Series Z1XYW/2

SET~2

प्रश्न-पत्र कोड
Q.P. Code 31/2/2

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.

*

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **27** हैं ।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में **39** प्रश्न हैं ।
- **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।**
- 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 ।
- Please check that this question paper contains **27** printed pages.
- 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.
- Please check that this question paper contains **39** questions.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 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.

विज्ञान
SCIENCE

निर्धारित समय : 3 घण्टे **अधिकतम अंक : 80**

Time allowed : 3 hours **Maximum Marks : 80**

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

*This section has **20** multiple choice questions (Q.No. 1 – 20). **All** questions are **compulsory**.* *20×1=20*

1. During electrolysis of water, if the volumes of oxygen and hydrogen evolved at the electrodes are V_O and V_H respectively, then V_O/V_H is

(a) 4 (b) 2

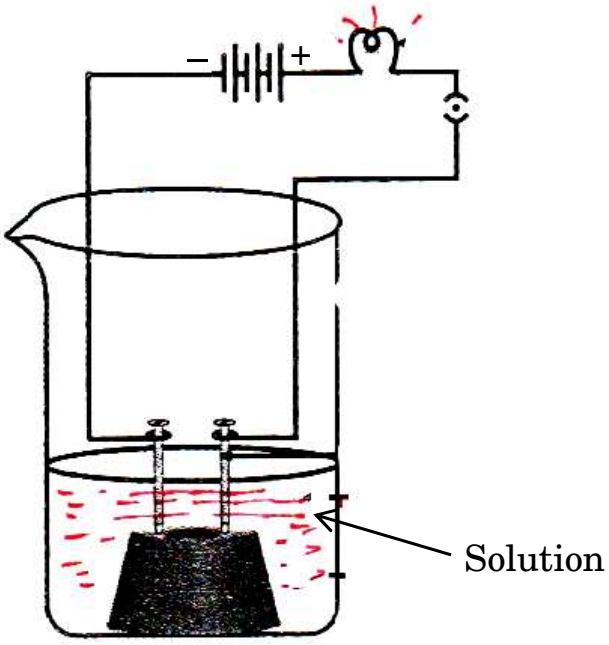
(c) $\frac{1}{2}$ (d) $\frac{1}{4}$

2. Among the following, the metal with lowest density is :

(a) Lithium (b) Lead

(c) Magnesium (d) Aluminium

3. In the given experimental set-up, if the experiment is carried out separately with each of the following solutions the cases in which the bulb will glow is/are :



(i) Dilute hydrochloric acid

(ii) Dilute sulphuric acid

(iii) Glucose solution

(iv) Alcohol

(a) (i) only

(b) (ii) only

(c) (i) and (ii)

(d) (ii), (iii) and (iv)

4. Which of the following gives the correct increasing order of acidic strength ?

(a) Sodium chloride < Acetic acid < Hydrochloric acid

(b) Sodium chloride < Hydrochloric acid < Acetic acid

(c) Acetic acid < Sodium chloride < Hydrochloric acid

(d) Hydrochloric acid < Sodium chloride < Acetic acid

5. In order to balance the following chemical equation, the values of the coefficients x and y respectively are :

$$x\ Pb(NO_3)_2 \xrightarrow{Heat} 2\ PbO + y\ NO_2 + O_2$$

(a) 2, 4 (b) 2, 2

(c) 2, 3 (d) 4, 2

6. When ethanol reacts with sodium two products are formed. These products are :

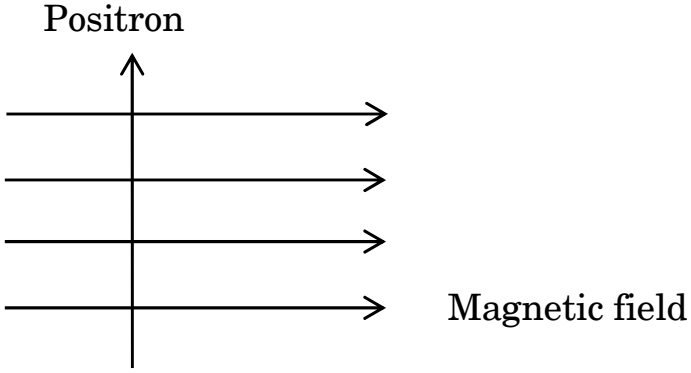
(a) Sodium ethanoate and oxygen

(b) Sodium ethanoate and hydrogen

(c) Sodium ethoxide and oxygen

(d) Sodium ethoxide and hydrogen

7. A positron enters a uniform magnetic field at right angles to it as shown. The direction of force experienced by the positron will be :



