Set-3

Series DAA1B/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.

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 **31** हैं ।	(I) Please check that this question paper contains **31** 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 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.

सामान्य निर्देश :

निम्नलिखित निर्देशों को 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।*

General Instructions :

Read the following instructions very carefully and strictly follow them :

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

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

(iii) ***Section A** - Question Nos. **1** to **20** are Multiple Choice Questions. Each question carries **1** mark.*

(iv) ***Section B** - Question Nos. **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** - Question Nos. **27** to **33** are Short Answer (SA) type questions. Each question carries **3** marks. Answer to these questions should be in the range of **50** to **80** words.*

(vi) ***Section D** - Question Nos. **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** - Question Nos. **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.*

खण्ड – क (20 × 1 = 20)

इस खण्ड में 20 बहुविकल्पी प्रश्न (प्रश्न 1 – 20) हैं । सभी प्रश्न अनिवार्य हैं ।

1. नीचे दी गयी कौन सी एक अभिक्रिया अन्य तीन अभिक्रियाओं से भिन्न है ? **1**

(A) $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$

(B) $CaO + H_2O \rightarrow Ca(OH)_2$

(C) $KNO_3 + H_2SO_4 \rightarrow KHSO_4 + HNO_3$

(D) $ZnCl_2 + H_2S \rightarrow ZnS + 2HCl$

2. नीचे दी गयी रासायनिक अभिक्रिया में प्राप्त उत्पाद 'X' पहचानिए : **1**

$$CaCO_3 \xrightarrow{\Delta} \text{'X'} + CO_2$$

(A) बिना बुझा चूना (B) जिप्सम

(C) चूना पत्थर (D) प्लास्टर ऑफ पेरिस

3. निम्नलिखित में से प्राकृतिक सूचकों का जोड़ा चुनिए : **1**

(A) लिटमस और मेथिल ऑरैन्ज (B) हल्दी और लिटमस

(C) फीनॉलफ्थेलिन और मेथिल ऑरैन्ज (D) मेथिल ऑरैन्ज और हल्दी

4. काँच, साबुन और कागज उद्योगों में उपयोग होने वाला रासायनिक यौगिक है **1**

(A) धोने का सोडा (B) बेकिंग सोडा

(C) विरंजक चूर्ण (D) साधारण नमक

SECTION – A (20 × 1 = 20)

In this section, Question Nos. 1 to 20 are Multiple-Choice Questions. All questions are compulsory.

1. Which one of the following reactions is different from the remaining three ? **1**

   (A) $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$

   (B) $CaO + H_2O \rightarrow Ca(OH)_2$

   (C) $KNO_3 + H_2SO_4 \rightarrow KHSO_4 + HNO_3$

   (D) $ZnCl_2 + H_2S \rightarrow ZnS + 2HCl$

2. Identify the product 'X' obtained in the following chemical reaction : **1**

   $$CaCO_3 \xrightarrow{\Delta} \text{'X'} + CO_2$$

   (A) Quick lime (B) Gypsum

   (C) Lime Stone (D) Plaster of Paris

3. Select a pair of natural indicator from the following : **1**

   (A) Litmus and methyl orange

   (B) Turmeric and Litmus

   (C) Phenolphthalein and methyl orange

   (D) Methyl orange and Turmeric

4. A chemical compound used in glass, soap and paper industries is **1**

   (A) Washing Soda (B) Baking Soda

   (C) Bleaching Powder (D) Common Salt

5. क्वथन नली में लेड नाइट्रेट को गर्म करने पर प्राप्त होने वाले उत्पाद हैं – **1**

(A) PbO, N_2O और O_2

(B) NO, PbO और O_2

(C) $Pb(NO_2)_2$ और O_2

(D) NO_2, PbO और O_2

6. निम्नलिखित में से असंतृप्त हाइड्रोकार्बनों का समूह पहचानिए : **1**

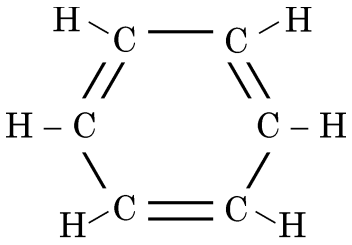
(A) प्रोपेन, एथीन, ब्यूटाइन

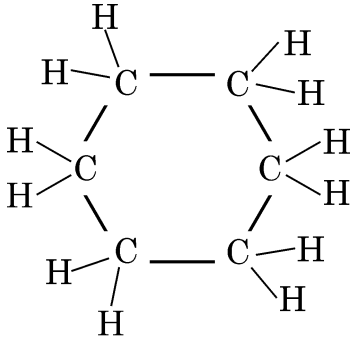
(B) एथीन, प्रोपेन, हैक्सेन

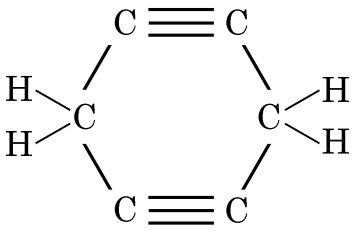
(C) साइक्लोहैक्सेन, मीथेन, एथेन

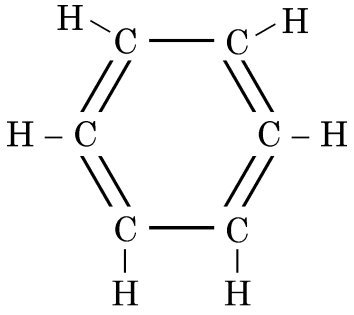
(D) ब्यूटाइन, एथीन, प्रोपाइन

7. साइक्लोहेक्सेन का संरचनात्मक सूत्र है **1**

(A) 

(B) 

(C) 

(D) 

5. The products obtained when Lead nitrate is heated in a boiling tube. **1**

(A) PbO, N_2O and O_2

(B) NO, PbO and O_2

(C) $Pb(NO_2)_2$ and O_2

(D) NO_2, PbO and O_2

6. Identify a group of the unsaturated hydrocarbons from the following : **1**

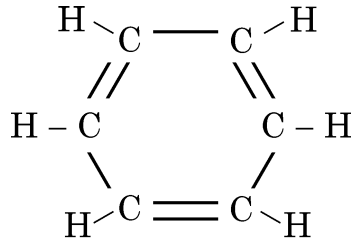
(A) Propane, Ethene, Butyne

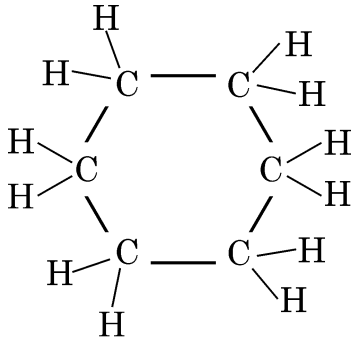
(B) Ethene, Propane, Hexane

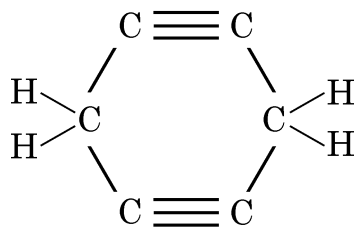
(C) Cyclohexane, Methane, Ethane

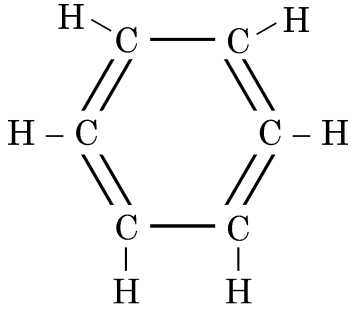
(D) Butyne, Ethene, Propyne

7. The structural formula of Cyclohexane is **1**

(A) 

(B) 

(C) 

(D) 

8. मानव हृदय के बारे नीचे दिए गए कथनों में सही कथन/कथनों को चुनिए : 1

(a) दायाँ अलिन्द फुफ्फुस से फुफ्फुसीय धमनी द्वारा ऑक्सीजनित रुधिर प्राप्त करता है ।

(b) बायाँ अलिन्द बाएँ निलय को ऑक्सीजनित रुधिर स्थानान्तरित करता है जो उसे शरीर के विभिन्न भागों तक पहुँचा देता है ।

(c) दायाँ अलिन्द महा शिरा द्वारा शरीर के विभिन्न भागों से आने वाले विऑक्सीजनित रुधिर को प्राप्त करता है ।

(d) बायाँ अलिन्द महाधमनी को ऑक्सीजनित रुधिर स्थानान्तरित करता है जो उसे शरीर के विभिन्न भागों को देती है ।

(A) केवल (b) (B) (a) और (d)

(C) (b) और (c) (D) (b) और (d)

9. दो पृथक लक्षणों – बीजों की आकृति और रंग (वर्ण) की स्वतंत्र वंशानुगति के अध्ययन के लिए किए गए प्रयोग में F_2 संतति में विभिन्न संयोजनों का अनुपात होगा – 1

(A) 1 : 3 (B) 1 : 2 : 1

(C) 9 : 3 : 3 : 1 (D) 9 : 1 : 1 : 3

10. नीचे दिए गए पादप हॉर्मोनों में से उस एक को चुनिए जो कोशिका विभाजन को बढ़ावा देता है । 1

(A) जिब्बेरेलिन (B) ऑक्सिन

(C) एब्सिसिक अम्ल (D) साइटोकाइनिन

8. Which of the following statement (s) is (are) true about human heart ? **1**

(a) Right atrium receives oxygenated blood from lungs through pulmonary artery.

(b) Left atrium transfers oxygenated blood to left ventricle which sends it to various parts of the body.

(c) Right atrium receives deoxygenated blood from different parts of the body through vena cava.

(d) Left atrium transfers oxygenated blood to aorta which sends it to different parts of the body.

(A) (b) only

(B) (a) and (d)

(C) (b) and (c)

(D) (b) and (d)

9. In an experiment to study independent inheritance of two separate traits : shape and colour of seeds, the ratio of the different combinations in F_2 progeny would be **1**

(A) 1 : 3

(B) 1 : 2 : 1

(C) 9 : 3 : 3 : 1

(D) 9 : 1 : 1 : 3

10. Select from the following a plant hormone which promotes cell division. **1**

(A) Gibberellins

(B) Auxins

(C) Abscissic Acids

(D) Cytokinins

11. लैंगिक जनन द्वारा उत्पन्न संतति में अधिक विभिन्नताएँ होने का कारण है – **1**

(A) कई जनकों द्वारा आनुवंशिक पदार्थ का योगदान होना ।

(B) लैंगिक जनन एक लम्बी प्रक्रिया है ।

(C) नई संतति उत्पन्न करने के लिए एक ही प्रजाति के दो व्यक्तियों द्वारा आनुवंशिक पदार्थ का योगदान होना ।

(D) DNA की प्रतिकृति बनने के साथ-साथ दूसरी कोशिकीय संरचना का सृजन नहीं होता है ।

12. पर्यावरण पर जिस जीव का लिंग निर्धारण निर्भर करता है, वह जीव है – **1**

(A) पक्षी (B) उभयचर

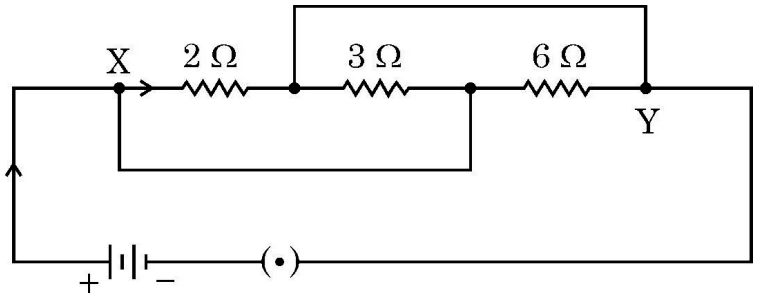
(C) सरीसृप (D) मछलियाँ

13. समान पदार्थ के चार तारों के प्रकरण में उस तार का प्रतिरोध निम्नतम होगा जिसका व्यास और लम्बाई क्रमशः हैं **1**

(A) D/2 और L/4 (B) D/4 और 4L

(C) 2D और L (D) 4D और 2L

14. दिए गए परिपथ में X और Y के बीच कुल प्रतिरोध है : **1**



(A) 12 Ω (B) 4 Ω

(C) 6 Ω (D) 1 Ω

11. Offsprings formed as a result of sexual reproduction produce more variations because **1**

(A) genetic material is contributed by many parents.

