

*प्रश्न संख्या **37** से **39** प्रकरण-आधारित/आँकड़ा-आधारित प्रश्न हैं जिनमें प्रत्येक में 3 लघु उपभाग हैं । इनमें से एक उपभाग में आन्तरिक चयन दिया गया है ।*

37. कार्बन एक सर्वतोमुखी तत्त्व है जो सभी सजीव जीवों तथा हमारे उपयोग की बहुत सी वस्तुओं का आधार बनाता है । कार्बन की संयोजकता चार होने के कारण इसके अत्यधिक प्रकार के यौगिक बनते हैं । कार्बन के ऑक्सीजन, हाइड्रोजन, नाइट्रोजन, सल्फर, क्लोरीन तथा अन्य बहुत से तत्त्वों के साथ यौगिक बनते हैं ।

निम्नलिखित प्रश्नों के उत्तर दीजिए :

(a) हाइड्रोकार्बन किन्हें कहते हैं ? *1*

36. (a) (i) The potential difference across the two ends of a circuit component is decreased to one-third of its initial value, while its resistance remains constant. What change will be observed in the current flowing through it ? Name and state the law which helps us to answer this question.

(ii) Draw a schematic diagram of a circuit consisting of a battery of four 1·5 V cells, a 5 Ω resistor, a 10 Ω resistor and a 15 Ω resistor and a plug key, all connected in series. Now find (I) the electric current passing through the circuit, and (II) potential difference across the 10 Ω resistor when the plug key is closed. *5*

OR

(b) (i) When is the potential difference between two points said to be 1 volt ?

(ii) A copper wire has a diameter of 0·2 mm and resistivity of $1{\cdot}6 \times 10^{-8}$ Ω m. What will be the length of this wire to make its resistance 14 Ω ? How much does the resistance change, if the diameter of the wire is doubled ? *5*

SECTION E

Questions no. ***37*** *to* ***39*** *are case-based/data-based questions with 3 short sub-parts. Internal choice is provided in one of these sub-parts.*

37. Carbon is a versatile element that forms the basis of all living organisms and many of the things we use. A large variety of compounds is formed because of its tetravalency. Compounds of carbon are formed with oxygen, hydrogen, nitrogen, sulphur, chlorine and many other elements.

Answer the following questions :

(a) What are hydrocarbons ? *1*

(b) उन दो गुणों की सूची बनाइए जिनके कारण कार्बन बड़ी संख्या में यौगिक बना सकता है । *1*

(c) (i) (1) ऐल्डिहाइड, और (2) कीटोन में उपस्थित प्रकार्यात्मक समूह का सूत्र लिखिए । किसी उत्प्रेरक की उपस्थिति में एथेनॉइक अम्ल और एथेनॉल के बीच होने वाली अभिक्रिया का रासायनिक समीकरण लिखिए । *2*

अथवा

(c) (ii) संरचनात्मक समावयव क्या होते हैं ? ब्यूटेन (C_4H_{10}) के दो समावयवों की संरचनाएँ लिखिए । *2*

38. परागण पादपों के लैंगिक जनन की महत्त्वपूर्ण प्रक्रिया है । यह एक ऐसी आवश्यक प्रक्रिया है जो पादपों में निषेचन की प्रक्रिया को सुसाध्य बनाती है । पवन, जल, कीट और पक्षी परागण के एजेन्ट होते हैं । निषेचन के पश्चात् पुष्प में बहुत से परिवर्तन होते हैं ।

(a) स्व-परागण और पर-परागण में मुख्य अन्तर लिखिए । *1*

(b) पुष्प के उस भाग का नाम लिखिए जो कीटों को परागण के लिए आकर्षित करता है । निषेचन के पश्चात् इस भाग का क्या होता है ? *1*

(c) (i) निषेचन की परिभाषा लिखिए । निषेचन के पश्चात् किसी पुष्प में बीजाण्ड और अंडाशय का क्या होता है ? *2*

अथवा

(c) (ii) अंकुरित होते बीज के कौन-से भाग भावी प्ररोह और भावी जड़ कहलाते हैं ? बीजपत्र के कार्य का उल्लेख कीजिए । *2*

(b) List two properties by virtue of which carbon can form a large number of compounds. *1*

(c) (i) Write the formula of the functional group present in (1) aldehydes, and (2) ketones. Write chemical equation for the reaction that occurs between ethanoic acid and ethanol in the presence of a catalyst. *2*

OR

(c) (ii) What are structural isomers ? Write the structures of two isomers of butane (C_4H_{10}). *2*

38. Pollination is an important process in sexual reproduction of plants. It is an essential process that facilitates fertilisation in plants. Pollinating agents can be wind, water, insects and birds. Several changes take place in the flower after the fertilization has taken place.

(a) Write the main difference between self-pollination and cross-pollination. *1*

(b) Name the part of the flower which attracts insects for pollination. What happens to this part after fertilisation ? *1*

(c) (i) Define fertilisation. What is the fate of ovules and the ovary in a flower after fertilisation ? *2*

OR

(c) (ii) In a germinating seed, which parts are known as future shoot and future root ? Mention the function of cotyledon. *2*

39. उच्च कोटि की पॉलिश किया हुआ पृष्ठ जैसे कि दर्पण अपने पर पड़ने वाले अधिकांश प्रकाश को परावर्तित कर देता है । हम दैनिक जीवन में दो प्रकार के दर्पणों — समतल और गोलीय का उपयोग करते हैं । किसी गोलीय दर्पण का परावर्तक पृष्ठ भीतर की ओर अथवा बाहर की ओर वक्रित हो सकता है । अवतल दर्पणों में परावर्तन भीतरी पृष्ठ से होता है, जबकि उत्तल दर्पणों में परावर्तन बाहरी पृष्ठ से होता है ।

(a) अवतल दर्पण के मुख्य अक्ष की परिभाषा लिखिए । *1*

(b) कोई प्रकाश किरण किसी अवतल दर्पण पर, दर्पण के मुख्य अक्ष के समान्तर आपतन करती है । यदि परावर्तन के पश्चात् यह किरण दर्पण के मुख्य अक्ष पर स्थित दर्पण के ध्रुव से 10 cm की दूरी के बिन्दु से होकर गुज़रती है, तो दर्पण की वक्रता त्रिज्या ज्ञात कीजिए । *1*

(c) (i) कोई बिम्ब 15 cm फोकस दूरी के उत्तल दर्पण के ध्रुव से 10 cm दूरी पर स्थित है । प्रतिबिम्ब की स्थिति ज्ञात कीजिए । *2*

अथवा

(c) (ii) कोई दर्पण किसी बिम्ब का आभासी, सीधा और साइज़ में बिम्ब से छोटा प्रतिबिम्ब बनाता है । इस दर्पण के प्रकार की पहचान कीजिए । इस प्रकरण में प्रतिबिम्ब बनना दर्शाने के लिए किरण आरेख खींचिए । *2*

39. A highly polished surface such as a mirror reflects most of the light falling on it. In our daily life we use two types of mirrors — plane and spherical. The reflecting surface of a spherical mirrors may be curved inwards or outwards. In concave mirrors, reflection takes place from the inner surface, while in convex mirrors reflection takes place from the outer surface.