(a) to the right

(b) to the left

(c) into the page

(d) out of the page

8. When an 'X' bearing sperm fertilises the egg, the resulting zygote has the following combination of chromosomes :

(a) 44 + XX (b) 44 + XY

(c) 22 + XX (d) 22 + XY

9. In a resistive circuit if the current is increased to two times, the percentage change in the amount of heat dissipated in the circuit would be :

(a) 400% (b) 300%

(c) 200% (d) 100%

10. For verifying Ohm's law, we design an electric circuit diagram in which we show the arrangement of different circuit components. We find that with respect to the resistor, the :

(a) ammeter is connected in parallel and the voltmeter in series.

(b) ammeter is connected in series and the voltmeter in parallel.

(c) ammeter and voltmeter are both connected in series.

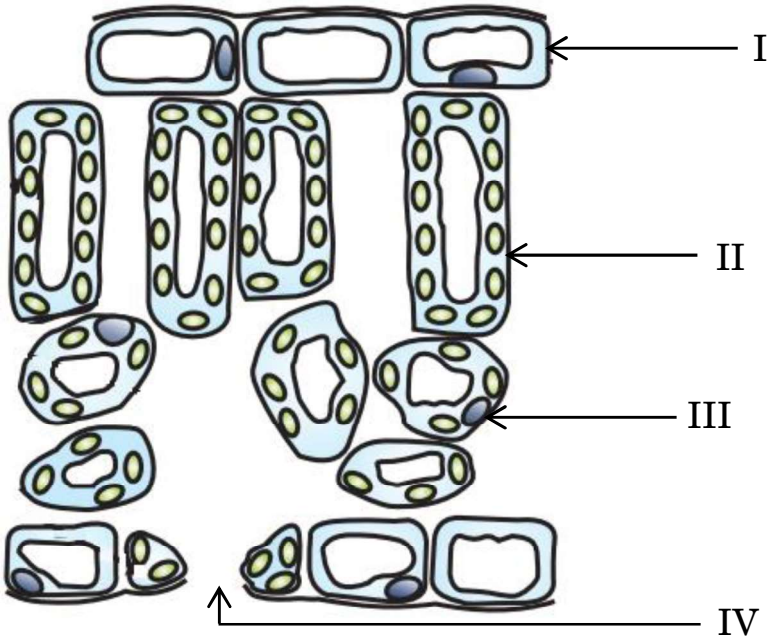
(d) ammeter and voltmeter are both connected in parallel.

11. The total number of electrons shared in the formation of an ethyne molecule is :

(a) 6 (b) 3

(c) 10 (d) 4

12. In the following diagram, identify the cells through which massive amounts of gaseous exchange takes place for photosynthesis :



(a) I (b) IV

(c) III (d) II

13. Sphincter muscles are present at the exit of :

(a) Stomach and small intestine

(b) Stomach and anus

(c) Small intestine and large intestine

(d) Oesophagus and stomach

14. During vigorous exercise, the occurrence of cramps in the outer muscles of an athlete is due to the conversion of pyruvate to :

(a) Glucose (b) Ethanol

(c) Lactic acid (d) Lactose

15. Plants which bear unisexual flowers are :

(a) Mustard and Papaya

(b) Hibiscus and Watermelon

(c) Mustard and Hibiscus

(d) Watermelon and Papaya

16. An object is placed in front of a convex mirror at infinity. According to the New Cartesian Sign Convention, the sign of the focal length and the sign of the image distance in this case are respectively :

(a) + , – (b) – , +

(c) – , – (d) + , +

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) :* Sodium, calcium and magnesium are obtained by the electrolysis of their molten oxides.

Reason (R) : These metals have more affinity for oxygen than carbon.

18. *Assertion (A) :* Magnetic field lines do not intersect each other.

Reason (R) : Magnetic field lines are imaginary lines, the tangent to which at any point gives the direction of the field at that point.