(B) sexual reproduction is a lengthy process.

(C) genetic material is contributed by two individuals of same species to produce a new generation.

(D) DNA copying is not accompanied by the creation of cellular apparatus.

12. Sex determination depends upon the environment in **1**

(A) Birds (B) Amphibians

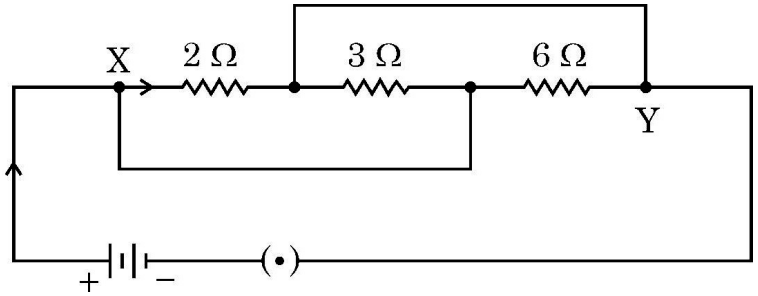
(C) Reptiles (D) Fishes

13. In case of four wires of same material, the resistance will be minimum if the diameter and length of the wire respectively are **1**

(A) D/2 and L/4 (B) D/4 and 4L

(C) 2D and L (D) 4D and 2L

14. In the given circuit the total resistance between X and Y is : **1**



(A) 12 Ω (B) 4 Ω

(C) 6 Ω (D) 1 Ω

15. ओज़ोन के विषय में नीचे दिए गए कथनों पर विचार कीजिए : 1

(a) ओज़ोन विषैली गैस है ।

(b) ओज़ोन पृथ्वी के पृष्ठ को सूर्य से आने वाले हानिकर अवरक्त विकिरणों से सुरक्षा प्रदान करती है ।

(c) पराबैंगनी विकिरणों के प्रभाव से ऑक्सीजन (O_2) अणुओं से ओज़ोन बनती है ।

(d) पृथ्वी के वायुमंडल के निचले स्तर पर ओज़ोन एक अत्यन्त आवश्यक प्रकार्य सम्पादित करती है ।

इनमें सही कथन हैं –

(A) (a) और (b) (B) (a) और (c)

(C) (b) और (c) (D) (b) और (d)

16. ऊर्जा के पदों में कोई आहार शृंखला तब अधिक लाभकारी होती है, जब उसमें होते हैं 1

(A) दो पोषी स्तर (B) तीन पोषी स्तर

(C) चार पोषी स्तर (D) पाँच पोषी स्तर

प्रश्न संख्या **17** से **20** इन प्रश्नों में **दो** कथन – अभिकथन (A) और कारण (R) दिए गए हैं । इन प्रश्नों के उत्तर नीचे दिए अनुसार उचित विकल्प को चुनकर दीजिए :

(A) (A) और (R) दोनों सही हैं तथा (R) द्वारा (A) की सही व्याख्या हो रही है ।

(B) (A) और (R) दोनों सही हैं तथा (R) द्वारा (A) की सही व्याख्या नहीं हो रही है ।

(C) (A) सही है, परन्तु (R) गलत है ।

(D) (A) गलत है, परन्तु (R) सही है ।

15. Consider the following statements about ozone : **1**

(a) Ozone is poisonous gas.

(b) Ozone shields the earth's surface from the infrared radiation from the sun.

(c) Ozone is a product of UV radiations acting on oxygen molecule.

(d) At the lower level of the earth's atmosphere, ozone performs most essential function.

The correct statements are

(A) (a) and (b) (B) (a) and (c)

(C) (b) and (c) (D) (b) and (d)

16. A food chain will be more advantageous in terms of energy if it has **1**

(A) 2 trophic levels (B) 3 trophic levels

(C) 4 trophic levels (D) 5 trophic levels

Q. 17 to **20** consists of two statements – Assertion (A) and Reason (R), answer these questions selecting the appropriate option given below :

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

(B) Both (A) and (R) are true and (R) is not correct explanation of (A).

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

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

17. **अभिकथन (A)** : सड़क पर वाहनों को रोकने के लिए लाल प्रकाश के सिग्नलों का उपयोग किया जाता है । **1**

कारण (R) : सबसे अधिक प्रकीर्णित होने के कारण लाल प्रकाश को अधिक दूरी से देखा जा सकता है ।

18. **अभिकथन (A)** : कुछ समय तक कॉपर सल्फेट विलयन में डुबाएँ रखने पर जिंक धातु का टुकड़ा रक्ताभ भूरा हो जाता है । **1**

कारण (R) : कॉपर जिंक से अधिक सक्रिय धातु है ।

19. **अभिकथन (A)** : अलैंगिक जनन द्वारा उत्पन्न संतति आनुवंशिकतः जनकों के समान होती है । **1**

कारण (R) : अलैंगिक जनन में एक जनक भाग लेता है ।

20. **अभिकथन (A)** : किसी पारितंत्र में भोजन उपलब्ध कराने के लिए उत्पादक सूर्य की ऊर्जा का उपयोग करने में समर्थ होते हैं । **1**

कारण (R) : किसी पारितंत्र में सभी आहार शृंखलाएँ उत्पादकों से आरम्भ होती हैं ।

खण्ड – ख

प्रश्न संख्या 21 से 26 अति लघु उत्तर प्रश्न हैं । प्रत्येक प्रश्न 2 अंकों का है ।

21. (a) नीचे दी गयी अभिक्रिया के प्रकार का नाम लिखिए तथा इस अभिक्रिया के होने की आवश्यक शर्तों का उल्लेख कीजिए :

$$2AgCl \longrightarrow 2Ag + Cl_2$$

(b) नीचे दी गयी रासायनिक अभिक्रिया को संतुलित रासायनिक समीकरण के रूप में पूरा कीजिए :

$$FeSO_4 \xrightarrow{\Delta} Fe_2O_3 + ... + ...$$ **2**

17. **Assertion (A) :** Red light signals are used to stop the vehicles on the road. **1**

Reason (R) : Red coloured light is scattered the most so as to be visible from a large distance.

18. **Assertion (A) :** A piece of Zinc metal gets reddish brown coating when kept in copper sulphate solution for some time. **1**

Reason (R) : Copper is more reactive metal than Zinc.

19. **Assertion (A) :** Offsprings produced by asexual reproduction are genetically similar to the parents. **1**

Reason (R) : Asexual reproduction involves a single parent.

20. **Assertion (A) :** Producers are capable of using light energy from the sun to make food available in an ecosystem. **1**

Reason (R) : All food chains in an ecosystem start with a producer.

SECTION – B

Question Nos. 21 to 26 are very short answer type questions. Each question carries 2 marks.

21. (a) Write the essential conditions for following reaction to take place and name its types :

$$2AgCl \longrightarrow 2Ag + Cl_2$$

(b) Complete the following chemical reaction in the form of a balanced equation :

$$FeSO_4 \xrightarrow{\Delta} Fe_2O_3 + \ldots\ldots + \ldots\ldots$$ **2**

22. (a) मटर के पौधों के किन्हीं दो दृष्टिगोचर होने वाले विपर्यासी लक्षणों के युगलों (जोड़ों) की सूची बनाइए जिनका उपयोग मेंडल ने अपने प्रयोगों में किया था । प्रत्येक जोड़े के प्रभावी और अप्रभावी लक्षणों का उल्लेख भी कीजिए । **2**

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22. (b) मानवों में शिशु नर होगा अथवा मादा होगा इसकी प्रायिकता (संभावना) 50% होती है । केवल प्रवाह आरेख खींचकर इस कथन की व्याख्या कीजिए । **2**

23. ऑक्सिन का संश्लेषण कहाँ होता है ? ये प्रकाशानुवर्तन को किस प्रकार बढ़ावा देते हैं ? **2**

24. (a) किसी सीधे धारावाही चालक के कारण उत्पन्न चुम्बकीय क्षेत्र रेखाओं के पैटर्न को दर्शाने के लिए नामांकित आरेख खींचिए । इस आरेख में चालक में प्रवाहित धारा की दिशा और चुम्बकीय क्षेत्र रेखाओं की दिशा अंकित कीजिए । **2**

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24. (b) उस युक्ति का नाम लिखिए जिसका उपयोग किसी चुम्बकीय पदार्थ के टुकड़े को चुम्बकित करने में किया जाता है । उस व्यवस्था को दर्शाने के लिए नामांकित आरेख खींचिए जिसका उपयोग नर्म लोहे के सिलिण्डर को चुम्बकित करने में किया जाता है । **2**

25. यह हम कब कहते हैं कि कोई व्यक्ति दीर्घ-दृष्टि दोष (दूर-दृष्टिता) से पीड़ित है ? इस दोष के दो कारणों की सूची बनाइए । इस दोष के संशोधन के लिए उपयोग किए जाने लेंस के प्रकार का नाम लिखिए । **2**

22. (a) List any two pairs of visible contrasting characters of garden pea plants used by Mendel for his experiments stating the dominant and recessive characters in each pair. **2**

OR

22. (b) In human beings, the probability of getting a male or a female child is 50%. Explain with the help of a flow diagram only. **2**

23. Where are auxins synthesized ? How do they promote phototropism ? **2**

24. (a) Draw a labelled diagram to show the pattern of magnetic field lines produced due to a current carrying straight conductor. Mark on it the direction of current in the conductor and the direction of magnetic field lines. **2**

OR

24. (b) Name the device used to magnetise a piece of magnetic material. Draw a labelled diagram to show the arrangement used for the magnetisation of a cylinder made of soft iron. **2**

25. When do we say that a particular person is suffering from hypermetropia ? List two causes of this defect. Name the type of lens used to correct this defect. **2**

26. निम्नलिखित के लिए कारण दीजिए : **2**

(a) किसी पारितंत्र में आहार शृंखला की तुलना में आहार–जाल अधिक स्थायी होता है ।

(b) किसी आहार शृंखला में चार या पाँच से अधिक पोषी स्तर नहीं होने चाहिए ।

खण्ड – ग

प्रश्न संख्या 27 से 33 लघु उत्तर प्रश्न हैं । प्रत्येक प्रश्न 3 अंकों का है ।

27. (a) आयरन (III) ऑक्साइड और एलुमिनियम धातु के बीच होने वाली रासायनिक अभिक्रिया का नाम लिखिए और इसका संतुलित रासायनिक समीकरण दीजिए । इस अभिक्रिया को विस्थापन अभिक्रिया क्यों कहते हैं ? इस अभिक्रिया का एक उपयोग लिखिए । **3**

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(b) कोई छात्र किसी धातु 'E', जिसका भण्डारण केरोसिन तेल में किया जाता है, के साथ प्रयोगशाला में कार्य कर रहा है । किसी तरह से इस धातु का छोटा टुकड़ा छिटककर पानी से भरे बीकर में गिर कर जलने लगता है । **3**

(i) धातु 'E' का नाम लिखिए ।

(ii) धातु 'E' की पानी से अभिक्रिया का रासायनिक समीकरण लिखिए । प्राप्त उत्पाद की प्रकृति (अम्लीय/क्षारकीय/उदासीन) का उल्लेख कीजिए ।

(iii) धातु 'E' को इसके गालित क्लोराइड से प्राप्त करने की प्रक्रिया का नाम लिखिए ।

28. निम्नलिखित के लिए कारण दीजिए : **3**

(a) जिंक ऑक्साइड एक उभयधर्मी ऑक्साइड है ।

(b) पानी में डुबोए जाने पर कैल्शियम पानी के पृष्ठ पर तैरने लगता है ।

(c) सामान्यतः धातुओं की नाइट्रिक अम्ल से अभिक्रिया में हाइड्रोजन गैस का उत्सर्जन नहीं होता है ।

26. Give reasons for the following : **2**

(a) Food web is more stable than a food chain in an ecosystem.