(a) Define the principal axis of a concave mirror. *1*

(b) A ray of light is incident on a concave mirror, parallel to its principal axis. If this ray after reflection from the mirror passes through the principal axis from a point at a distance of 10 cm from the pole of the mirror, find the radius of curvature of the mirror. *1*

(c) (i) An object is placed at a distance of 10 cm from the pole of a convex mirror of focal length 15 cm. Find the position of the image. *2*

OR

(c) (ii) A mirror forms a virtual, erect and diminished image of an object. Identify the type of this mirror. Draw a ray diagram to show the image formation in this case. *2*

Marking Scheme
Strictly Confidential
Secondary School Examination, 2024
SUBJECT NAME SCIENCE (086) (Q.P. CODE 31/5/1)

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 News Paper/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 delibration 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.
11	A full scale of marks 0-80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.
13	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 totaled and written in figures and words.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

MARKING SCHEME

Secondary School Examination, 2024

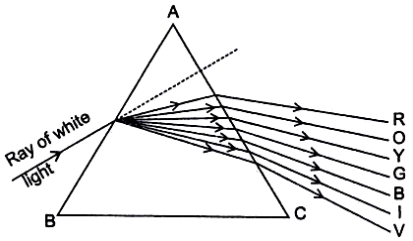
SCIENCE (Subject Code–086)

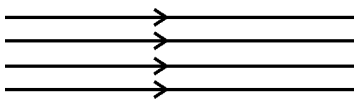
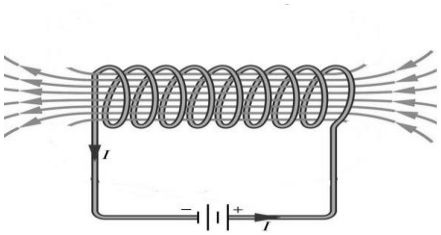
[Paper Code: 31/5/1]

Maximum Marks: 80

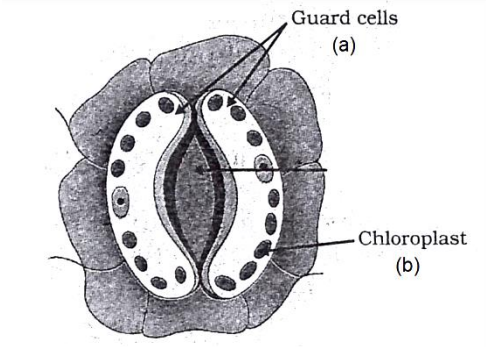
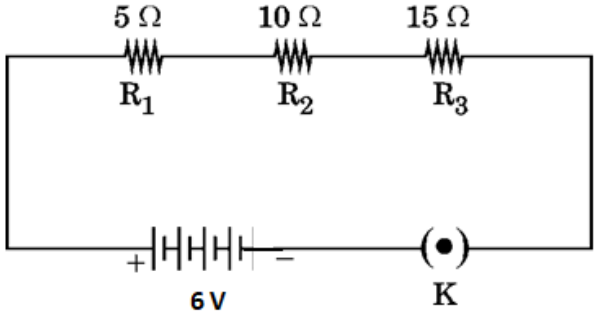
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(C) /2,2,4	1	1
2	(D) / Fe_2O_3 + 3 CO→ 2 Fe + 3 CO_2	1	1
3	(A) /Calcium Phosphate	1	1
4	(C)/ 7	1	1
5	(B) / Al, Al_2O_3	1	1
6	(D) / Translocation	1	1
7	(C)/ Receptors in skin →Sensory neuron →Relay neuron → Motor neuron→ Effector muscle in arm.	1	1
8	(A) / Nose	1	1
9	(C)/ It has a very small area for glucose and oxygen to pass from mother to the embryo	1	1
10	(A) / (i) and (ii)	1	1
11	(C) / The brightness of the image will reduce	1	1
12	(B) / Refraction, Dispersion and internal reflection	1	1
13	(A) / Red	1	1
14	(C) / A solenoid	1	1
15	(A) / both pointing into the plane of the paper.	1	1
16	(D)/ Crop land ecosystem	1	1
17	(A) / Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).	1	1
18	(D) / Assertion (A) is false, but Reason (R) is true.	1	1
19	(B) / Both Assertion (A) and Reason (R) are the true , but Reason (R) is not a correct explanation of Assertion (A).	1	1
20	(B) / Both Assertion (A) and Reason (R) are the true , but Reason (R) is not a correct explanation of Assertion (A).	1	1
	SECTION B		
21	(a) • Copper Oxide • Black $2Cu + O_2 \xrightarrow{Heat} 2CuO$ **OR** (b) $BaCl_2$ (aq)+ Na_2SO_4 (aq)→ $BaSO_4$ (s)+ 2NaCl (aq) Ba^{2+}, SO_4^{2-}	½ ½ 1 1 ½+½	2