19. *Assertion (A) :* When a bacterium divides into two, and the resultant two bacteria divide again, the four bacteria produced would be almost similar.

Reason (R) : DNA copying involves small inaccuracies in the reproduction process.

20. *Assertion (A) :* A person suffering from myopia cannot see the distant objects clearly.

Reason (R) : A converging lens is used for the correction of myopic eye as it can form real as well as virtual images of the objects placed in front of it.

SECTION B

21. (a) When and where does a rainbow appear in the sky ? Draw a labelled ray diagram to show its formation. *2*

OR

(b) What is scattering of light ? Why does the clear sky appear blue ? *2*

22. What will happen if :

(a) Xylem tissue in a plant is removed ?

(b) We are injured and start bleeding ? *2*

23. (a) What is observed when aqueous solutions of potassium iodide and lead nitrate are mixed together ? Name the type of reaction and write the chemical equation for the reaction that occurs. *2*

OR

(b) When copper powder is heated in a watch glass, a black substance is formed.

(i) Why is this black substance formed ? Name it.

(ii) How can this black substance be reversed to its original form ? *2*

24. Mendel crossed a pure tall pea plant (TT) with a pure short pea plant (tt) and obtained all tall plants in F_1 generation.

(a) What is the gene combination present in the plants of F_1 generation ?

(b) Give reason why only tall plants are observed in F_1 progeny.

(c) What will be the ratio of the plants obtained in the F_2 generation when F_1 plants are self-pollinated ? *2*

25. Consider a circular loop of thick copper wire lying horizontally on a table. Let the current pass through the loop anticlockwise. Draw the magnetic field lines to show the direction and the pattern of the magnetic field inside and outside the loop. *2*

26. (a) What is meant by trophic level ?

(b) On an average, what percentage of energy is transferred to the second trophic level from the first trophic level ? Which categories of consumers do the organisms of the second trophic level belong to ? *2*

SECTION C

27. Write down the balanced chemical equations for the following reactions and identify the type of reaction in each case.

(a) Nitrogen gas is treated with hydrogen gas to form ammonia gas.

(b) Lead nitrate is heated strongly to form lead monoxide, nitrogen dioxide and oxygen.

(c) A copper wire is dipped in silver nitrate solution and a shining deposit of silver is produced. *3*

28. Explain how some harmful chemicals enter our bodies through the food chain. Why is the concentration of these harmful chemicals found to be maximum in human beings ? *3*

29. (a) A student has focussed the image of an object of height 3 cm on a white screen using a concave mirror of focal length 12 cm. If the distance of the object from the mirror is 18 cm, find the values of the following :

(i) Distance of the image from the mirror

(ii) Height of the image *3*

OR

(b) Define power of a lens. The focal length of a lens is – 10 cm. Write the nature of the lens and find its power. If an object is placed at a distance of 20 cm from the optical centre of this lens, according to the New Cartesian Sign Convention, what will be the sign of magnification in this case ? *3*

30. Explain the directional movement due to growth in response to touch in a pea plant. *3*

31. With the help of suitable chemical equations, list the two main differences between roasting and calcination. How is metal reduced from the product obtained after roasting/calcination of the ore ? Write the chemical equation for the reaction involved. *3*

32. What is a solenoid ? Draw a diagram to show the pattern of magnetic field around a current carrying solenoid. Name the region of uniform magnetic field. *3*

33. (a) (i) What is the first step in the breakdown of glucose during aerobic and anaerobic respiration ? Where does it take place ?

(ii) ATP is called the energy currency of the cell. Why ?

(iii) What is meant by "residual volume of air" in a breathing cycle ? *3*

OR

(b) Write in sequence the steps for experimental verification of the fact that "sunlight is essential for photosynthesis". *3*

SECTION D

34. (a) An acid 'X' and an alcohol 'Y' react with each other in the presence of an acid catalyst to form a sweet smelling substance 'Z'. Identify 'X', 'Y' and 'Z'. Write the chemical equation for the reaction involved and name it. The substance 'Z' on treatment with sodium hydroxide produces back the alcohol 'Y' and sodium ethanoate. Write the chemical equation for the reaction involved and name it, giving justification for the name. *5*

OR

(b) (i) Name the simplest saturated hydrocarbon. Draw its electron dot structure. Which type of bonds exist in this compound ?