(b) A food chain should not have more than four to five trophic levels.

SECTION – C

Question Nos. 27 to 33 are short answer type questions. Each question carries 3 marks.

27. (a) Name the chemical reaction that occurs between iron (III) oxide and aluminium metal. Write its balanced chemical equation. Why is this reaction called displacement reaction ? Give one use of this reaction. **3**

OR

(b) A student is working in a laboratory with metal 'E' which is stored under kerosene oil. Some how a small piece of this metal falls in a beaker containing water and starts burning. **3**

(i) Name the metal 'E'.

(ii) Write chemical equation for the reaction when metal 'E' reacts with water. State the nature (acidic/basic/neutral) of the product obtained.

(iii) Name the process by which this metal 'E' is obtained from its molten chloride.

28. State reasons for the following : **3**

(a) Zinc oxide is an amphoteric oxide.

(b) Calcium starts floating when immersed in water.

(c) In the reactions of nitric acid with metals, generally hydrogen gas is not evolved.

29. हम मृदा को जल देते हैं, परन्तु यह जल पौधे की सबसे ऊँची पत्ती तक पहुँच जाता है । इसमें होने वाली प्रक्रिया की संक्षेप में व्याख्या कीजिए । **3**

30. उस हॉर्मोन का नाम और अवस्थिति लिखिए जो किसी व्यक्ति की, कुत्ते द्वारा पीछा करने पर अनुक्रिया करने में उसकी सहायता करता है । उसके शरीर में उन अनुक्रियाओं का उल्लेख कीजिए जो उसकी इस प्रकार की परिस्थितियों में सहायता करती हैं । **3**

31. घरेलू परिपथों में विद्युत फ्यूज़ के कार्य की संक्षेप में व्याख्या कीजिए । 3 kW; 220 V अनुमतांक के किसी विद्युत हीटर को 5 A धारा अनुमतांक के विद्युत परिपथ में प्रचालित किया जाना है । विद्युत हीटर के स्विच को **'ऑन'** करने पर क्या हो सकता है ? आवश्यक परिकलनों की सहायता से अपने उत्तर की पुष्टि कीजिए । **3**

32. किसी परिपथ का व्यवस्था आरेख खींचिए जिसमें 1.5 V के चार शुष्क सेल वाली बैटरी, एक 2 Ω का प्रतिरोधक, एक 6 Ω का प्रतिरोधक, एक 16 Ω का प्रतिरोधक तथा एक प्लग कुंजी सभी श्रेणी में संयोजित हैं । परिपथ में धारा मापने के लिए एक एमीटर लगाइए तथा 16 Ω के प्रतिरोधक के सिरों पर विभवान्तर मापने के लिए एक वोल्टमीटर इसके दोनों सिरों से जोड़िए । जब कुंजी बन्द है, तब ओम के नियम का उपयोग करके निर्धारित कीजिए **3**

(a) एमीटर का पाठ्यांक, तथा

(b) वोल्टमीटर का पाठ्यांक

29. We water the soil but it reaches the topmost leaves of the plants. Explain in brief the process involved. **3**

30. Write the name and location of a hormone which helps a person to respond when chased by a dog. Mention the responses in the body which help him to deal with the situation. **3**

31. Explain in brief the function of an electric fuse in a domestic circuit. An electric heater of current rating 3 kW; 220 V is to be operated in an electric circuit of rating 5 A. What is likely to happen when the heater is switched **'ON'** ? Justify your answer with necessary calculation. **3**

32. Draw a schematic diagram of a circuit consisting of a battery of four dry cells of 1.5 V each, a 2 Ω resistor, a 6 Ω resistor, 16 Ω resistor and a plug key all connected in series. Put an ammeter to measure the current in the circuit and a voltmeter across the 16 Ω resistor to measure potential difference across its two ends. Use Ohm's law to determine **3**

(a) ammeter reading, and

(b) voltmeter reading when key is closed.

33. प्रकाश की उस परिघटना का नाम लिखिए तथा उसकी व्याख्या कीजिए जिसके कारण किसी सूक्ष्म छिद्र से धुएँ से भरे किसी कमरे में आने वाले प्रकाश पुन्ज का मार्ग दिखाई देने लगता है । यह भी उल्लेख कीजिए कि हमारे नेत्रों तक आने वाले प्रकाश का रंग जिस माध्यम से होकर प्रकाश पुन्ज गुजरता है, उस माध्यम के कणों के साइज़ पर किस प्रकार निर्भर करता है । **3**

खण्ड – घ

प्रश्न संख्या 34 से 36 दीर्घ उत्तर प्रश्न हैं । प्रत्येक प्रश्न 5 अंकों का है ।

34. (a) (i) नीचे दिए गए प्रत्येक प्रकरण में अपवर्तित किरण का पथ दर्शाने के लिए किरण आरेख खींचिए :

किसी अवतल लेंस पर आपतित उस प्रकाश किरण का

(1) जो मुख्य अक्ष के समान्तर गतिमान है, तथा

(2) जो मुख्य फोकस की ओर दिशिक (जाती दिखाई देती) है ।

(ii) 4 cm ऊँचा कोई बिम्ब 24 cm फोकस दूरी के किसी उत्तल लेंस के मुख्य अक्ष पर लम्बवत स्थित है । लेंस से बिम्ब की दूरी 16 cm है । प्रतिबिम्ब की स्थिति और साइज़ ज्ञात कीजिए । **5**

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34. (b) (i) नीचे दिए गए प्रत्येक प्रकरण में परावर्तित किरण का पथ दर्शाने के लिए किरण आरेख खींचिए :

किसी उत्तल दर्पण पर आपतित उस प्रकाश किरण का

(1) जो मुख्य अक्ष के समान्तर गतिमान है, तथा

(2) जो मुख्य फोकस की ओर दिशिक (जाती दिखाई देती) है ।

(ii) 1.5 cm ऊँची मोमबत्ती की ज्वाला 12 cm फोकस दूरी के किसी अवतल दर्पण के मुख्य अक्ष पर लम्बवत रखी है । यदि ज्वाला की दर्पण के ध्रुव से दूरी 18 cm है, तो दर्पण सूत्र का उपयोग करके प्रतिबिम्ब की स्थिति और उसका साइज़ निर्धारित कीजिए । **5**

35. (a) किन्हीं दो लैंगिक संचरित रोगों के नाम लिखिए ।

(b) भ्रूण लिंग निर्धारण कानूनी अपराध है । क्यों ?

(c) गर्भनिरोध की तीन विधियों के नाम तथा प्रत्येक का एक–एक विपरीत प्रभाव लिखिए । **5**

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33. Name and explain the phenomenon of light due to which the path of a beam of light becomes visible when it enters a smoke filled room through a small hole. Also state the dependence of colour of the light we receive on the size of the particle of the medium through which the beam of light passes. **3**

SECTION – D

Question Nos. 34 to 36 are long answer type questions. Each question carries 5 marks.

34. (a) (i) Draw a ray diagram to show the path of the refracted ray in each of the following cases :

A ray of light incident on a concave lens

(1) parallel to its principal axis, and

(2) is directed towards its principal focus.

(ii) A 4 cm tall object is placed perpendicular to the principal axis of convex lens of focal length 24 cm. The distance of object from the lens is 16 cm. Find the position and size of image formed. **5**

OR

34. (b) (i) Draw a ray diagram to show the path of the reflected ray in each of the following cases :

A ray of light incident on a convex mirror

(1) parallel to its principal axis, and

(2) is directed towards its principal focus

(ii) A 1.5 cm tall candle flame is placed perpendicular to the principal axis of a concave mirror of focal length 12 cm. If the distance of the flame from the pole of the mirror is 18 cm, use mirror formula to determine the position and size of the image formed. **5**

35. (a) Name any two sexually transmitted diseases.

(b) Prenatal sex determination is prohibited by law. Why ?

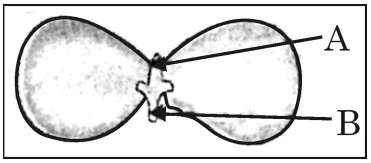
(c) Name any three methods of contraception stating one side-effect of each. **5**

OR

35. (a) एक एकलिंगी पुष्प और एक उभयलिंगी पुष्प का नाम लिखिए ।

(b) परपरागण की परिभाषा लिखिए । उल्लेख कीजिए कि यह किस प्रकार होता है ।

(c) नीचे दिए गए आरेख का प्रेक्षण कीजिए तथा इस पर अंकित भाग A और B के नाम लिखिए । इन भागों में प्रत्येक के कार्य का उल्लेख कीजिए । **5**



36. (a) (i) pH पेपर के साथ परीक्षण करने पर पाँच विलयनों A, B, C, D और E के pH क्रमशः 4, 1, 13, 7 और 10 दर्शाए गए । इनमें से कौन सा विलयन –

(1) प्रबल अम्लीय, (2) प्रबल क्षारकीय, (3) दुर्बल अम्लीय, (4) उदासीन तथा (5) दुर्बल क्षारकीय है ? इन विलयनों को इनकी बढ़ती H^+ आयन सांद्रता के क्रम में व्यवस्थित कीजिए ।

(ii) (1) एक अम्लीय लवण और (2) एक क्षारकीय लवण का नाम लिखिए और प्रत्येक प्रकरण में इन लवणों के जनक अम्ल और जनक क्षारक का नाम भी दीजिए । **5**

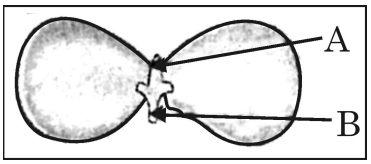
अथवा

36. (b) सोडियम क्लोराइड से सोडियम हाइड्रॉक्साइड बनाने की प्रक्रिया का नाम लिखिए और उसका संक्षेप में उल्लेख कीजिए । इस प्रक्रिया में मुख्य उत्पाद के साथ दो गैसें 'X' और 'Y' भी दो इलेक्ट्रोडों पर निकलती हैं । 'X' और 'Y' के नाम तथा जिन इलेक्ट्रोडों पर ये प्राप्त होती हैं उनके नाम भी क्रमशः लिखिए । इन दोनों गैसों में एक गैस जब शुष्क कैल्सियम हाइड्रॉक्साइड से अभिक्रिया करती है, तो कोई यौगिक 'Z' बनता है जिसका उपयोग पीने के पानी को जीवाणु से मुक्त कराने वाले संयंत्रों में तथा वस्त्र उद्योग में होता है । Z का नाम तथा इसके बनने में होने वाली रासायनिक अभिक्रिया का रासायनिक समीकरण लिखिए । **5**

35. (a) Name a unisexual and a bisexual flower.

(b) Define cross pollination. State how it is carried out.

(c) Observe the diagram given below and name the parts marked as 'A' and 'B'. **5**



Mention the function of each of these parts.

36. (a) (i) Five solutions A, B, C, D and E when tested with pH paper showed pH as 4, 1, 13, 7 and 10 respectively. Which solution is :

(1) Strongly acidic (2) Strongly alkaline (3) Weakly acidic (4) Neutral and (5) Weakly alkaline ? Arrange the solutions in increasing order of H^+ ion concentration.