22	• Low melting points and boiling points – Weak intermolecular forces of attraction. • Non-conductors of electricity – Bonding in these compounds does not give rise to any ions. / Covalent bonds or sharing of electrons do not form any charged particles.	1 1	2
23	(a) • Formation of lactic acid in muscles causes cramps. • Aerobic respiration takes place in the presence of oxygen whereas the respiration taking place above is due to lack of oxygen. / End products of aerobic respiration are $CO_2 + H_2O +$ Energy whereas in the above case, Lactic acid + Energy is formed. **OR** (b) • Tissue fluid / Extracellular fluid Functions : i. Carries digested and absorbed fats from the intestine. ii. Drains excess fluid from extracellular space back into the blood. iii. Fight against infections. **(Any two)**	1 1 1 ½ + ½	2
24	• Plasmodium: Multiple fission- A single cell divides into many daughter cells simultaneously. • Leishmania: Binary fission- Splitting of one cell into two daughter cells in definite orientation.	½ +½ ½+½	2
25	(a) The sun light is converged at a point by convex lens which generates heat causing the paper to burn. (b) •Principal Focus •Real image of the Sun.	1 ½ ½	2
26	$Q = I \times t$ $\therefore t = \frac{500\ C}{25 / 1000\ A}$ $= 20000\ s$	½ ½ 1	2
	SECTION C		
27	• $Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$ • Displacement reaction – A reaction in which a more reactive metal displaces a less reactive metal from its salt solution. • Zinc, Aluminium, Calcium, Magnesium **(Any two)**	1 ½ +½ ½ ,+½	3

28	• Cinnabar • Sulphide ore • $2HgS + 3O_2 \xrightarrow{Heat} 2HgO + 2SO_2$ • $2HgO \xrightarrow{Heat} 2Hg + O_2$	½ ½ 1 1	3
29	(i) •Growth hormone •Secreted by pituitary gland. •It stimulates growth in all organs. (ii) •Thyroxin •Secreted by thyroid gland. •It regulates carbohydrate, protein and fat metabolism for body growth.	½ x 3 ½ x 3	3
30	(a) •All Plants Tall •Gene combination: Tt (b) It is a recessive trait / it cannot be expressed in presence of dominant trait. (c) Tall : Short 3:1 Conclusion: Tall trait is dominant and short trait is recessive.	½ ½ 1 ½ ½	3
31	(a) (i) • Hypermetropia • Ciliary muscles/ eye lens (ii) • Focal length of the eye lens is too long. • Eyeball becomes too small. (iii) Converging lenses/ convex lens They provide the additional focussing power required for forming the image on the retina./ Helps to decrease the focal length of the eye lens. **OR** (b) The splitting of white light into its constituent colours is called dispersion. Cause: Different colours of white light bend through different angles with respect to incident ray.  	½ ½ ½ ½ ½ ½ 1 1 1	3

32	(a) • It gets magnetised • Electromagnet. • It behaves as a magnet only when current passes through the solenoid. (b)   **(Any one diagram)** • This pattern indicates that the magnetic field is uniform.	½ ½ ½ 1 ½	3
33	<table><tr><th>Food chain</th><th>Food web</th></tr><tr><td>It is a series of organisms feeding on one another at various levels</td><td>It is a network of interconnected food chains / series of branching lines which provides a number of feeding connections amongst different organisms.</td></tr></table> • Population of grass/ first trophic level will increase. • Population of tiger/ third trophic level will decrease.	1+1 ½ ½	3
	SECTION D		
34	(a) (i) The molecules of water of crystallisation in ferrous sulphate crystals get evaporated on heating. (ii) Green ⟶ White (iii) Seven / ($FeSO_4 \cdot 7H_2O$) (I) $CuSO_4 \cdot 5H_2O$ (II) $Na_2CO_3 \cdot 10H_2O$ (iv) • On heating gypsum ($CaSO_4 \cdot 2H_2O$) at 373 K it loses water molecules/ $CaSO_4 \cdot 2\,H_2O \xrightarrow[373\ K]{\Delta} CaSO_4 \cdot \frac{1}{2}\,H_2O + 1\frac{1}{2}\,H_2O$ Two uses of plaster of Paris: • Making toys / material for decoration • Supporting fractured bones **(or any other)**	1 ½ ½ ½ ½ 1 ½ + ½	

	OR (b) (i) X-Tartaric acid Y-Baking soda Z- Baking powder Y- $NaHCO_3$ (ii) $NaCl + H_2O + CO_2 + NH_3 \longrightarrow NH_4Cl + NaHCO_3$ $NaHCO_3 + H^+ \longrightarrow CO_2 + H_2O$ + Sodium salt of acid CO_2 released during heating makes the cake soft and spongy (iii) Magnesium hydroxide; $Mg(OH)_2$	½ ½ ½ ½ 1 ½ ½ 1	5
35	(a) • Take two healthy potted plants, A and B of nearly the same size. • Keep them in darkness for three days. (Destarch the plant) • Place a watch glass containing potassium hydroxide by the side of potted plant A but not in potted plant B. • Cover both the plants with separate bell jars and seal the bottom of the jars with Vaseline. • Keep both the plants in sunlight for two hours. • Pluck one leaf each from both the plants and test for the presence of starch with iodine solution. • <u>Observation</u>: The leaf of the potted plant A with KOH did not turn blue – black. The leaf of the potted plant B turns blue. • <u>Conclusion</u>: KOH absorbs CO_2 so photosynthesis did not occur in potted plant A. **OR** (b) (i) In set up (I) lime water turns milky in more time as compared to set up (II) because the air we exhaled contains high percentage of CO_2 as compared to atmospheric air.	½ x 6 1 1 1,1	

	(ii)  Open Stomatal Pore Two labellings : (I) Guard Cells (II) Chloroplast Two functions performed by stomata : • Gaseous exchange • Transpiration	1 ½ ½ ½ ½	5
36	(a) (i) • Current becomes one-third of its initial value. • Ohm's Law The potential difference across the ends of a conductor is directly proportional to the current flowing through it, provided its temperature remains the same. (ii)  Total Voltage = V = 4 × 1·5 V = 6 V Total resistance, R(s) = $R_1 + R_2 + R_3$ = 5 Ω + 10 Ω +15 Ω = 30 Ω (I) Current, $I = \frac{V}{R} = \frac{6\ V}{30\ \Omega} = 0{\cdot}2\ A$ (II) V = IR = 0·2 A × 10 Ω = 2 V	½ ½ 1 1 1 1	

OR

(b)

(i) When 1 joule of work is done to move a charge of 1 coulomb from one point to the other. — 1

(ii) $d = 0{\cdot}2\ mm = 2 \times 10^{-4}\ m$; $R = 14\ \Omega$ — ½

$\rho = 1{\cdot}6 \times 10^{-8}\ \Omega\ m$; $A = \pi d^2/4$

$R = \frac{\rho l}{A} = \frac{4\rho l}{\pi d^2}$ or $l = \frac{\pi d^2 R}{4\rho}$ — ½