(ii) Name any two mixtures of the carbon compound used as a fuel in daily life, of which the above mentioned compound is an important component.

(iii) In which homologous series of carbon compounds can this compound be placed ? Write the general formula of the series.

(iv) Which type of flame is produced on burning it ? *5*

35. (a) (i) List three points of difference between nervous and hormonal mechanisms for control and coordination in animals.

(ii) How are auxins related with the bending of plant shoot towards unidirectional light ? Explain. *5*

OR

(b) (i) Name the disorder which a person is likely to suffer from due to the following :

(I) Over-secretion of growth hormone

(II) Deficiency of oestrogen in females

(III) Less secretion of thyroxine

Also name the gland that secretes each of the hormones mentioned above.

(ii) How is the timing and amount of hormone released regulated ? Explain with the help of an example. *5*

36. (a) Name the type of mirror that should be used to obtain the following types of images :

(i) A magnified and virtual image of an object

(ii) A diminished and virtual image of an object

(b) Draw labelled ray diagrams to justify your answers in each case mentioned above.

(c) Which of these mirrors can also be used to obtain a magnified and real image of an object ? State the position of the object in this case. *5*

SECTION E

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

37. The teacher while conducting practicals in the laboratory divided the students into three groups and gave them various solutions to find out their pH and classify them into acidic, basic and neutral solutions.

Group A – Lemon juice, vinegar, colourless aerated drink

Group B – Tomato juice, coffee, ginger juice

Group C – Sodium hydroxide, sodium chloride, lime water

(a) For the solutions provided, which group is/are likely to have pH value (i) less than 7, and (ii) greater than 7 ? *1*

(b) List two ways of determining pH of a solution *1*

(c) Explain, why the sour substances such as lemon juice are effective in cleaning the tarnished copper vessels. *2*

OR

(c) "pH has great importance in our daily life." Justify this statement by giving two examples. *2*

38. All the reproductive methods of living organisms are broadly categorized into two types : 1. Asexual reproduction, and 2. Sexual reproduction.

Asexual reproduction involves the participation of a single parent without the formation of gametes, fertilisation and transfer of genetic material. This method is a common means of rapidly increasing offsprings under favourable conditions.

(a) Name the type of fission that occurs in Leishmania and Plasmodium. *1*

(b) Write one advantage of sexual mode of reproduction over asexual reproduction. *1*

(c) Give reasons why :

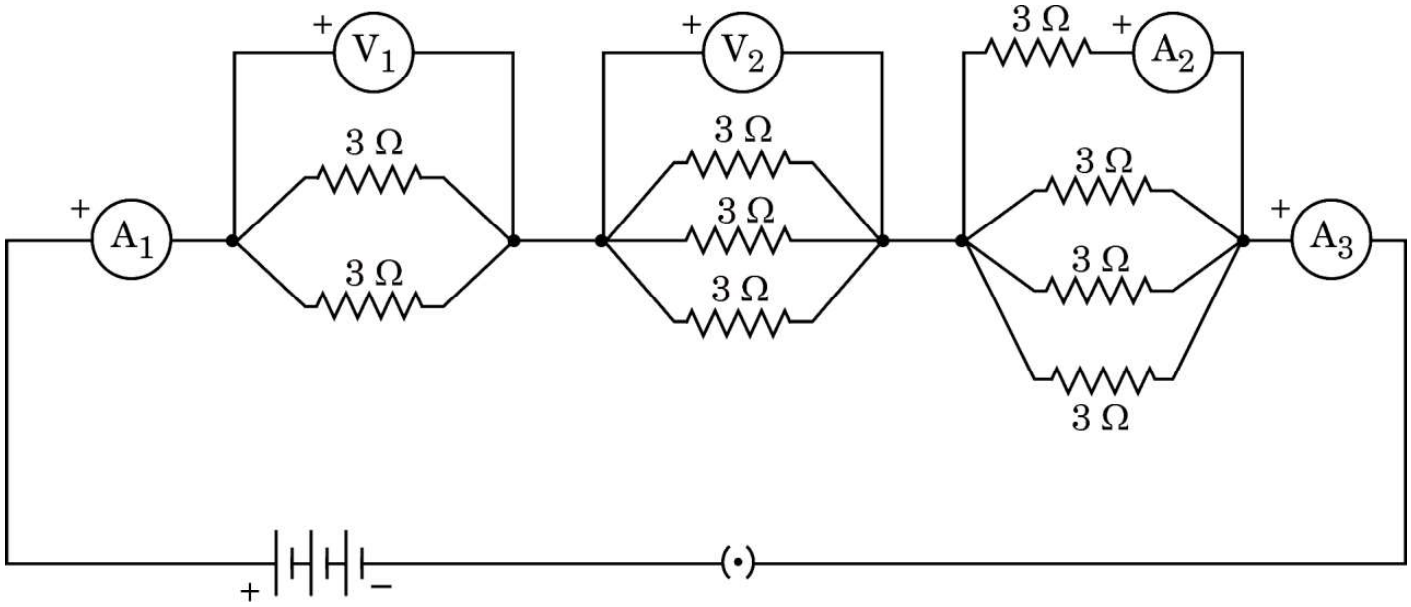
(i) Colonies of yeast fail to multiply in water but multiply in sugar solution.