(ii) Write the name and formula of (1) an acidic salt and (2) a basic salt giving the name of the parent acid and parent base used to form the salt in each case. **5**

OR

36. (b) Name and state in brief the process which is used to prepare sodium hydroxide from sodium chloride. In this process along with the main product two gases 'X' and 'Y' are also given off at the two electrodes. Name 'X' and 'Y' specifying the name of their respective electrode at which each gas is obtained. One of these gases when reacts with dry calcium hydroxide produces a compound 'Z' which is widely used in water treatment plants and textile industries. Name Z and write chemical equation for the reaction involved in its formation. **5**

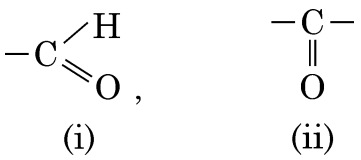
खण्ड – ङ

प्रश्न संख्या 37 से 39 स्रोत आधारित/प्रकरण आधारित प्रश्न हैं । प्रत्येक प्रश्न 4 अंकों का है ।

37. रसायन के क्षेत्र में तीस लाख से भी अधिक कार्बन के यौगिकों की खोज हो चुकी है । इन यौगिकों की विभिन्नता का कारण कार्बन परमाणुओं की परस्पर आबन्ध बनाने और अन्य तत्त्वों के साथ आबन्ध बनाने की क्षमता होना है । कार्बन के अधिकांश यौगिक विद्युत के कुचालक होते हैं तथा इनके गलनांक और क्वथनांक निम्न होते हैं । **4**

(a) उस समजातीय श्रेणी के पहले दो सदस्यों का आण्विक सूत्र लिखिए जिनका प्रकार्यात्मक समूह –Br है । **1**

(b) नीचे कुछ प्रकार्यात्मक समूहों के सूत्र दिए गए हैं : **1**



(i) (ii)

इन प्रकार्यात्मक समूहों का नाम लिखिए ।

(c) आप क्या प्रेक्षण करते हैं जब आप किसी परखनली में कुछ गरम एथेनॉल लेकर उसमें बूँद-बूँद करके 5% क्षारीय पोटैशियम परमैंगनेट मिलाते हैं ? इसमें पोटैशियम परमैंगनेट की भूमिका का उल्लेख कीजिए तथा होने वाली अभिक्रिया का रासायनिक समीकरण लिखिए । **2**

अथवा

(c) एथेनॉल को आधिक्य सांद्र सल्फ्युरिक अम्ल के साथ 443 K ताप पर गरम करने पर बनने वाले यौगिक का नाम लिखिए । इस अभिक्रिया में सांद्र सल्फ्युरिक अम्ल की भूमिका का उल्लेख कीजिए तथा होने वाली अभिक्रिया का रासायनिक समीकरण लिखिए । **2**

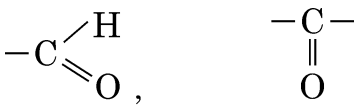
SECTION – E

Question Nos. 37 to 39 are Case/Source based questions. Each question carries 4 marks.

37. More than three million carbon compounds have been discovered in the field of chemistry. The diversity of these compounds is due to the capacity of carbon atoms for bonding with one another as well as with other atoms. Most of the carbon compounds are poor conductors of electricity and have low melting and boiling points. **4**

(a) Write the molecular formula of first two members of homologous series having functional group –Br. **1**

(b) Given below are the formulae of some functional groups : **1**



(i) (ii)

Write the name of these functional groups.

(c) What would be observed on adding a 5% alkaline potassium permanganate drop by drop to some warm ethanol taken in a test tube ? State the role of $KMnO_4$ in the reaction and write the chemical equation for the reaction involved. **2**

OR

(c) Write the name of the compound formed when ethanol is heated at 443 K temperature with excess of conc. H_2SO_4. What is the role of conc. H_2SO_4 in the reaction ? Write the chemical equation for the reaction involved. **2**

38. मानव पाचन तंत्र एक नलिका होती है जो मुँह से गुहा तक जाती है । इसका मुख्य कार्य भोजन में उपस्थित जटिल अणुओं, जो उसी रूप में अवशोषित नहीं हो सकते हैं, को छोटे अणुओं में खंडित करना होता है । ये छोटे अणु इस नलिका की भित्तियों में अवशोषित होते हैं तथा अवशोषित भोजन शरीर की प्रत्येक कोशिका तक पहुँचता है जहाँ इसका उपयोग ऊर्जा प्राप्त करने के लिए किया जाता है । **4**

(a) मुख गुहा में उपस्थित ग्रंथियों का नाम लिखिए तथा भोजन के उस घटक का उल्लेख कीजिए जिस पर इन ग्रंथियों के स्राव क्रिया करते हैं । **1**

(b) दो अंगों में निकास पर अवरोधिनी पेशी होती है । इनका नाम लिखिए । **1**

(c) क्या होगा यदि

(i) जठर ग्रंथियों द्वारा श्लेष्मा का स्रावण नहीं किया जाए ?

(ii) क्षुद्रांत्र में दीर्घ रोम उपस्थित न हों ? **2**

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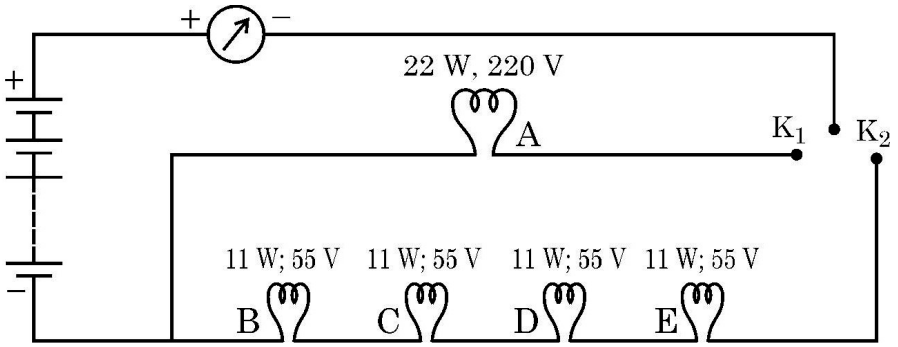
(c) "पित्त रस में कोई एन्जाइम नहीं होते, फिर भी यह पाचन में एक महत्वपूर्ण भूमिका निभाता है ।" इस कथन की पुष्टि कीजिए । **2**

39. किसी घरेलू परिपथ में पाँच LED बल्ब आरेख में दर्शाए अनुसार व्यवस्थित हैं । स्रोत की वाटता 220V है तथा प्रत्येक बल्ब का शक्ति अनुमतांक परिपथ आरेख में बल्ब के साथ अंकित किया गया है । नीचे दिए गए परिपथ आरेख के आधार पर निम्नलिखित प्रश्नों के उत्तर दीजिए : **4**



(a) उल्लेख कीजिए क्या होता है, जब **1**

(i) कुंजी K_1 को बन्द करते हैं ।

(ii) कुंजी K_2 को बन्द करते हैं ।

38. Human digestive system is a tube running from mouth to anus. Its main function is to breakdown complex molecules present in the food which cannot be absorbed as such into smaller molecules. These molecules are absorbed across the walls of the tube and the absorbed food reaches each and every cell of the body where it is utilised for obtaining energy. **4**

(a) Name the glands present in the buccal cavity and write the components of food on which the secretion of these glands act upon. **1**

(b) Two organs have a sphincter muscle at their exit. Name them. **1**

(c) What will happen if :

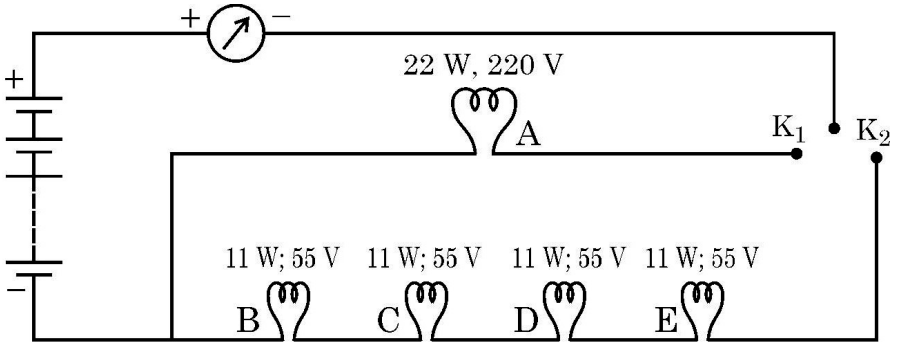
(i) mucus is not secreted by the gastric glands.

(ii) Villi are absent in the small intestine. **2**

OR

(c) "Bile juice does not contain any enzyme, yet it has important roles in digestion." Justify the statement. **2**

39. In a domestic circuit five LED bulbs are arranged as shown. The source voltage is 220 V and the power rating of each bulb is marked in the circuit diagram. Based on the following circuit diagram, answer the following questions : **4**



(a) State what happens when **1**

(i) key K_1 is closed.

(ii) key K_2 is closed.

(b) जब बल्ब B चमक रहा होता है तब वह कितनी धारा लेता है ? **1**

(c) परिकलित कीजिए : **2**

(i) बल्ब B का प्रतिरोध, तथा

(ii) चारों बल्ब B, C, D और E के संयोजन का कुल प्रतिरोध

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(c) परिपथ के सभी बल्बों की चमक का क्या होगा जबकि कुंजी K_1 तथा K_2 दोनों बन्द हैं तथा अचानक बल्ब C फ्यूज़ हो जाता है ? अपने उत्तर की पुष्टि के लिए कारण दीजिए। **2**

(b) Find the current drawn by the bulb B when it glows. **1**

(c) Calculate **2**

(i) the resistance of bulb B, and

(ii) total resistance of the combination of four bulbs B, C, D and E.

OR

(c) What would happen to the glow of all the bulbs in the circuit when keys K_1 and K_2 both are closed and the bulb C suddenly get fused ? Give reason to justify your answer. **2**

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2024
SUBJECT NAME SCIENCE (086) (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 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

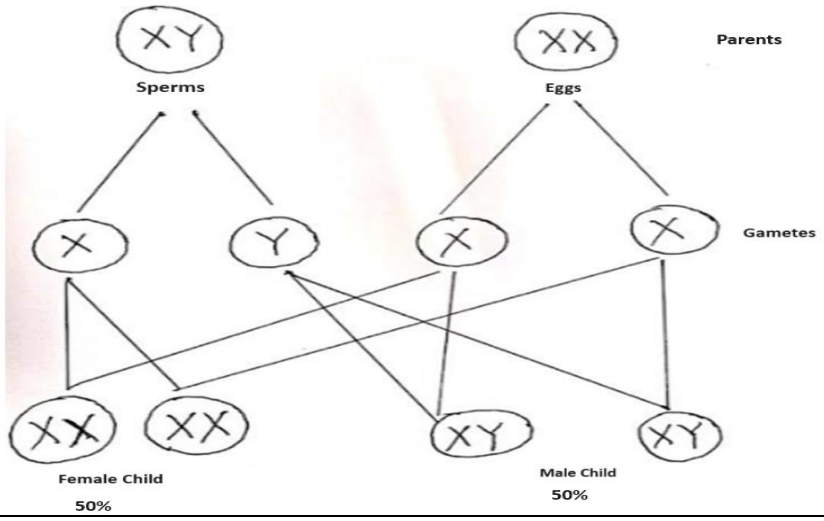
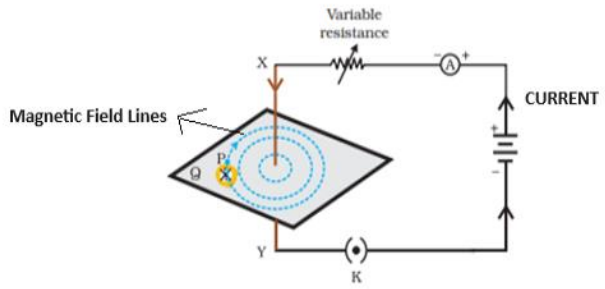
Secondary School Examination, 2024

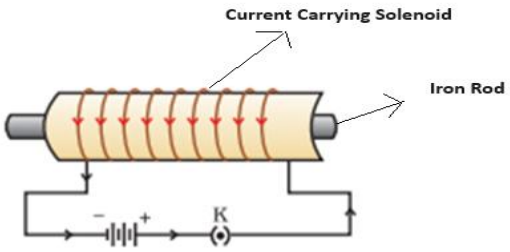
SCIENCE (Subject Code–086)