$l = \frac{22}{7} \times \frac{(2 \times 10^{-4})^2}{4 \times 1{\cdot}6 \times 10^{-8}} \times 14$

$= 27{\cdot}5\ m$ — 1

When the diameter is doubled, $d' = 2d$

$A' = 4A$ — ½

$\frac{R'}{R} = \frac{A}{A'}$ or $R' = \frac{RA}{A'} = \frac{RA}{4A}$

$\frac{R'}{14} = \frac{A}{4A}$

$R' = 3{\cdot}5\ \Omega$ — 1

Change $(14{\cdot}0 - 3{\cdot}5) = 10{\cdot}5\ \Omega$ — ½

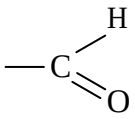
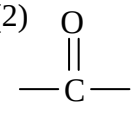
5

SECTION E

37

(a) Compounds formed by carbon and hydrogen only. — 1

(b) Tetravalency and Catenation — 1

(c) (i) (1)  (2)  — ½ + ½

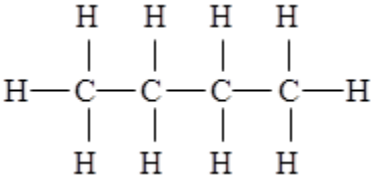
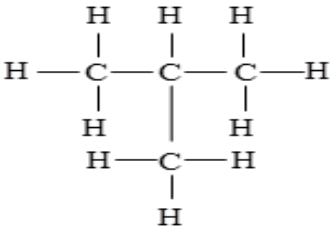
$CH_3COOH + C_2H_5OH \xrightarrow{Acid} CH_3COOC_2H_5 + H_2O$

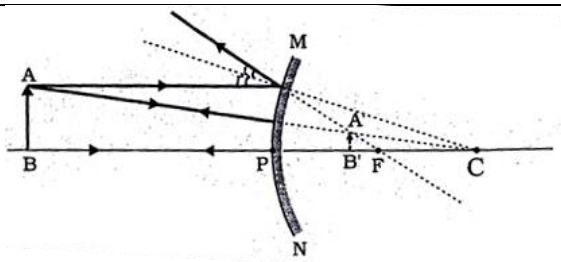
Ester — 1

OR

(c)

(ii) Compounds with identical molecular formula but different structures — 1

	Two isomers of butane C_4H_{10}  	½ + ½	4
38	(a) **Self-pollination**: Transfer of pollen grains from anther to the stigma of the same flower. **Cross-pollination**: Transfer of pollen grains from the anther of one flower to the stigma of another flower.	1	
	(b) Petals, they dry and fall off.	½ + ½	
	(c)(i) Fusion of male and female gametes to form a zygote Ovule – Seed, Ovary – fruit	1 ½ ½	
	OR		
	(c) (ii) Future shoot – Plumule, Future root – Radicle Cotyledon – Stores food.	½ ½ 1	4
39	(a) It is straight line passing through the pole and centre of curvature of a concave mirror.	1	
	(b) Radius of curvature ,R= 20 cm	1	
	(c) (i) u = –10 cm, f = +15 cm $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{15} - \frac{1}{-10}$ $\frac{1}{v} = \frac{1}{6}$ $\Rightarrow$ v = + 6 cm	½ ½ 1	
	OR		
	(c) (ii) Convex mirror / Diverging mirror	½	

	 **[Note: Deduct ½ mark if direction of rays is not shown]**	1 ½	4

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Marking Scheme
Strictly Confidential
Secondary School Examination, 2024
SUBJECT NAME SCIENCE (086) (Q.P. CODE 31/5/2)

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 News Paper/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 delibration 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.
11	A full scale of marks 0-80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.
13	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 totaled and written in figures and words.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

MARKING SCHEME

Secondary School Examination, 2024

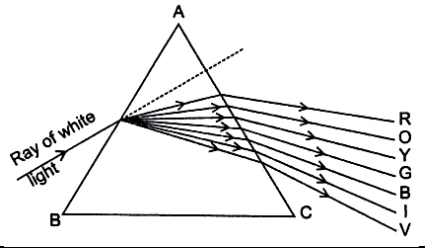
SCIENCE (Subject Code–086)

[Paper Code: 31/5/2]

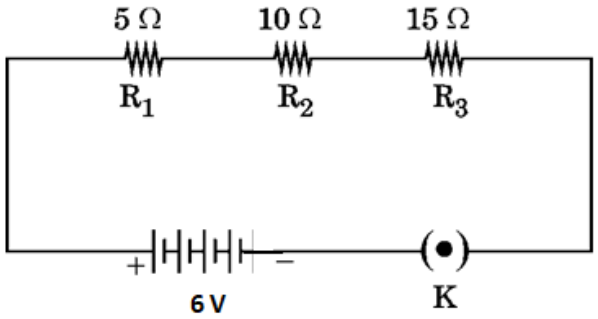
Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(C)/ $2AgCl \rightarrow 2Ag + Cl_2$	1	1
2	(D) / Translocation	1	1
3	(A) / Nose	1	1
4	(C)/ It has a very small area for glucose and oxygen to pass from mother to the embryo	1	1
5	(D) / $Fe_2O_3 + 3\ CO \rightarrow 2\ Fe + 3\ CO_2$	1	1
6	(A) /Calcium Phosphate	1	1
7	(C)/Regular beating of heart	1	1
8	(C)/ 7	1	1
9	(B) / Al, Al_2O_3	1	1
10	(D)/ Cropland ecosystem	1	1
11	(A) / both pointing into the plane of the paper.	1	1
12	(C) / A solenoid	1	1
13	(A) / (i) and (ii)	1	1
14	(C) / The brightness of the image will reduce	1	1
15	(B) / Refraction, Dispersion and internal reflection	1	1
16	(A) / Red	1	1
17	(B) / Both Assertion (A) and Reason (R) are the true , but Reason (R) is not a correct explanation of Assertion (A).	1	1
18	(A) / Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).	1	1
19	(D) / Assertion (A) is false, but Reason (R) is true.	1	1
20	(B) / Both Assertion (A) and Reason (R) are the true , but Reason (R) is not a correct explanation of Assertion (A).	1	1
	SECTION B		
21	(a) • Formation of lactic acid in muscles causes cramps. •Aerobic respiration takes place in the presence of oxygen whereas the respiration taking place above is due to lack of oxygen. / End products of aerobic respiration are $CO_2 + H_2O$ + Energy whereas in the above case, Lactic acid + Energy is formed. **OR**	1 1	