(ii) Rhizopus individuals do not grow on a dry slice of bread. *2*

OR

(c) Name the filamentous structures a student could identify when he collected water from a pond that appeared dark green. How do these organisms multiply ? Explain. *2*

39. Consider the following electrical circuit diagram in which nine identical resistors of 3 Ω each are connected as shown. If the reading of the ammeter A_1 is 1 ampere, answer the following questions :



(a) What is the relationship between the readings of A_1 and A_3 ? Give reasons for your answer. *1*

(b) What is the relationship between the readings of A_2 and A_3 ? *1*

(c) Determine the reading of the voltmeter V_1. *2*

OR

(c) Find the total resistance of the circuit. *2*

Strictly Confidential: (For Internal and Restricted use only)
Secondary School Examination, **2023**
Marking Scheme – Science (SUBJECT CODE -086)
(PAPER CODE –31/2/2)

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 **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 a reply.
    - 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. Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

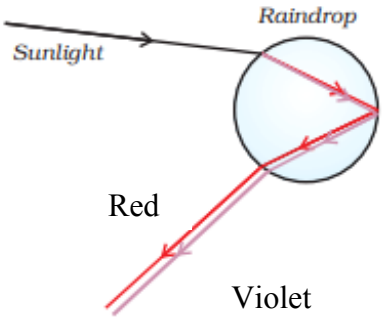
17. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.

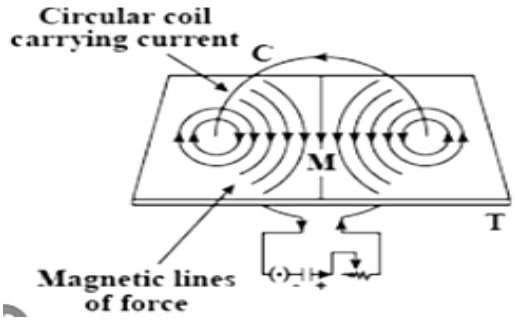
18. The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

MARKING SCHEME
Secondary School Examination, 2023
SCIENCE (Subject Code–086)
[Paper Code: 31/2/2]

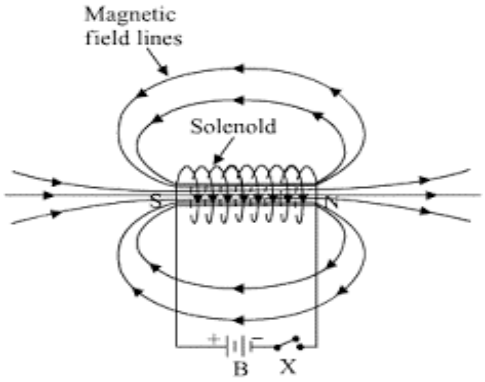
Maximum Marks: 80

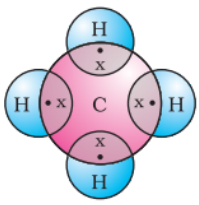
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	(c)	1	1
2.	(a)	1	1
3.	(c)	1	1
4.	(a)	1	1
5.	(a)	1	1
6.	(d)	1	1
7.	(c)	1	1
8.	(a)	1	1
9.	(b)	1	1
10.	(b)	1	1
11.	(c)	1	1
12.	(b)	1	1
13.	(b)	1	1
14.	(c)	1	1
15.	(d)	1	1
16.	(d)	1	1
17.	(d)	1	1
18.	(b)	1	1
19.	(a)	1	1
20.	(c)	1	1
	SECTION—B		
21.	(a) • It is formed after a rain shower. • It is always formed in a direction opposite to that of the Sun.	½ ½	