[Paper Code: 31/3/1]

Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(A) / Quick lime	1	1
2	(B) / Turmeric and litmus	1	1
3	(A) / Washing Soda	1	1
4	(B)	1	1
5	(A) / 1, 6, 2 and 3	1	1
6	(B) / $C_7 H_{14}$	1	1
7	(B) / $CaO + H_2O \rightarrow Ca(OH)_2$	1	1
8	(D) / Cytokinins	1	1
9	(C) / Petals only	1	1
10	(C) / 9 : 3 : 3 : 1	1	1
11	(C) / (b) and (c)	1	1
12	(A) / Tt and Tt	1	1
13	(D) / Dispersion, refraction and internal reflection	1	1
14	(D) / 4D and 2L	1	1
15	(A) / 2 trophic levels	1	1
16	(B) / (a) and (c)	1	1
17	(C) / Assertion (A) is true, but Reason (R) is false	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) is ***not*** the correct explanation of Assertion (A).	1	1
	SECTION B		
21	• $2 Mg + O_2 \rightarrow 2 MgO$ • Magnesium oxide • Type – Combination reaction • Reason : Two or more substances combine to form a single product .	½ ½ ½ ½	2
22	• Synthesized at shoot tip/root tip • When light falls on one side of the plant, auxin diffuses towards the shady side of shoot. The concentration of auxin stimulates the cells to grow longer on the side of shoot which is away from light. Thus plant appears bent towards light/phototropism.	½ 1½	2

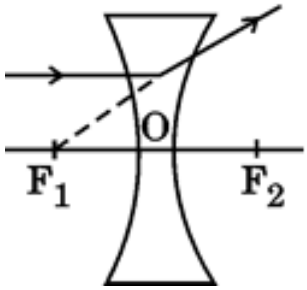
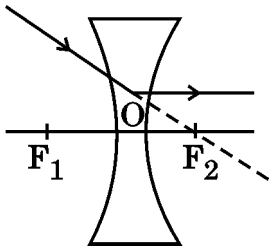
23	(a) 2 visible characters of garden pea plants are : • Tallness (dominant) , Dwarfness (recessive) • Yellow seeds (dominant) , Green seeds (recessive) **(Any other pair)** **OR** (b)  	½ + ½ ½ + ½ ½ ½ ½ ½	2
24	• When he cannot see nearby objects distinctly but can see far object clearly. • 2 causes: Focal length of the eye lens is too long. Eyeball becomes too small. • Convex or Converging lens	½ ½ ½ ½	2
25	(a)  Fig.12.6(a) on page 199-NCERT **Diagram:** **Directions of current and magnetic field:**	1 ½+½	

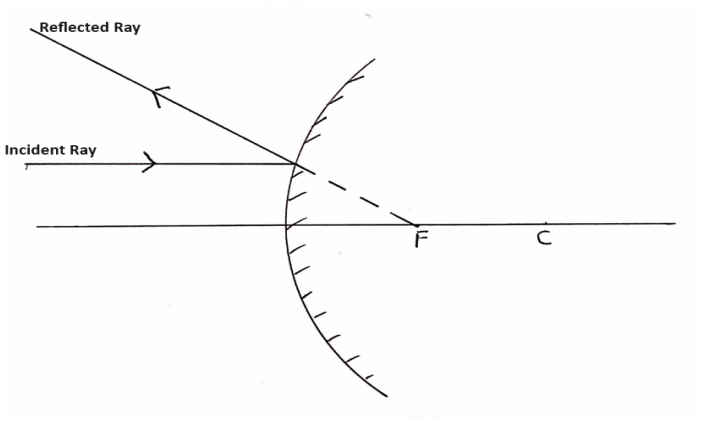
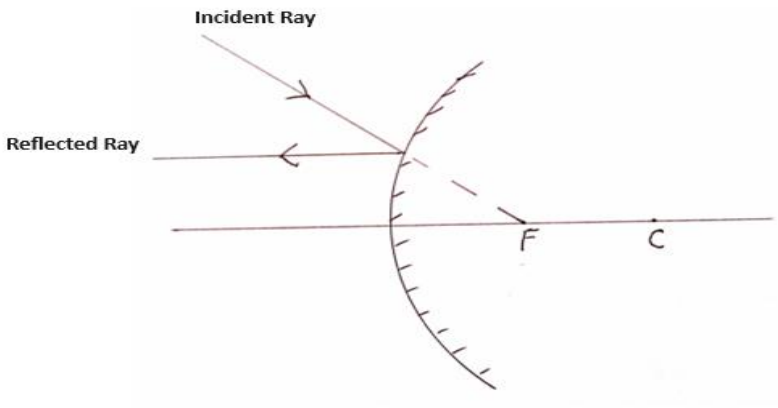
	OR (b) • Permanent magnet / Current carrying solenoid/ Electromagnet •  Fig-12.11, page no.201-NCERT **Diagram:** **Labelling:**	½ 1 ½	2
26	• Decomposers are the microorganisms that break-down the complex organic substances into simple inorganic substances. **Consequences :** (i) No replenishment of soil (ii) Foul smell (iii) Breeding of flies (iv) Accumulation of dead plants and animals in the environment. (v) No recycling of nutrients **(Any two or any other)**	1 ½ + ½	2
	SECTION C		
27	(a) Amphoteric oxide (zinc oxide) reacts with acids as well as bases to produce salt and water. (b) If kept in open, sodium metal reacts vigorously with air and catches fire / kerosene oil does not allow sodium to come in contact with air and catch fire. (c) Nitric acid is a strong oxidising agent. It oxidises the hydrogen produced in the reaction to water.	1 1 1	3
28	(a) (i) **Reduction Process-** Roasting	½	

	Reason- Mercury has low reactivity. (ii) **Reduction Process-** Roasting **Reason-** Copper has low reactivity. (iii) **Reduction Process**- Electrolytic Reduction. **Reason**- Sodium has high reactivity . **OR** (b) (i) **Change in appearance -** White to black colour. **Reason-** Silver sulphide is formed. (ii) **Change in appearance** – Reddish brown to green colour. **Reason-** Basic Copper Carbonate is formed. **(**iii**) Change in appearance**- Grey to brown colour. **Reason-** Rust (iron oxide) is formed.	½ ½ ½ ½ ½ ½+½ ½+½ ½ + ½	3
29	When water is lost through stomata in the leaves by transpiration, it creates a suction force/transpiration pull, due to which water is pulled up through xylem of the roots to the leaves.	1+1+1	3
30	(a) Constituents:- Brain and Spinal cord. Protection:- Brain – Bony box/in skull/Cranium/fluid filled balloon. Spinal Cord – Vertebral column. (b) Limitations : (i) They will reach only those cells that are connected by nervous tissue, not each and every cell in the animal body. (ii) Once an electrical impulse is generated in a cell and transmitted, the cell will take some time to reset its mechanisms before it can generate and transmit a new impulse. **(Any other)**	½ + ½ ½ ½ ½ ½	3
31	• Scattering of light / Tyndall effect • When a beam of light strikes fine particles of smoke, it is reflected diffusely and the path of the light becomes visible. • Very fine particles scatter mainly blue light/short wavelength colours while the particles of larger size scatter longer wavelength colours.	1 1 1	3
32	• It prevents damage to the appliances and the electrical circuit from overloading and short circuiting.	1	

	• Here P = 3 kW = 3000 W, V = 220 V, I = ? P = V I I = $\frac{P}{V} = \frac{3000\ W}{220\ V}$ = 13·63 A 13·63 A > Rating of fuse 5 A, therefore fuse wire will melt and break the circuit.	½ 1 ½	3
33	(a) Ohm's Law – The potential difference, *V*, across the ends of a given metallic wire in an electric circuit is directly proportional to the current flowing through it, provided its temperature remains the same. Formula :- $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ (b) $R + \frac{R}{2} = \frac{3R}{2}$	1 1 1	3
	SECTION D		
34	(a) (i) (1) Solution B (2) Solution C (3) Solution A (4) Solution D (5) Solution E Increasing Order of H^+ ion concentration :– C < E < D < A < B (ii) (1) Acidic salt : Ammonium chloride; NH_4Cl **Parent Acid**-Hydrochloric acid /HCl **Parent Base**- Ammonium hydroxide/(NH_4OH) (2) Basic salt : Sodium Carbonate; Na_2CO_3 **Parent Acid**-Carbonic acid / H_2CO_3 **Parent Base**- Sodium hydroxide/ NaOH **(Or Any other)**	½ x 5 ½ ½ ½ ½ ½	

	OR (b) Chlor – alkali process; • When electricity is passed through NaCl (aq) it decomposes to form sodium hydroxide / $2NaCl + 2H_2O \rightarrow 2NaOH+Cl_2+H_2$ • X – Cl_2 gas – at anode • Y – H_2 gas – at cathode ***(award marks if explained by diagram)*** • Z – Bleaching powder / $CaOCl_2$ / Calcium Oxychloride • $Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$ (Bleaching powder)	1 ½ ½+ ½ ½ + ½ ½ 1	5
35	(a) (i) • Spores are reproductive structures that detach from the parent and give rise to a new individual. • Sporangium / Sporangia • Covered by thick walls to protect them from unfavourable conditions. • Rhizopus (ii) • Plants which have lost the capacity to produce seeds. • Plants bear flowers and fruits earlier so as to reduce time. • To get genetically similar plants. **(Any two or any Other)** • **Methods** Layering and Grafting **(Or any other)** **OR** (b) (i) • A – Male Germ Cell/Male Gamete; B – Pollen tube; C – Female Germ Cell / Female Gamete. • B carries A (male germ cell) and this germ cell fuses with C (female germ cell) to form a zygote. • Significance: Zygote is capable of growing into a new plant.	½ ½ ½ ½ 1 + 1 1 ½ x 3 1 ½	

	(ii) Post fertilisation changes: - • Zygote divides many times to form an embryo within ovule. • Ovule is converted into seed • Ovary ripens into fruit. • Petals, Sepals, Stamens, Style and Stigma may shrivel/dry and may fall off.	½ x 4	5
36	(a) (i) (1)  Fig.9.13(b)-Page-153, NCERT. (2)  Fig.9.14(b)-Page-154, NCERT. **(Note:- Deduct half mark if directions of rays are not shown)** (ii) Given u = –16 cm, f = + 24 cm, h = 4 cm Formula used $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ $\therefore \frac{1}{v} - \frac{1}{(-16)} = \frac{1}{+24}$ $\frac{1}{v} = \frac{-1}{48}$	1 1 ½ ½	

	$v = -48$ cm Image is formed on the same side as the object $m = \frac{h'}{h} = \frac{v}{u}$ $\frac{h'}{4} = \frac{-48}{-16}$ h' = 12 cm **OR** (b) (i) (1)  (2)  **(Note:- Deduct half mark if directions of rays are not shown)**	1 ½ ½ 1 1	

	(ii) Here f = – 12 cm, u = – 18 cm, v = ?, h = 1·5 cm, h′ = ? Mirror formula $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ $\therefore \frac{1}{v} = \frac{1}{f} - \frac{1}{u}$ $= \frac{1}{-12 \text{ cm}} - \frac{1}{-18 \text{ cm}}$ $= \frac{-1}{36}$ $\therefore v = -36$ cm $m = \frac{h'}{h} = -\frac{v}{u}$ $\frac{h'}{1.5} = -\frac{(-36)}{(-18)}$ $h' = -3{\cdot}0$ cm	½ ½ 1 ½ ½	5
	SECTION E		
37	(a) • CH_3Br • C_2H_5Br (b) (i) Aldehyde (ii) Ketone (c) • The colour of $KMnO_4$ disappears; • $KMnO_4$ acts as an oxidizing agent. • $CH_3CH_2OH \xrightarrow{Alkaline\ KMnO_4 + Heat} CH_3COOH$ **OR** (c) • Ethene Conc. H_2SO_4 acts as a dehydrating agent. • $C_2H_5OH \xrightarrow[443\text{ K}]{\text{Conc. } H_2SO_4 + \text{Heat}} CH_2 = CH_2 + H_2O$	½ ½ ½ ½ ½ ½ 1 ½ ½ 1	4
38	(a) Salivary glands; Starch / Carbohydrate	½ + ½	