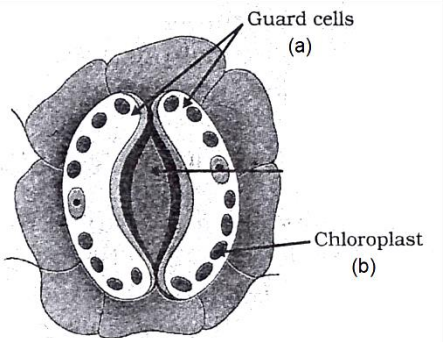
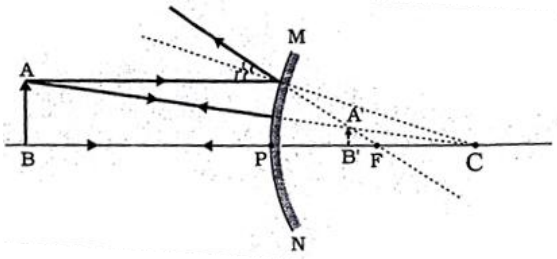
	(b) • Tissue fluid / Extracellular fluid Functions : i. Carries digested and absorbed fats from the intestine. ii. Drains excess fluid from extracellular space back into the blood. iii. Fight against infections. **(any 2)**	1 ½ ,½	2
22	(a) Carboxylic group • Ethanoic acid (b) Aldehyde • Methanal	½ x 4	2
23	(a) • Copper Oxide • Black $2Cu + O_2 \xrightarrow{Heat} 2CuO$ **OR** (b) $BaCl_2\,(aq) + Na_2SO_4\,(aq) \rightarrow BaSO_4\,(s) + 2NaCl\,(aq)$ Ba^{2+}, SO_4^{2-}	½ ½ 1 1 ½, ½	2
24	• Parents produce germ cells in specialised organs which have only half the number of chromosomes as compared to non-reproductive body cells. When these germ cells from two parents combine during sexual reproduction to obtain a progeny/ zygote, it restores the original number of chromosomes as in the parents. • Meiosis	1 ½ ½	2
25	• Power of a lens is the reciprocal of focal length in metre./ It is the degree of convergence or divergence of light rays achieved by a lens. • $P = \frac{1}{f} = \frac{100}{50} = 2\ D$	1 1	2
26	• $Q = I \times t \Rightarrow t = \frac{Q}{I}$ • $\therefore\ t = \frac{750}{\frac{15}{1000}} = \frac{750X1000}{15} = 50000\ s$	1 1	2
	SECTION C		
27	(a) (i) • Hypermetropia • Ciliary muscles/ eye lens (ii) • Focal length of the eye lens is too long. • Eyeball becomes too small.	 ½ ½ ½ ½	

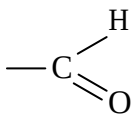
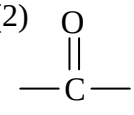
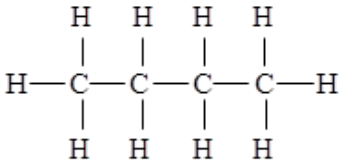
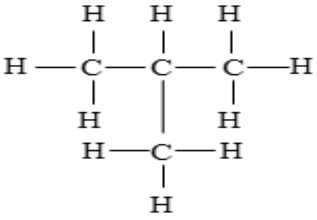
	(iii) Converging lenses/ convex lens They provide the additional focussing power required for forming the image on the retina./ Decrease the focal length of the eye lens **OR** (b) The splitting of white light into its constituent colours is called dispersion. Cause: Different colours of white light bend through different angles with respect to incident ray.  	½ ½ 1 1 1	3
28	• Activity – Magnesium Burn magnesium ribbon ↓ Collect the ashes ↓ Dissolve in water Add blue Litmus solution — Remains blue Add red Litmus solution — Turns blue Inference : Metalic oxides are basic in nature Sulphur Burn sulphur ↓ Collect the fumes ↓ Add water Add blue Litmus solution — Turns red Add red Litmus solution — Remains red Oxides of non – metals are acidic in nature	 1 1 1	3
29	• $Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$ • Displacement reaction – A reaction in which a more reactive metal displaces a less reactive metal from its salt solution. • Zinc, Aluminium, Calcium, Magnesium **(Any two)**	1 ½ +½ ½+ ½	3

30	(a) Violet flowers Violet colour dominates over white colour of flowers. (b) 25%, It could not express itself in the presence of dominant gene/white colour is a recessive gene. (c) V V : V v 1 : 2	½ ½ ½ ½ 1	3
31	(i) •Growth hormone •Secreted by pituitary gland. •It stimulates growth in all organs. (ii) •Thyroxin •Secreted by thyroid gland. •It regulates carbohydrate, protein and fat metabolism for body growth.	½ x 3 ½ x 3	3
32	• Earthing is used as a safety measure, especially for those appliances that have a metallic body which is connected to the earth wire. • It provides a low-resistance conducting path for the current. •Thus, it ensures that any leakage of current to the metallic body of the appliance keeps its potential to that of the earth, and the user may not get a severe electric shock.	1 1 1	3
33	<table><tr><td>Food chain</td><td>Food web</td></tr><tr><td>It is a series of organisms feeding on one another at various levels</td><td>It is a network of interconnected food chains/series of branching lines which provides a number of feeding connections amongst different organisms.</td></tr></table> • Population of grass/ first trophic level will increase. • Population of tiger/ third trophic level will decrease.	1+1 ½ ½	3
	SECTION C		
34	(a)• Chlor-akali process – When electricity is passed through aqueous solution of sodium chloride (brine), it decomposes to form sodium hydroxide, chlorine and hydrogen. • $2NaCl\ (aq) + 2H_2O\ (l) \rightarrow 2NaOH + Cl_2 + H_2$ • Anode – Chlorine gas / Cl_2 Cathode- Hydrogen gas/ H_2 • Cl_2 – 1. Used in the preparation of bleaching powder. 2. To make drinking water free from germs or any other.	1 1 ½ ½ ½ ½	