	(ii)  **OR** (b) The phenomenon of the change in direction of propagation of light caused by large sized molecules/ caused by colloidal particles. When sunlight passes through the atmosphere, fine particles in the air scatter blue light (shorter wavelengths) more than the red colour (longer wavelengths).	1 1 1	2
22.	(a) Movement of water and minerals from the soil to other parts of the plant will stop and it will ultimately die. (b) Platelet cells plug these leaks by helping the blood to clot at these points of injury. / Leakage of blood would lead to loss of pressure which would reduce efficiency of pumping system.	1 1	2
23.	(a) • Yellow precipitate of lead iodide is formed. • Double displacement reaction / Precipitation reaction $Pb(NO_3)_2 + 2KI \longrightarrow PbI_2 + 2KNO_3$ **OR** (b) (i) • Oxygen is added to copper / Copper is oxidised • copper oxide / CuO (ii) By passing hydrogen gas over it **Alternative answer** (i) $2Cu + O_2 \xrightarrow{\Delta} 2CuO$ (ii) $CuO + H_2 \longrightarrow Cu + H_2O$	½ ½ 1 1 1	**2**
24.	(a) Tt (b) Because only Dominant trait (Tall) is expressed in F1 generation / Tallness is dominant over recessive short trait. (c) F_2 generation – Tall : short 3 : 1	½ 1 ½	2

25.	 Direction of current / Polarity of cell Direction of Magnetic field lines Pattern of magnetic field lines.	 ½ ½ 1	 2
26.	(a) Each step or level of the food chain forms a trophic level. (b) •10% • Primary consumers/Herbivores	1 ½ ½	 2
	SECTION—C		
27.	(a) Combination reaction; $N_2 + 3H_2 \longrightarrow 2NH_3$ (b) Decomposition reaction / Thermal Decomposition $2Pb(NO_3)_2 \xrightarrow{Heat} 2PbO + 4NO_2 + O_2$ (c) Displacement reaction; $Cu + 2AgNO_3 \longrightarrow Cu(NO_3)_2 + 2Ag$	½ , ½ ½ , ½ ½ , ½	 3
28.	• Some harmful substances like pesticides are used to protect crops. When these chemicals are washed down in the soil or water bodies, they are absorbed by plants along with water and minerals and by animals from water. When we consume these food items, the pesticides enter our body. (**Alternate answer** : If the child explains the question through food chain, credit marks.) • As human beings occupy the top level in any food chain, maximum concentration of these chemicals get accumulated in them.	2 1	 3
29.	(a) Here h = 3 cm; f = – 12 cm, u = - 18 cm, **(Award full marks if data not written but calculations are correct)**	½	

	(i) v = ?, h′ = ? $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{-12\ cm} - \frac{1}{-18\ cm}$ $\therefore v = -36\ cm$ (ii) $h' = -\frac{v}{u} \times h$ $h' = (-)\ \frac{-36\,cm}{-18\ cm} \times 3\ cm = -\ 6\ cm$ **OR** (b)• Power of lens : Ability of a lens to converge or diverge light rays falling on it / Degree of convergence or divergence of light achieved by a lens / Reciprocal of focal length of lens in metre. **(Any one)** • It is diverging/concave lens • $P = \frac{1}{f(m)} = \frac{100}{f(cm)}$ $P = \frac{100}{-10\ cm} = -10\ D$ • Sign of magnification = + or positive	½ ½ ½ ½ ½ 1 ½ ½ ½	3
30.	Pea plant develops tendrils which help it to climb up other plants or fences or some other support. When they come in contact with any support, the part of the tendril in contact with the support does not grow as rapidly as part of the tendril away from the support. This causes the tendril to circle around the support and thus cling to it.	3	3
31.	(a) (i) **Roasting**: It is carried out for sulphide ores. Ore is heated in excess of air $2ZnS + 3O_2 \longrightarrow 2ZnO + 2SO_2$ OR $2HgS + 3O_2 \xrightarrow{Heat} 2HgO + 2SO_2$ OR $2Cu_2S + 3O_2 \xrightarrow{Heat} 2Cu_2O + 2SO_2$ **(Any One)** **Calcination**: It is carried out for carbonate ores. Ore is heated in absence or limited supply of air. $ZnCO_3 \xrightarrow{Heat} ZnO + CO_2$ OR $CaCO_3 \xrightarrow{heat} CaO + CO_2$ OR $PbCO_3 \xrightarrow{heat} PbO + CO_2$ **(Any One)**	½ ½ 1	