	(b) Stomach, Anus (c) (i) The inner lining of the stomach will not be protected from the action of acid. (ii) Digested food will not be absorbed. / Absorption area will be reduced **OR** (c) • Emulsification of fats. • Acidic medium has to be made alkaline for the pancreatic enzymes to act.	½ +½ 1 1 1 1	4
39	(a) (i) Bulb A glows (ii) Bulbs B, C, D and E glow (b) P = V×I 11 = 55 ×I I = $\frac{1}{5}$ = 0.2 amp (c) (i) Resistance of bulb B, R = $\frac{V}{I} = \frac{55\ V}{0.2\ A} = 275\ \Omega$ **(alternative formula for calculation R = $\frac{V^2}{P}$)** (ii) Total resistance of the series combination of four bulbs = 4 × 275 = 1100 Ω **OR** (c) • Bulb A will keep glowing with same brightness. • Other bulbs i.e., B, D and E will stop glowing. • **Reason:**	 ½ ½ ½ ½ 1 1 ½ ½	

	As the bulbs B, D and E are connected in series with fused bulb C, so no current flows through them and thus they will not glow. The bulb A remains unaffected as it is connected in parallel combination.	1	4

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Marking Scheme
Strictly Confidential
Secondary School Examination, 2024
SUBJECT NAME SCIENCE (086) (Q.P. CODE 31/3/2)

General Instructions: -

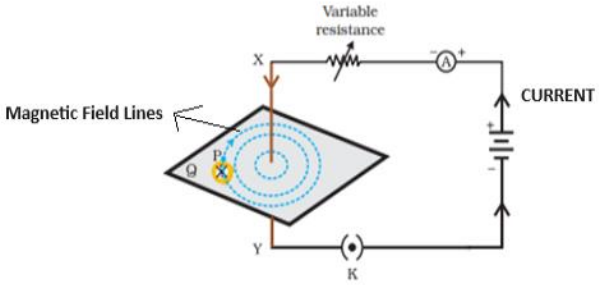
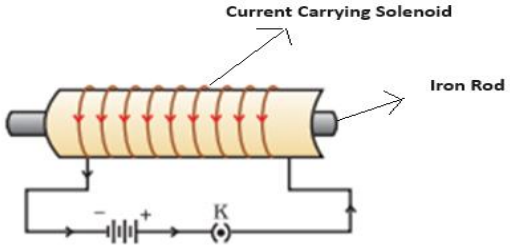
1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested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

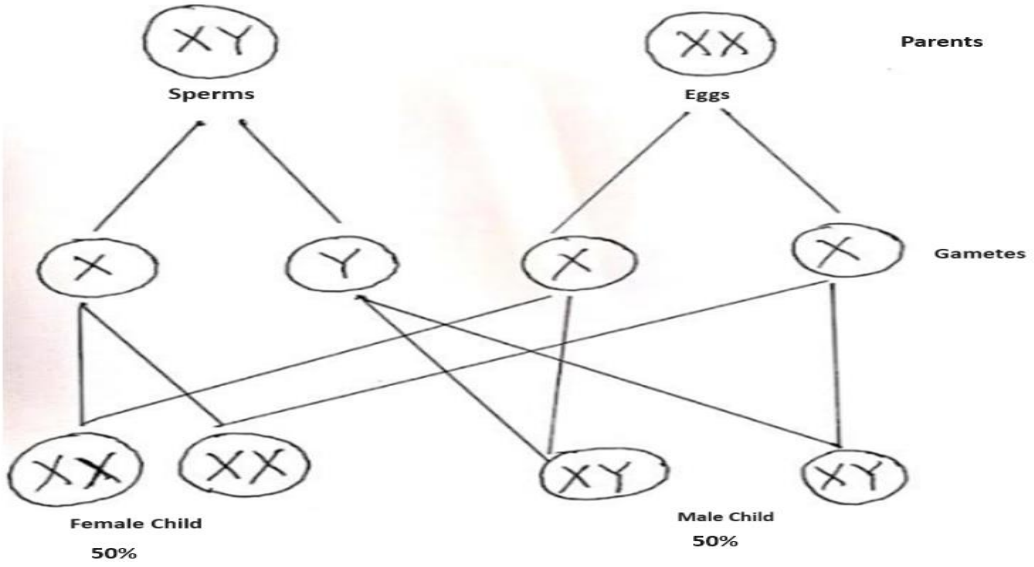
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks ___0-80_____(example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner 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.

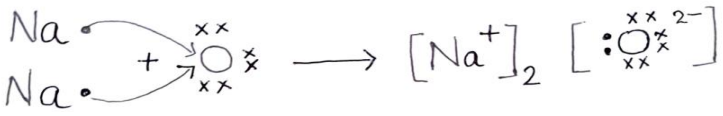
MARKING SCHEME
Secondary School Examination, 2024
SCIENCE (Subject Code–086)
[Paper Code: 31/3/2]

Maximum Marks: 80

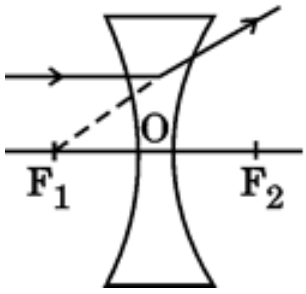
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(A) / Washing Soda	1	1
2	(B) / $CaO + H_2O \rightarrow Ca(OH)_2$	1	1
3	(A) / Quick lime	1	1
4	(B) / Turmeric and litmus	1	1
5	(B) / $C_7 H_{14}$	1	1
6	(C) / $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$	1	1
7	(A) / 1, 6, 2 and 3	1	1
8	(D) / 4D and 2L	1	1
9	(D) / Reduce CFC production	1	1
10	(D) / They reproduce asexually	1	1
11	(A) / Tt and Tt	1	1
12	(C) / (b) and (c)	1	1
13	(C) / Petals only	1	1
14	(D) / Dispersion, refraction and internal reflection	1	1
15	(B) / (a) and (c)	1	1
16	(A) / 2 trophic levels	1	1
17	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)	1	1
18	(C) / Assertion (A) is true, but Reason (R) is false	1	1
19	(D) / Assertion (A) is false but Reason (R) is true.	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) $BaCl_{2\,(aq)} + Na_2SO_{4(aq)} \rightarrow 2NaCl\,(aq) + BaSO_4\,(s)$ (b) • Double displacement reaction • As exchange of ions takes place	1 ½ ½	2
22	• When he can not see nearby objects distinctly but can see far object clearly. • 2 causes: Focal length of the eye lens is too long. Eyeball becomes too small. • Convex or Converging lens	½ ½ ½ ½	2

23	(a)  Fig.12.6(a) on page 199-NCERT **Diagram:** **Directions of current and magnetic field:** **OR** (b) • Permanent magnet / Current carrying solenoid/ Electromagnet •  Fig-12.11, page no.201-NCERT **Diagram:** **Labelling:**	1 ½+½ ½ 1 ½	2
24	• Synthesized at shoot tip/root tip • When light falls on one side of the plant, auxin diffuses towards the shady side of shoot. The concentration of auxin stimulates the cells to grow longer on the side of shoot which is away from light. Thus, plant appears bent towards light/phototropism.	½ 1½	2
25	(a) 2 visible characters of garden pea plants are : • Tallness (dominant), Dwarfness (recessive) • Yellow seeds (dominant), Green seeds (recessive) **(Any other pair)**	 ½ + ½ ½ + ½	

	OR (b)  	½ ½ ½ ½	2
26	• Biodegradable – Substances that are broken down by biological processes. • Non-biodegradable –Substances that are not broken down by biological processes. **Classification:-** Biodegradable – Newspaper, Vegetable peels Non-biodegradable – Glass bottles, Polythene bags	½ ½ ½ ½	2
	SECTION C		
27	(a) (i) **Reduction Process-** Roasting **Reason-** Mercury has low reactivity. (ii) **Reduction Process-** Roasting **Reason-** Copper has low reactivity. (iii) **Reduction Process-** Electrolytic Reduction. **Reason-** Sodium has high reactivity . **OR** (b) (i) **Change in appearance -** White to black colour. **Reason-** Silver sulphide is formed.	½ ½ ½ ½ ½ ½ ½+½	

	(ii) **Change in appearance** – Reddish brown to green colour. **Reason-** Basic Copper Carbonate is formed. **(iii) Change in appearance**- Grey to brown colour. **Reason-** Rust (iron oxide) is formed.	½+½ ½ +½	3
28	Na = 2, 8, 1; O = 2,6  • Cation – Sodium Anion – Oxide	½+½ 1 ½ ½	3
29	(a) Constituents:- Brain and Spinal cord. Protection:- Brain – Bony box/in skull/Cranium/fluid filled balloon Spinal Cord – Vertebral column. (b) Limitations : (i) They will reach only those cells that are connected by nervous tissue, not each and every cell in the animal body. (ii) Once an electrical impulse is generated in a cell and transmitted, the cell will take some time to reset its mechanisms before it can generate and transmit a new impulse. **(Any other)**	½ + ½ ½ ½ ½ ½	3
30	• Difference : Common pathway for aerobic and anaerobic respiration Glucose → Pyruvate Glucose→Pyruvate $\xrightarrow{\text{Presence of } O_2}$ Carbon dioxide+Water + Energy Site – in mitochondria	½ +½ ½ 1 ½	3
31	• It prevents damage to the appliances and the electrical circuit from overloading and short circuiting. •	1	

Aerobic Respiration	Anaerobic Respiration
Utilises Oxygen	Takes place in the absence of Oxygen

	Here P = 3 kW = 3000 W, V = 220 V, I = ? P = V I $I = \frac{P}{V} = \frac{3000\ W}{220\ V} = 13{\cdot}63$ A 13·63 A > Rating of fuse 5 A, therefore fuse wire will melt and break the circuit.	½ 1 ½	3
32	• Scattering of light / Tyndall effect • When a beam of light strikes fine particles of smoke, it is reflected diffusely and the path of the light becomes visible. • Very fine particles scatter mainly blue light/short wavelength colours while the particles of larger size scatter longer wavelength colours.	1 1 1	3
33	• Each electrical appliance has its own switch due to which each one can be turned ON and OFF separately, as per their requirement. • If due to some defect one electrical appliance stops working, then all other appliances keep working. • Each appliance has equal potential difference and draws the required amount of current. • The total resistance in a parallel circuit is decreased. **(Any three)**	1 1 1	3
	SECTION E		
34	(a) (i) (1)  Fig.9.13(b)-Page-153, NCERT.	1	

(2)

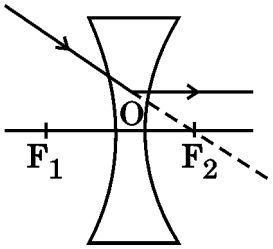


Fig.9.14(b)-Page-154, NCERT. 1

(Note:- Deduct half mark if directions of rays are not shown)