	• H_2 – 1. Used in the manufacture of ammonia fertilisers. 2. Used in fuels and margarine. **OR** (b)• Concentrated solution of sodium chloride reacts with ammonia and carbon dioxide to obtain sodium hydrogen carbonate and ammonium chloride. $NaCl + NH_3 + CO_2 + H_2O \rightarrow NaHCO_3 + NH_4Cl$ • When sodium hydrogen carbonate is heated strongly, sodium carbonate is obtained. $2NaHCO_3 \xrightarrow{Heat} Na_2CO_3 + CO_2 + H_2O$ • Sodium carbonate is dissolved in water to obtain washing soda. $Na_2CO_3 + 10H_2O \rightarrow Na_2CO_3 \cdot 10H_2O$ Uses : • In glass, soap and paper industries • Manufacture of borax • As cleaning agent for domestic purposes. •For removing permanent hardness of water.	½ ½ 1 1 1 ½ x 4	5
35	(a) (i) • Current becomes one-third of its initial value. • Ohm's Law The potential difference across the ends of a conductor is directly proportional to the current flowing through it, provided its temperature remains the same. (ii)  Total Voltage = V = 4 × 1·5 V = 6 V Total resistance, R(s) = $R_1 + R_2 + R_3$ = 5 Ω + 10 Ω +15 Ω = 30 Ω (I) Current, $I = \frac{V}{R} = \frac{6\ V}{30\ \Omega} = 0{\cdot}2\ A$ (II) V = IR = 0·2 A × 10 Ω = 2 V	½ ½ 1 1 1 1	

	OR (b) (i) When 1 joule of work is done to move a charge of 1 coulomb from one point to the other. $d = 0{\cdot}2 \text{ mm} = 2 \times 10^{-4} \text{ m}$; $R = 14\ \Omega$ $\rho = 1{\cdot}6 \times 10^{-8}\ \Omega$ m; $A = \pi d^2/4$ $R = \frac{\rho l}{A} = \frac{4\rho l}{\pi d^2}$ or $l = \frac{\pi d^2 R}{4\rho}$ $l = \frac{22}{7} \times \frac{(2\times10^{-4})^2}{4\times1{\cdot}6\times10^{-8}} \times 14$ $= \frac{22\times14}{7\times1{\cdot}6} = 27{\cdot}5$ m When the diameter is doubled, d' = 2d A' = 4A $\frac{R'}{R} = \frac{A}{A'}$ or $R' = \frac{RA}{A'} = \frac{RA}{4A}$ $R' = \frac{R}{4} = \frac{14\ \Omega}{4} = 3{\cdot}5\ \Omega$ Change $(14{\cdot}0 - 3{\cdot}5) = 10{\cdot}5\ \Omega$	1 ½ ½ 1 ½ 1 ½	5
36	(a) • Take two healthy potted plants, A and B of nearly the same size. • Keep them in darkness for three days. (Destarch the plant) • Place a watch glass containing potassium hydroxide by the side of potted plant A but not in potted plant B. • Cover both the plants with separate bell jars and seal the bottom of the jars with Vaseline. • Keep both the plants in sunlight for two hours. • Pluck one leaf each from both the plants and test for the presence of starch with iodine solution. • <u>Observation</u>: The leaf of the potted plant A with KOH did not turn blue – black. The leaf of the potted plant B turns blue. • <u>Conclusion</u>: KOH absorbs CO_2 so photosynthesis did not occur in potted plant A. **OR** (b) (i) In set up (I) lime water turns milky in more time as compared to set up (II) because the air we exhaled contains high percentage of CO_2 as compared to atmospheric air.	½ x 6 1 1 1,1	

	(ii)  Open Stomatal Pore Two labellings: (I) Guard Cells (II) Chloroplast Two functions performed by stomata : • Gaseous exchange • Transpiration	1 ½ ½ ½ ½	5
37	(a) It is straight line passing through the pole and centre of curvature of a concave mirror. (b) Radius of curvature ,R= 20 cm (c) (i) u = –10 cm, f = +15 cm $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{15} - \frac{1}{-10}$ $\frac{1}{v} = \frac{1}{6}$ $\Rightarrow$ v = + 6 cm **OR** (c) (ii) Convex mirror / Diverging mirror  **[Note: Deduct ½ mark if direction of rays is not shown]**	1 1 ½ ½ 1 ½ 1 ½	4

38	(a) Compounds formed by carbon and hydrogen only. (b) Tetravalency and Catenation (c) (i) (1)  (2)  $CH_3COOH + C_2H_5OH \xrightarrow{Acid} CH_3COOC_2H_5 + H_2O$ Ester **OR** (c) (ii) Compounds with identical molecular formula but different structures Two isomers of butane C_4H_{10}  	1 1 ½ +½ 1 1 ½ +½	4
39	(a) **Self-pollination**: Transfer of pollen grains from anther to the stigma of the same flower. **Cross-pollination**: Transfer of pollen grains from the anther of one flower to the stigma of another flower. (b) Petals, they dry and fall off. (c) (i) Fusion of male and female gametes to form a zygote Ovule – Seed, Ovary – fruit **OR** (c) (ii) Future shoot – Plumule, Future root – Radicle Cotyledon – Stores food.	1 ½ +½ 1 ½ ½ ½ ½ 1	4

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Marking Scheme **Strictly Confidential** **Secondary School Examination, 2024** **SUBJECT NAME SCIENCE (086) (Q.P. CODE 31/5/3)**	
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 News Paper/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 delibration 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.
11	A full scale of marks 0-80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.
13	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 totaled and written in figures and words.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

MARKING SCHEME

Secondary School Examination, 2024

SCIENCE (Subject Code–086)

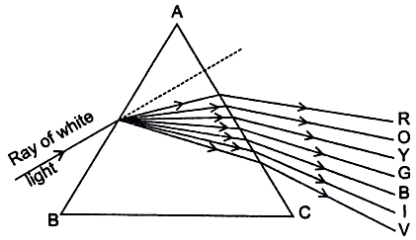
[Paper Code: 31/5/3]