	(b) Reduction with the help of carbon $ZnO + C \xrightarrow[Heat]{} Zn + CO$ **Alternate answer** With the help of heat $2HgO(s) \xrightarrow{Heat} 2\,Hg\,(l) + O_2(g)$ **OR** Auto reduction / Heating with its ore $2Cu_2O + Cu_2S \xrightarrow{Heat} 6Cu\,(s) + SO_2(g)$ **(or Any other)**	½ ½	3
32.	• A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder is called a solenoid.  (Deduct ½ mark if direction of current or magnetic field not marked) • Field is unform inside the solenoid.	1 1 1	3
33.	(a) (i) Glucose ⟶ Pyruvic acid /Pyruvate In the cytoplasm (ii) It is used as fuel for all activities in a cell / ATP is broken down giving rise to a fixed amount of energy which drive endothermic reactions in the cell. (iii) When air is taken in and let out, the lungs always contain a residual volume of air so that there is sufficient time for the oxygen to be absorbed and for the carbon dioxide to be released / volume of air present in lung after	½ ½ 1 1	

	exhalation. **OR** (b) • A potted plant is taken and kept in dark for 24 hrs to destarch it. • Cover a part of a leaf of the plant with black paper to prevent that area from getting sunlight. • Keep the plant in sunlight for 24 hours. • Pluck the leaf, remove the black paper, boil it in alcohol and dip the leaf in iodine solution for starch test. • The covered part showed no change in colour indicating that starch has not been produced due to the absence of sunlight. • The rest of the leaf turned blue black proving that starch is produced during photosynthesis and sunlight is essential for that.	½ × 6	3
	SECTION— D		
34.	(a) 'X' – CH_3COOH / Ethanoic Acid / Acetic Acid 'Y' – C_2H_5OH / Ethanol 'Z' – $CH_3COOC_2H_5$ / Ethyl Ethanoate • $CH_3COOH + C_2H_5OH \xrightarrow[\text{catlyst}]{\text{Acid}} CH_3COOC_2H_5 + H_2O$ • Esterification Reaction • $CH_3COOC_2H_5 \xrightarrow{NaOH} C_2H_5OH + CH_3COONa$ • Saponification Reaction • It is used in the preparation of soap. **OR** (b) (i) • Methane / CH_4  • Covalent bond / Single Covalent bond/ Single bond	½ ½ ½ 1 ½ 1 ½ ½ ½ 1 ½	

(ii) Biogas; Compressed Natural gas / CNG — ½, ½

(iii) • Alkanes ; • C_nH_{2n+2} — ½, ½

(iv) Clean flame/blue flame — 1 — 5

35. (a) (i)

Nervous Control	**Hormonal Control**
1. Messages are sent as an electrical impulse.	1. Messages are carried in the form of chemicals (hormone)
2. It is carried through Neurons.	2. It is carried through blood .
3. Nerve impulses produce rapid responses.	3. Hormones produce slow responses.
4. Nerve impulses produce short lived responses.	4. Hormones produce long lasting responses.

(or Any other) (Any three) — 1×3

(ii) • When growing shoot is exposed to unidirectional light, it results in auxin shifting towards the shaded side.
• More auxin causes more growth of shoot in the shaded side resulting in the bending of stem towards source of light. — 1 ,1