(ii) Given $u = -16$ cm, f = + 24 cm, h = 4 cm ½

Formula used $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ ½

$$\therefore \frac{1}{v} - \frac{1}{(-16)} = \frac{1}{+24}$$

$$\frac{1}{v} = \frac{-1}{48}$$

$v = -48$ cm 1

Image is formed on the same side as the object

$$m = \frac{h'}{h} = \frac{v}{u}$$ ½

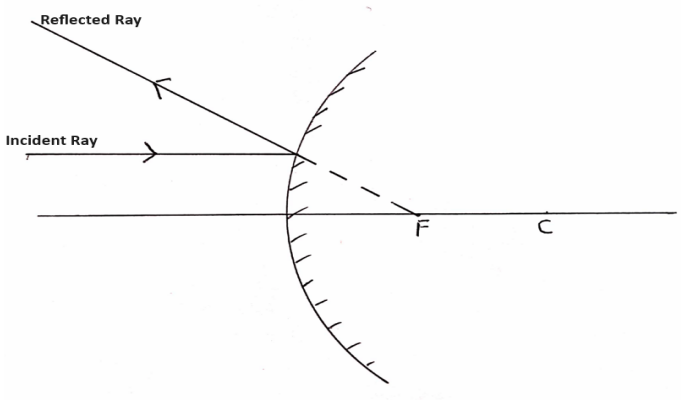
$$\frac{h'}{4} = \frac{-48}{-16}$$

h' = 12 cm ½

5

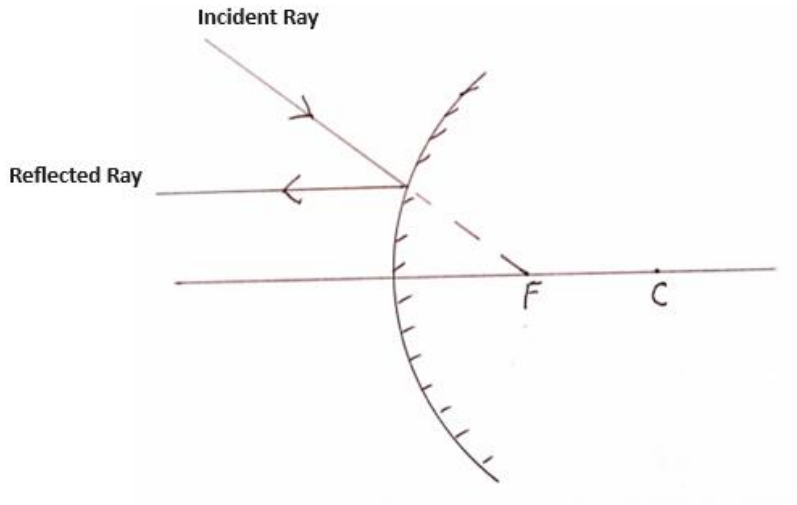
OR

(b) (i)
(1)



1

(2)



1

(Note:- Deduct half mark if directions of rays are not shown)

(ii) Here f = – 12 cm, u = – 18 cm, v = ?, h = 1·5 cm, h′ = ? ½

Mirror formula $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ ½

$$\therefore \frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

$$= \frac{1}{-12 \text{ cm}} - \frac{1}{-18 \text{ cm}}$$

$$= \frac{-1}{36}$$

$\therefore$ v = – 36 cm 1

$$m = \frac{h'}{h} = -\frac{v}{u}$$ ½

$$\frac{h'}{1.5} = -\frac{(-36)}{(-18)}$$

h' = – 3·0 cm ½

35	(a) • When the rate of general body growth begins to slow down and reproductive tissue begins to mature. • In boys – New thick hair growth on face, voice begins to crack, penis begins to enlarge and become erect. **(Any two)** (b) Testis – Formation of sperms, Secretion of hormone testosterone Role of : (i) Vas deferens – Delivery of sperms from testes to urethra. (ii) Seminal vesicle – Provides nutrition to sperms /makes the transport(movement) of sperms easier. (iii) Urethra – Common passage for sperms and urine. (iv) Scrotum – Providing required temperature for sperm formation **OR** (a) (i) Ovary – • Production of Estrogen hormone • Production of female gamete /egg (ii) Oviduct – • Transfer of female gamete from the ovary to uterus • Site of fertilisation (iii) Uterus – • Implantation of zygote • Nourishment of the developing embryo (b) Structure of Placenta – • Disc like structure embedded in the uterine wall connected to the embryo. • It has villi on the embryo's side and blood spaces on the mother's side.	1 ½+½ ½ ½ ½× 4 ½ ½ ½ ½ ½× 2	5

	Function : • Provides a large surface area for nutrients (glucose and oxygen) to pass from the mother's side to embryo, waste substances from embryo's side to mother's blood.	1	
36	(a) (i) (1) Solution B (2) Solution C (3) Solution A (4) Solution D (5) Solution E Increasing Order of H^+ ion concentration – C < E < D < A < B (ii)(1) Acidic salt : (Ammonium chloride) NH_4Cl **Parent Acid-**Hydrochloric acid /HCl **Parent Base**- Ammonium hydroxide/(NH_4OH) (2) Basic salt : **(**Sodium Carbonate) Na_2CO_3 **Parent Acid-**Carbonic acid / H_2CO_3 **Parent Base**- Sodium hydroxide / NaOH **(Or Any other)** **OR** (b) Chlor – alkali process; • When electricity is passed through NaCl (aq) it decomposes to form sodium hydroxide / $2NaCl + 2H_2O \rightarrow 2NaOH+Cl_2+H_2$ • X – Cl_2 gas – at anode • Y – H_2 gas – at cathode ***(award marks if explained by diagram)*** • Z – Bleaching powder / $CaOCl_2$ / Calcium Oxychloride • $Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$ (Bleaching powder)	½ x 5 ½ ½ ½ ½ ½ 1 ½ ½+ ½ ½ +½ ½ 1	5
	SECTION E		
37	(a) • CH_3Br • C_2H_5Br (b) (i) Aldehyde (ii) Ketone	½ ½ ½ ½	

	(c) • The colour of $KMnO_4$ disappears; • $KMnO_4$ acts as an oxidizing agent. • $CH_3CH_2OH \xrightarrow{Alkaline\ KMnO_4 + Heat} CH_3COOH$ **OR** (c) • Ethene Conc. H_2SO_4 acts as a dehydrating agent. • $C_2H_5OH \xrightarrow[443\ K]{Conc.\ H_2SO_4 + Heat} CH_2 = CH_2 + H_2O$	½ ½ 1 ½ ½ 1	4
38	(a) Salivary glands; Starch / Carbohydrate (b) Stomach, Anus (c) (i) The inner lining of the stomach will not be protected from the action of acid. (ii) Digested food will not be absorbed / Absorption area will be reduced. **OR** (c) • Emulsification of fats. • Acidic medium has to be made alkaline for the pancreatic enzymes to act.	½ + ½ ½ +½ 1 1 1 1	4
39	(a) (i) Bulb A glows (ii) Bulbs B, C, D and E glow (b) P = V×I 11 = 55 ×I I = $\frac{1}{5}$ = 0.2 amp (c) (i) Resistance of bulb B, R = $\frac{V}{I} = \frac{55\ V}{0.2\ A} = 275\ \Omega$ **(alternative formula for calculation R = $\frac{V^2}{P}$)**	½ ½ ½ ½ 1	

	(ii) Total resistance of the series combination of four bulbs $= 4 \times 275 = 1100\ \Omega$	1	
	OR		
	(c) • Bulb A will keep glowing with same brightness.	½	
	• Other bulbs i.e., B, D and E will stop glowing.	½	
	Reason: As the bulbs B, D and E are connected in series with fused bulb C, so no current flows through them and thus they will not glow. The bulb A remains unaffected as it is connected in parallel combination.	1	4

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Marking Scheme
Strictly Confidential
Secondary School Examination, 2024
SUBJECT NAME SCIENCE (086) (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 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

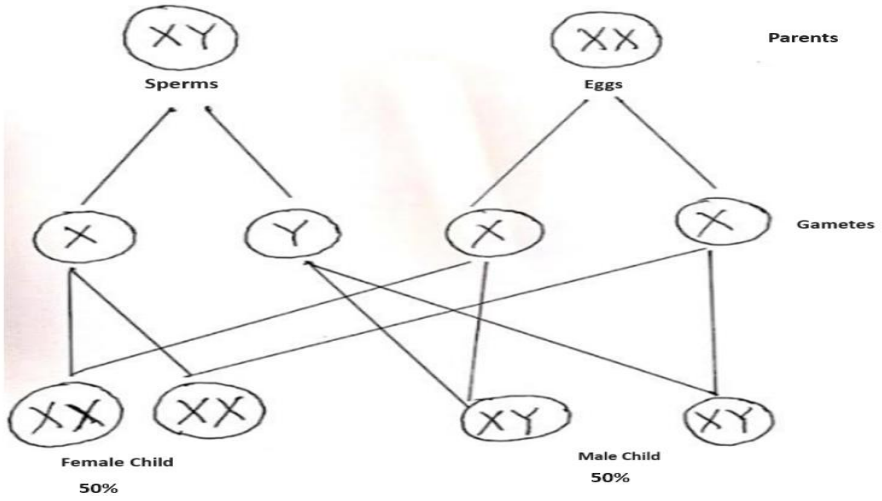
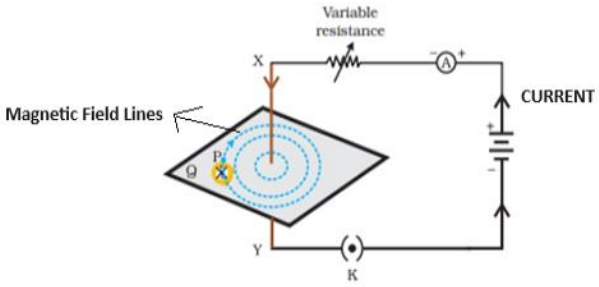
Secondary School Examination, 2024

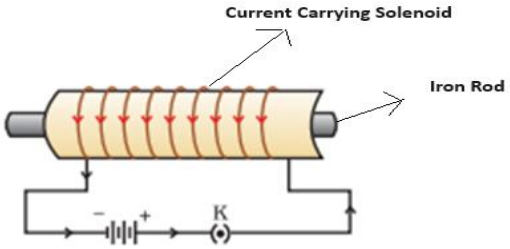
SCIENCE (Subject Code–086)

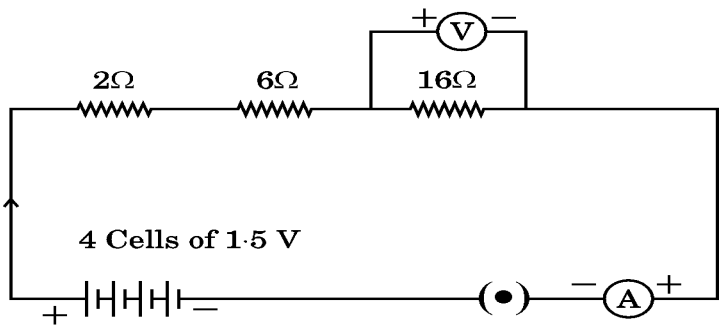
[Paper Code: 31/3/3]

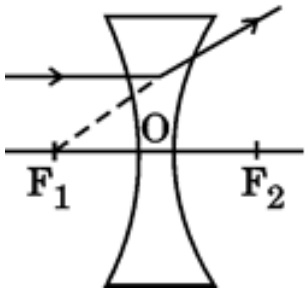
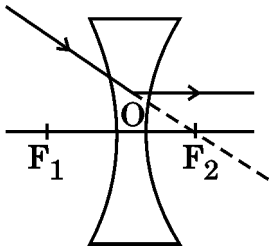
Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(B) / $CaO + H_2O \rightarrow Ca(OH)_2$	1	1
2	(A) / Quick lime	1	1
3	(B) / Turmeric and litmus	1	1
4	(A) / Washing Soda	1	1
5	(D) /NO_2, PbO and O_2	1	1
6	(D) /Butyne, Ethene, Propyne	1	1
7	(B)	1	1
8	(C) / (b) and (c)	1	1
9	(C) / 9 : 3 : 3 : 1	1	1
10	(D) / Cytokinins	1	1
11	(C) / Genetic material is contributed by two individuals of same species to produce a new generation.	1	1
12	(C) / Reptiles	1	1
13	(D) / 4D and 2L	1	1
14	(D) / 1 Ω	1	1
15	(B) / (a) and (c)	1	1
16	(A) / 2 trophic levels	1	1
17	(C) / Assertion (A) is true, but Reason (R) is false	1	1
18	(C) / Assertion (A) is true, but Reason (R) is false	1	1
19	(A) / Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A)	1	1
20	(B) / Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)	1	1
	SECTION B		
21	(a) Presence of Sunlight Decomposition reaction / Photochemical reaction. (b) $2FeSO_{4(s)} \xrightarrow{Heat} Fe_2O_{3(s)} + SO_{2(g)} + SO_{3(g)}$	½ ½ 1	2
22	(a) 2 visible characters of garden pea plants are: • Tallness (dominant), Dwarfness (recessive) • Yellow seeds (dominant), Green seeds (recessive) **(Any other pair)**	 ½ + ½ ½ + ½	