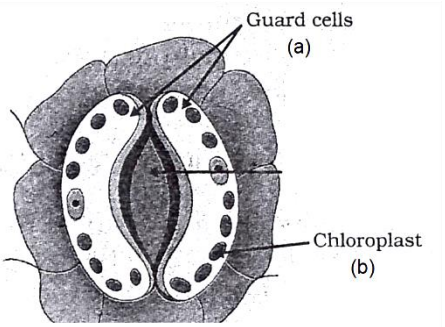
Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(A) / (i) and (ii)	1	1
2	(C)/ It has a very small area for glucose and oxygen to pass from mother to the embryo	1	1
3	(D)/basic→ acidic→ basic	1	1
4	(C)/ Receptors in skin →Sensory neuron →Relay neuron → Motor neuron→ Effector muscle in arm.	1	1
5	(C) /2,2,4	1	1
6	(D) / Fe_2O_3 + 3 CO→ 2 Fe + 3 CO_2	1	1
7	(C)/ 7	1	1
8	(B) / Al, Al_2O_3	1	1
9	(D) / Translocation	1	1
10	(A) / Nose	1	1
11	(D)/ Cropland ecosystem	1	1
12	(A) / both pointing into the plane of the paper.	1	1
13	(C) / The brightness of the image will reduce	1	1
14	(B) / Refraction, Dispersion and internal reflection	1	1
15	(A) / Red	1	1
16	(C) / A solenoid	1	1
17	(B) / Both Assertion (A) and Reason (R) are the true , but Reason (R) is not a correct explanation of Assertion (A).	1	1
18	(A) / Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).	1	1
19	(D) / Assertion (A) is false, but Reason (R) is true.	1	1
20	(B) / Both Assertion (A) and Reason (R) are the true , but Reason (R) is not a correct explanation of Assertion (A).	1	1
	SECTION B		
21	(a) • Formation of lactic acid in muscles causes cramps. •Aerobic respiration takes place in the presence of oxygen whereas the respiration taking place above is due to lack of oxygen. / End products of aerobic respiration are CO_2 + H_2O +Energy whereas in the above case, Lactic acid + Energy is formed. **OR**	1 1	

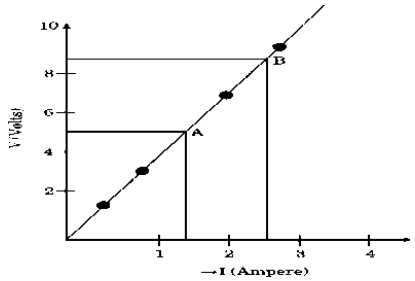
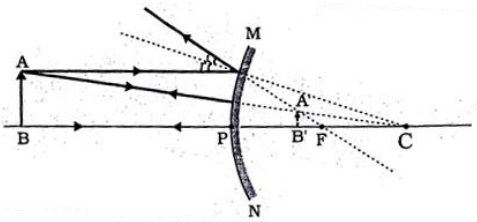
	(b) • Tissue fluid / Extracellular fluid Functions : i. Carries digested and absorbed fats from the intestine. ii. Drains excess fluid from extracellular space back into the blood. iii. Fight against infections. **(any 2)**	1 ½ + ½	2
22	C_3H_7OH $= 3 \times 12 + 7 \times 1 + 16x1 + 1$ $= 60u$ Boiling point of alcohols increases from lower to higher homologues	½ ½ 1	2
23	(a) • Copper Oxide • Black $2Cu + O_2 \xrightarrow{Heat} 2CuO$ OR (b) $BaCl_2\,(aq) + Na_2SO_4\,(aq) \rightarrow BaSO_4\,(s) + 2NaCl\,(aq)$ Ba^{2+}, SO_4^{2-}	½ ½ 1 1 ½, ½	2
24	• Fallopian tube/oviduct • Fertilisation will not take place. • Surgical method/Tubectomy	1 ½ ½	2
25	(a) Concave mirror/ Converging mirror (b) Between pole and focus (c) • Virtual • Erect • Behind the mirror **(Any two)**	½ ½ ½ + ½	2
26	I = 0·5 A, t = 2 hours = 2 × 3600 s $I = Q/t$ $\therefore Q = I \times t = 0{\cdot}5\ A \times 2 \times 3600\ s = 3600\ C$	½ ½ 1	2
	SECTION C		
27	(a) Because water breaks up into hydrogen gas and oxygen gas. (b) Endothermic reaction as Electrical energy is required to decompose water.	½ ½ + ½	

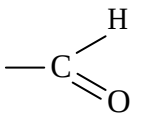
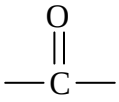
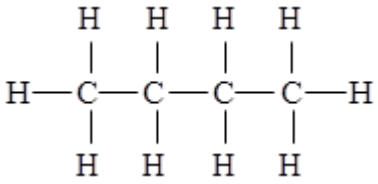
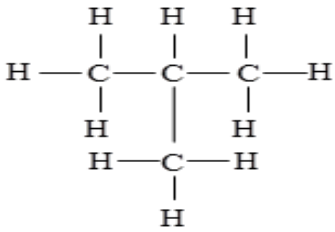
	(c) Anode – oxygen; Cathode – hydrogen (d) Mass ratio = 8 : 1	½ + ½ ½	3
28	<table><tr><th>Food chain</th><th>Food web</th></tr><tr><td>It is a series of organisms feeding on one another at various levels</td><td>It is a network of interconnected food chains/series of branching lines which provides a number of feeding connections amongst different organisms.</td></tr></table> • Population of grass/ first trophic level will increase. • Population of tiger/ third trophic level will decrease.	1+1 ½ ½	3
29	• Auxin • When light is coming from one side of the plant, auxin located at shoot tip diffuses towards the shaded side of the shoot. • Concentration of auxin in the shaded region stimulates the cells to grow longer as compared to the region exposed to light. So the plant tends to bend towards the light.	1 1 1	3
30	• Cinnabar • Sulphide ore • $2HgS + 3O_2 \xrightarrow{Heat} 2HgO + 2SO_2$ • $2HgO \xrightarrow{Heat} 2Hg + O_2$	½ ½ 1 1	3
31	(a) All Plants Tall Gene combination: Tt (b) It is a recessive trait / it cannot be expressed in presence of dominant trait. (c) Tall : Short 3 : 1 Conclusion: Tall trait is dominant and short trait is recessive.	½ ½ 1 ½ ½	3
32	(a) 2000 W heater , For heater, $I_1 = \frac{P}{V}$ =9.09 A ; For Bulb, $I_2 = \frac{P}{V}$ = 0.45 A $I_1 > I_2$ (b) 100 W bulb $I_2 = \frac{P}{V}$ = 0.45 A As it draws only 0·45 A which is less than 1 A.	½ ½ ½ ½	

