

SET-2**Series QQARR/1**प्रश्न-पत्र कोड
Q.P. Code **31/1/2**

रोल नं.

Roll No.

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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 11 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 15 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 11 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 15 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 : 2 घण्टे

Time allowed : 2 hours

अधिकतम अंक : 40

Maximum Marks : 40

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P.T.O.



सामान्य निर्देश :

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

- (i) इस प्रश्न-पत्र में कुल 15 प्रश्न हैं। सभी प्रश्न अनिवार्य हैं।
- (ii) यह प्रश्न-पत्र तीन खण्डों में विभाजित किया गया है – क, ख एवं ग।
- (iii) खण्ड क – प्रश्न संख्या 1 से 7 तक लघु-उत्तरीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न 2 अंकों का है।
- (iv) खण्ड ख – प्रश्न संख्या 8 से 13 भी लघु-उत्तरीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न 3 अंकों का है।
- (v) खण्ड ग – प्रश्न संख्या 14 और 15 प्रकरण-आधारित प्रश्न हैं। प्रत्येक प्रश्न 4 अंकों का है।
- (vi) कुछ प्रश्नों में आंतरिक चयन प्रदान किया गया है। इस प्रकार के प्रश्नों में केवल एक ही विकल्प का उत्तर दीजिए।

खण्ड क

1. (क) ओज़ोन क्या है ? पृथ्वी के वायुमण्डल के उच्चतर स्तरों पर यह किस प्रकार निर्मित होती है ? ओज़ोन हमारे पारितंत्र को किस प्रकार प्रभावित करती है ? 2

अथवा

- (ख) (i) दो मानव-निर्मित पारितंत्रों की सूची बनाइए। 1
 - (ii) “हम किसी तालाब की सफाई उस ढंग से नहीं करते हैं जिस ढंग से हम अपनी जलजीवशाला की सफाई करते हैं।” इस कथन की कारण सहित पुष्टि कीजिए। 1
2. (क) (i) उस नियम का नाम और वह नियम लिखिए जो किसी एकसमान चुम्बकीय क्षेत्र में क्षेत्र के लम्बवत् किसी धारावाही सीधे चालक पर लगने वाले बल की दिशा निर्धारित करता है।
 - (ii) कोई ऐल्फा कण किसी चुम्बकीय क्षेत्र में गुज़रते समय उत्तर दिशा में प्रक्षिप्त हो जाता है। यदि इसी चुम्बकीय क्षेत्र में कोई इलेक्ट्रॉन गुज़रता है, तो वह किस दिशा में प्रक्षिप्त होगा ? 2

अथवा

- (ख) (i) परिनालिका किसे कहते हैं ?
- (ii) किसी परिनालिका जिससे कोई स्थायी धारा प्रवाहित हो रही है, के चुम्बकीय क्षेत्र की चुम्बकीय क्षेत्र रेखाओं का पैटर्न खींचिए। 2



General Instructions :

Read the following instructions very carefully and strictly follow them :

- (i) This question paper comprises **15** questions. **All** questions are compulsory.
- (ii) This question paper is divided into **three** sections – **A, B** and **C**.
- (iii) **Section A** – Questions No. **1** to **7** are short answer type questions. Each question carries **2** marks.
- (iv) **Section B** – Questions No. **8** to **13** are also short answer type questions. Each question carries **3** marks.
- (v) **Section C** – Questions No. **14** and **15** are case-based questions. Each question carries **4** marks.
- (vi) Internal choices have been provided in some questions. Only one of the alternatives has to be attempted.

SECTION A

1. (a) What is ozone ? How is it formed in the upper layers of the Earth's atmosphere ? How does ozone affect our ecosystem ? 2

OR

- (b) (i) List two human-made ecosystems. 1
- (ii) "We do not clean a pond in the same manner as we do in an aquarium." Give reason to justify this statement. 1
2. (a) (i) Name and state the rule to determine the direction of force experienced by a current carrying straight conductor placed in a uniform magnetic field which is perpendicular to it.
- (ii) An alpha particle while passing through a magnetic field gets projected towards north. In which direction will an electron project when it passes through the same magnetic field ? 2

OR

- (b) (i) What is a solenoid ?
- (ii) Draw the pattern of magnetic field lines of the magnetic field produced by a solenoid through which a steady current flows. 2

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P.T.O.

3. (क) विभिन्नता किसे कहते हैं ? उन दो प्रमुख कारणों की सूची बनाइए जिनके कारण किसी समष्टि में विभिन्नता उत्पन्न होती है ।

2

अथवा

- (ख) (i) बैंगनी पुष्पों वाले पौधों और श्वेत पुष्पों वाले पौधों के मध्य संकरण द्वारा उत्पन्न F_1 संतति के पौधों के लक्षणों का उल्लेख कीजिए ।
(ii) यदि F_1 संतति के पौधों का स्वपरागण कराया जाए, तो F_2 संतति के पौधों में क्या प्रेक्षण होंगे ?
(iii) यदि F_2 संतति में 100 पौधे प्राप्त होते हैं, तो उनमें से कितने पौधे अप्रभावी लक्षण दर्शाएँगे ?