	OR (b)  	½ ½ ½ ½	2
23	• Synthesized at shoot tip/root tip • When light falls on one side of the plant, auxin diffuses towards the shady side of shoot. The concentration of auxin stimulates the cells to grow longer on the side of shoot which is away from light. Thus plant appears bent towards light/phototropism.	½ 1½	2
24	(a)  Fig.12.6(a), on page 199-NCERT **Diagram:** **Directions of current and magnetic field:** OR (b) • Permanent magnet / Current carrying solenoid/ Electromagnet	1 ½+½ ½	2

	•  Fig-12.11, page no.201-NCERT **Diagram:** **Labelling:**	1 ½	
25	• When he cannot see nearby objects distinctly but can see far object clearly. • **2 causes:** Focal length of the eye lens is too long. Eyeball becomes too small. • Convex or Converging lens	½ ½ ½ ½	2
26	(a) Greater number of alternatives in the form of variety of organisms available at each trophic level in an ecosystem. (b) The available energy keeps on decreasing at each trophic level according to 10 percent law. So more trophic levels lead to less energy at the last trophic level which is not enough for the organisms to survive.	1 1	2
	SECTION C		
27	(a) • Thermit reaction • $Fe_2O_{3(s)} + 2Al(s) \rightarrow 2Fe(l) + Al_2O_{3(s)}$ + Heat • Because Al being more reactive than Fe, it displaces Fe in Fe_2O_3 • This reaction is used to join railway tracks / cracked machine parts. **OR** (b) (i) ‘E’– Sodium (Na) / Potassium(K) (ii) • In water – $2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_{2\,(g)}$ + heat energy	½ 1 1 ½ ½ 1	

	• Nature of the product – Basic (iii) Electrolytic reduction	½ 1	3
28	(a) Amphoteric oxide (zinc oxide) reacts with acids as well as bases to produce salt and water. (b) Bubbles of hydrogen gas which are formed during the reaction stick to the surface of calcium metal and make it lighter. (c) Nitric acid is a strong oxidising agent. It oxidises the hydrogen produced in the reaction to water.	1 1 1	3
29	When water is lost through stomata in the leaves by transpiration, it creates a suction force/transpiration pull, due to which water is pulled up through xylem of the roots to the leaves.	1+1+1	3
30	• Name:- Adrenaline • Location:- Adrenal gland • Responses : Heart beats faster resulting in supply of more oxygen to our muscles. Blood to the digestive system is reduced due to contraction of muscles around small arteries. Breathing rate increases due to the contractions of diaphragm and rib muscles.	½ ½ 2	3
31	• It prevents damage to the appliances and the electrical circuit from overloading and short circuiting. • Here P = 3 kW = 3000 W, V = 220 V, I = ? P = V I I = $\frac{P}{V} = \frac{3000\ W}{220\ V}$ = 13·63 A 13·63 A > Rating of fuse 5 A, therefore fuse wire will melt and break the circuit.	1 ½ 1 ½	3
32	•  (a) Current (I) = $\frac{V}{R} = \frac{4\times 1{\cdot}5\ V}{2\Omega+6\Omega+16\Omega} = \frac{6\ V}{24\Omega} = \frac{1}{4}$ A	1 1	

	(b) Potential Difference across 16 Ω resistor = $\frac{1}{4}$ A × 16 Ω = 4 V	1	3
33	• Scattering of light / Tyndall effect • When a beam of light strikes fine particles of smoke, it is reflected diffusely and the path of the light becomes visible. • Very fine particles scatter mainly blue light/short wavelength colours while the particles of larger size scatter longer wavelength colours.	1 1 1	3
	SECTION D		
34	(a) (i) (1)  Fig.9.13(b), Page-153, NCERT. (2)  Fig.9.14(b)-Page-154, NCERT. **(Note:- Deduct half mark if directions of rays are not shown)** (ii) Given *u* = –16 cm, f = + 24 cm, h = 4 cm	1 1 ½	

Formula used $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$ ½

$\therefore \frac{1}{v} - \frac{1}{(-16)} = \frac{1}{+24}$

$\frac{1}{v} = \frac{-1}{48}$

$v = -48$ cm 1

Image is formed on the same side as the object

$m = \frac{h'}{h} = \frac{v}{u}$ ½

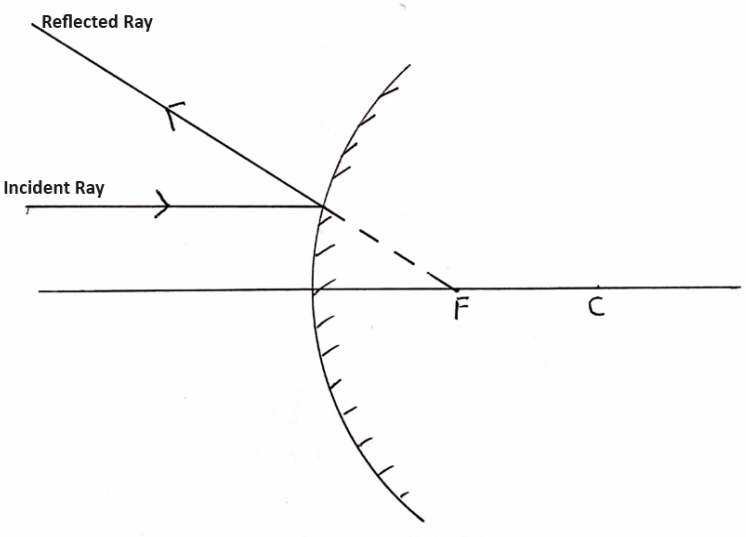
$\frac{h'}{4} = \frac{-48}{-16}$

h' = 12 cm ½

OR

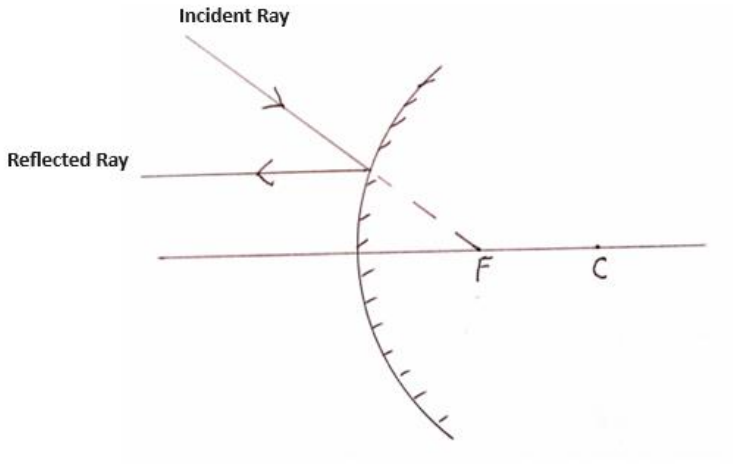
(b) (i) 5

(1)



1

(2)



1

(Note:- Deduct half mark if directions of rays are not shown)

(ii) Here f = – 12 cm, u = – 18 cm, v = ?, h = 1·5 cm, h′ = ? ½

Mirror formula $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ ½

$$\therefore \frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

$$= \frac{1}{-12 \text{ cm}} - \frac{1}{-18 \text{ cm}}$$

$$= \frac{-1}{36}$$

$\therefore$ v = – 36 cm 1

$$m = \frac{h'}{h} = -\frac{v}{u}$$ ½

$$\frac{h'}{1.5} = -\frac{(-36)}{(-18)}$$

h' = – 3·0 cm ½

35	(a) Gonorrhoea, Syphilis, AIDS, Warts **(Any two)**	½ + ½	
	(b) Because child sex ratio is declining/ due to reckless female foeticide.	1	
	(c)		
	(i) Oral pills/ Chemical method ; change the hormonal balance of the body.		
	(ii) Copper – T or loop; irritation of the uterus.	½× 6	
	(iii) Surgical method; can cause infections.		5
	OR		
	(a) Unisexual – Papaya / Watermelon Bisexual – Hibiscus / Mustard	½ ½	
	(b) The transfer of pollen grains from anther of one flower to stigma of another flower is called cross – pollination.	1	
	Transfer of pollen grains is carried out by some pollinating agents like wind, water and animals.	1	
	(c) A → Plumule – Future shoot B → Radicle – Future root	½× 4	
	∗Refer fig. 7·9 Page 121 for diagram		
36	(a) (i) (1) Solution B (2) Solution C (3) Solution A (4) Solution D (5) Solution E	½ x 5	
	Increasing Order of H^+ ion concentration – C < E < D < A < B	½	
	(ii) (1) Acidic salt : **(**Ammonium chloride) NH_4Cl	½	
	Parent Acid-Hydrochloric acid /HCl **Parent Base-** Ammonium hydroxide/(NH_4OH)	½	
	(2) Basic salt : **(**Sodium Carbonate) Na_2CO_3	½	
	Parent Acid-Carbonic acid / H_2CO_3		
	Parent Base- Sodium hydroxide / NaOH **(Or Any other)**	½	5

	OR (b) Chlor – alkali process; • When electricity is passed through NaCl (aq) it decomposes to form sodium hydroxide./$2NaCl + 2H_2O \rightarrow 2NaOH + Cl_2 + H_2$ • X – Cl_2 gas – at anode • Y – H_2 gas – at cathode ***(award marks if explained by diagram)*** • Z – Bleaching powder / $CaOCl_2$ / Calcium Oxychloride • $Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$ (Bleaching powder)	1 ½ ½+ ½ ½ + ½ ½ 1	
	SECTION E		
37	(a) • CH_3Br • C_2H_5Br (b) (i) Aldehyde (ii) Ketone (c) • The colour of $KMnO_4$ disappears; • $KMnO_4$ acts as an oxidizing agent. • $CH_3CH_2OH \xrightarrow{Alkaline\ KMnO_4 + Heat} CH_3COOH$ **OR** (c) • Ethene Conc. H_2SO_4 acts as a dehydrating agent. • $C_2H_5OH \xrightarrow[443\ K]{Conc.\ H_2SO_4 + Heat} CH_2 = CH_2 + H_2O$	½ ½ ½ ½ ½ ½ 1 ½ ½ 1	4
38	(a) Salivary glands; Starch / Carbohydrate (b) Stomach, Anus (c) (i) The inner lining of the stomach will not be protected from the action of acid. (ii) Digested food will not be absorbed. / Absorption area will be reduced	½ + ½ ½ +½ 1 1	

	OR (c) • Emulsification of fats. • Acidic medium has to be made alkaline for the pancreatic enzymes to act.	 1 1	 4
39	(a) (i) Bulb A glows (ii) Bulbs B, C, D and E glow (b) P = V×I 11 = 55 ×I I = $\frac{1}{5}$ = 0.2 amp (c) (i) Resistance of bulb B, R = $\frac{V}{I} = \frac{55\ V}{0.2\ A} = 275\ \Omega$ **(alternative formula for calculation R = $\frac{V^2}{P}$)** (ii) Total resistance of the series combination of four bulbs = 4 × 275 = 1100 Ω **OR** (c) • Bulb A will keep glowing with same brightness. • Other bulbs i.e., B, D and E will stop glowing. **Reason :** As the bulbs B, D and E are connected in series with fused bulb C, so no current flows through them and thus they will not glow. The bulb A remains unaffected as it is connected in parallel combination.	 ½ ½ ½ ½ 1 1 ½ ½ 1	 4

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