	(c) 2000 W heater $I_1 = \frac{P}{V}$ =9.09 A As the current drawn is 9·09 A which is higher than 5·0 A.	½ ½	3
33	(a) (i) • Hypermetropia • Ciliary muscles/ eye lens (ii) • Focal length of the eye lens is too long. • Eyeball becomes too small. (iii) Converging lenses/ convex lens They provide the additional focussing power required for forming the image on the retina./ Decrease the focal length of the eye lens **OR** (b) The splitting of white light into its constituent colours is called dispersion. Cause: Different colours of white light bend through different angles with respect to incident ray.  	½ ½ ½ ½ ½ ½ 1 1 1	3
	SECTION D		
34	(a) • Take two healthy potted plants, A and B of nearly the same size. • Keep them in darkness for three days. (Destarch the plant) • Place a watch glass containing potassium hydroxide by the side of potted plant A but not in potted plant B. • Cover both the plants with separate bell jars and seal the bottom of the jars with Vaseline. • Keep both the plants in sunlight for two hours. • Pluck one leaf each from both the plants and test for the presence of starch with iodine solution. • <u>Observation</u>: The leaf of the potted plant A with KOH did not turn blue – black. The leaf of the potted plant B turns blue. • <u>Conclusion</u>: KOH absorbs CO_2 so photosynthesis did not occur in potted plant A.	 ½ x 6 1 1	

	OR (b) (i) In set up (I) lime water turns milky in more time as compared to set up (II) because the air we exhaled contains high percentage of CO_2 as compared to atmospheric air. (ii)  Open Stomatal Pore Two labellings : (I) Guard Cells (II) Chloroplast Two functions performed by stomata : • Gaseous exchange • Transpiration	1,1 1 ½ ½ ½ ½	5
35	(a) (i) The molecules of water of crystallisation in ferrous sulphate crystals get evaporated on heating. (ii) Green $\longrightarrow$ White (iii) Seven / ($FeSO_4 \cdot 7H_2O$) (I) $CuSO_4 \cdot 5H_2O$ (II) $Na_2CO_3 \cdot 10H_2O$ (iv) • On heating gypsum ($CaSO_4 \cdot 2H_2O$) at 373 K it loses water molecules/ $CaSO_4 \cdot 2\,H_2O \xrightarrow[373\,K]{\Delta} CaSO_4 \cdot \frac{1}{2}\,H_2O + 1\frac{1}{2}\,H_2O$ Two uses of plaster of Paris: • Making toys / material for decoration • Supporting fractured bones **(or any other)** **OR**	1 ½ ½ ½ ½ 1 ½ , ½	

	(b) (i) X-Tartaric acid Y-Baking soda Z- Baking powder Y-$NaHCO_3$ (ii) $NaCl + H_2O + CO_2 + NH_3 \longrightarrow NH_4Cl + NaHCO_3$ $NaHCO_3 + H^+ \longrightarrow CO_2 + H_2O$ + Sodium salt of acid CO_2 released during heating makes the cake soft and spongy (iii) Magnesium hydroxide; $Mg(OH)_2$	½ ½ ½ ½ 1 ½ ½ 1	5
36	(a) (i) Parallel Circuit • Each electrical appliance has its own switch due to which it can be turned ON and OFF separately. • If one electrical appliance stops working, others remain unaffected. • Each appliance has equal potential difference and draws current as per its requirement. • The total resistance in parallel circuit decreases. (any two) (ii) Combined resistance of the series, $R_1 = 6\ \Omega + 6\ \Omega = 12\ \Omega$ Combined resistance of parallel grouping of 6 Ω and $R_1 = 12\ \Omega$, resistors is R_2, where $\frac{1}{R_2} = \frac{1}{6} + \frac{1}{12} = \frac{9}{20}$ $R_2 = 4{\cdot}0\ \Omega$ Total resistance of circuit = R = 3 + 4 + 3 = 10 Ω Current flowing = $I = \frac{V}{R}$ $= \frac{4{\cdot}5\ V}{10\ \Omega}$ $= 0{\cdot}45\ A$ **OR**	1 ½ +½ ½ ½ 1 ½ ½	

	(b) (i)  (ii) Resistance of resistor = $\frac{V_2 - V_1}{I_2 - I_1} = \frac{8 \cdot 3 - 5 \cdot 2}{2 \cdot 5 - 1 \cdot 5} = 3 \cdot 1\ \Omega$ (iii) The given resistor obeys Ohm's law./ Resistance remains constant. (iv) Because when the value of V = 0, the current I = 0.	1 1+1 1 1	5
	SECTION E		
37	(a) It is straight line passing through the pole and centre of curvature of a concave mirror. (b) Radius of curvature ,R= 20 cm (c) (i) u = –10 cm, f = +15 cm $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{15} - \frac{1}{-10}$ $\frac{1}{v} = \frac{1}{6}$ $\Rightarrow$ v = + 6 cm **OR** (c) (ii) Convex mirror / Diverging mirror  **[Note: Deduct ½ mark if direction of rays is not shown]**	1 1 ½ ½ 1 ½ 1 ½	4
38	(a) Compounds formed by carbon and hydrogen only. (b) Tetravalency and Catenation	1 1	

	(c) (i) (1)  (2)  $CH_3COOH + C_2H_5OH \xrightarrow{Acid} CH_3COOC_2H_5 + H_2O$ Ester **OR** (c) (ii) Compounds with identical molecular formula but different structures Two isomers of butane C_4H_{10}  	½ +½ 1 1 ½ +½	4
39	(a) **Self-pollination**: Transfer of pollen grains from anther to the stigma of the same flower. **Cross-pollination**: Transfer of pollen grains from the anther of one flower to the stigma of another flower. (b) Petals, they dry and fall off. (c) (i) Fusion of male and female gametes to form a zygote Ovule – Seed, Ovary – fruit **OR** (c) (ii) Future shoot – Plumule, Future root – Radicle Cotyledon – Stores food.	1 ½ + ½ 1 ½ ½ ½ ½ 1	4