OR

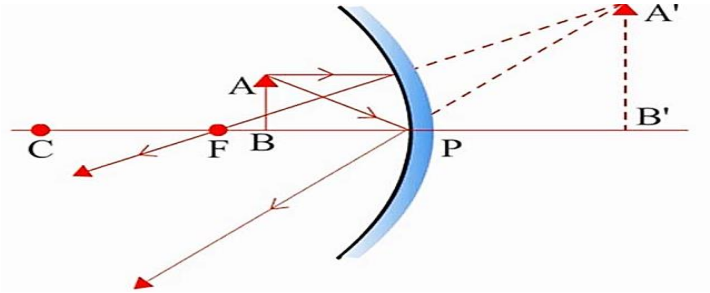
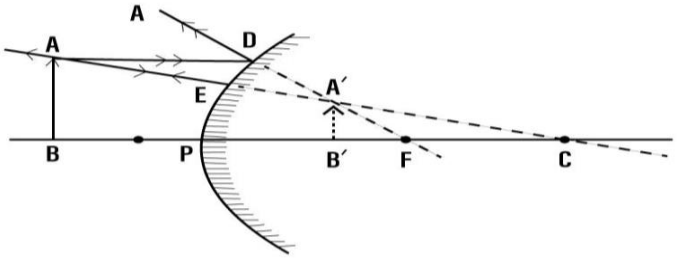
(b) (i)

	Disorder	**Gland**
(I)	Gigantism	Pituitary
(II)	Delay in Puberty	Ovary
(III)	Goitre	Thyroid

½ × 6

(ii) The timing and amount of hormone released are regulated by feedback mechanisms. — 1

Example –
• If the sugar level in the blood rises more insulin is produced.
• As blood sugar level falls, insulin secretion is reduced. — 1 — 5

36.	(a) (i) Concave mirror / Converging mirror	1	
	(ii) Convex mirror / Diverging mirror	1	
	(b) (i) 	1	
	(ii) 	1	
	(Overall deduct ½ mark for not drawing the arrows)		
	(c) • Concave mirror / Converging mirror • Between focus and centre of curvature of the mirror / between F & C	½ ½	5
	SECTION—E		
37.	(a) (i) Groups A and B – less than 7 (ii) Group C – greater than 7	½ ½	
	(b) pH paper and universal indicator.	½, ½	
	(c) • Copper vessel is tarnished due to formation of basic copper oxide. • Lemon juice being acidic react with copper oxide and the salt formed is washed away.	2	
	OR		
	(c) • An optimal pH is required for digestion. • Change in pH can cause tooth decay		

	• Animals and plants defend themselves through change in pH. • Survival of aquatic life becomes difficult when pH of river water becomes low. **(or any other)** **(Any two)**	1 × 2	4
38.	(a) Leishmania – Binary fission ; Plasmodium – Multiple fission	½, ½	
	(b) Sexual reproduction leads to more variations which are useful for ensuring the survival of a species.	1	
	(c) (i) sugar solution provides nutrients for growth and multiplication whereas water does not do.	1	
	(ii) Moisture is required for the growth of Rhizopus.	1	
	OR		
	(c) • Spirogyra	½	
	• Fragmentation – Spirogyra simply breaks up into smaller pieces upon maturation. Each piece grows into a new individual.	½, 1	4
39.	(a) • Both have same reading / $A_1 = A_3$	½	
	• Both are connected in series	½	
	(b) Reading of $A_2 = \frac{1}{4}$ A as current is equally divided in the four identical resitors . /Reading of $A_2 = \frac{1}{4}$ times Reading of A_3. / A_2 =0.25 A / $A_2 < A_3$	1	
	(c) $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$ / $R_p = \frac{R}{n}$	½	
	$\frac{1}{R_p} = \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega}$	½	
	$R_p = \frac{3}{2}\ \Omega$	½	
	$V = I\ R$		
	$V_1 = 1A \times \frac{3}{2}\ \Omega = \frac{3}{2} V = 1{\cdot}5V$		
	OR		
	$\frac{1}{R_p} = \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega}$		
	$\therefore R_p = \frac{3}{2}\ \Omega$	½	
	$\frac{1}{R_p} = \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega}$		

	$\therefore R_{p_2} = 1\ \Omega$	½	
	$\frac{1}{R_p} = \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega}$		
	$\therefore R_{p_3} = \frac{3}{4}\ \Omega$	½	
	$\therefore R = R_{p_1} + R_{p_2} + R_{p_3} = \left(\frac{3}{2} + 1 + \frac{3}{4}\right)\Omega = \frac{13}{4}\ \Omega\ /\ 3.25\ \Omega$	½	4

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