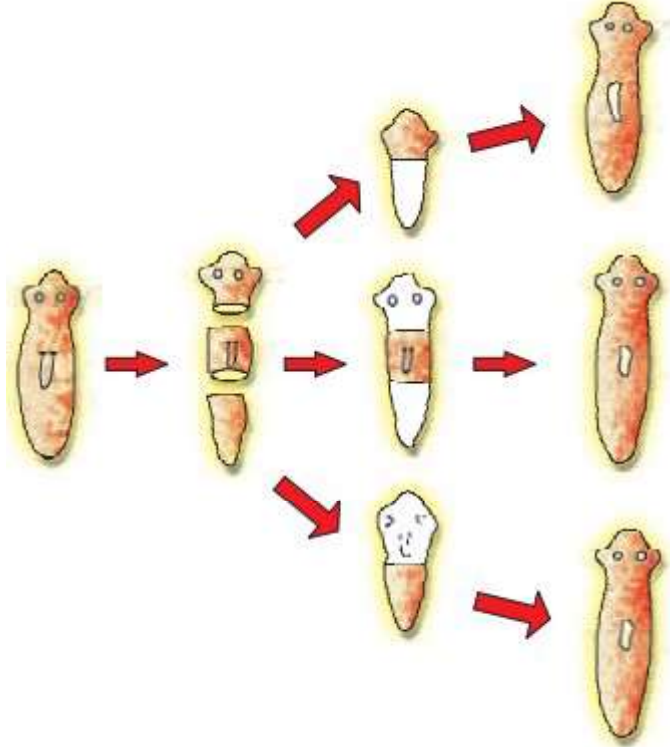
2

4. (क) नीचे दिए गए पुष्पों में से किसमें स्वपरागण की संभावना उच्चतर है ?
सरसों, पपीता, तरबूज, गुड़हल

- (ख) उभयलिंगी पुष्प के दो जननांगों की सूची बनाइए ।

2

5. (क) नीचे दी गई प्रक्रिया का नाम लिखिए और इसकी परिभाषा दीजिए :



- (ख) उन कोशिकाओं के प्रकार का नाम लिखिए जो इस प्रक्रिया को प्रदर्शित करने वाले जीवों में उपस्थित होती हैं ।

2

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4



3. (a) What is variation ? List two main reasons that may lead to variation in a population. 2

OR

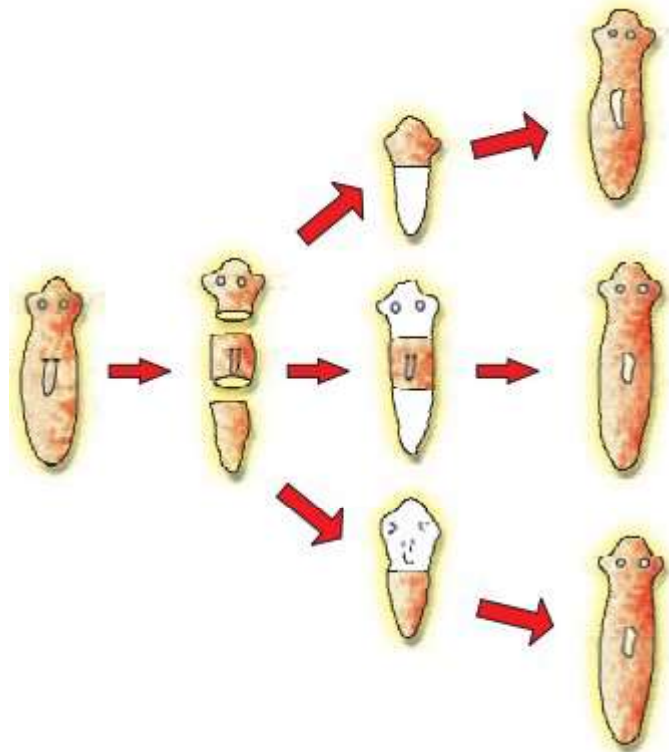
- (b) (i) In a cross between violet flowered plants and white flowered plants, state the characteristics of the plants obtained in the F_1 progeny.
- (ii) If the plants of F_1 progeny are self-pollinated, then what would be observed in the plants of F_2 progeny ?
- (iii) If 100 plants are produced in F_2 progeny, then how many plants will show the recessive trait ? 2

4. (a) Which of the following flowers will have higher possibility of self-pollination ?

Mustard, Papaya, Watermelon, Hibiscus

- (b) List the two reproductive parts of a bisexual flower. 2

5. (a) Name the process shown below and define it :



- (b) Name the types of cells present in the organisms which exhibit this process. 2

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6. डॉबेराइनर त्रिक क्या होता है ? नीचे दिए गए तीन तत्व इस प्रकार का त्रिक क्यों नहीं बना सकते हैं ? 2

N (14); P (31); As (75)
(परमाणु द्रव्यमान कोष्ठक में दिए गए हैं)

7. दो एल्काइनों, A और B के आण्विक सूत्र क्रमशः C_xH_2 और C_3H_y हैं ।

(क) x और y के मान ज्ञात कीजिए ।

(ख) A और B के नाम लिखिए ।

$$\frac{1}{2} \times 4 = 2$$

खण्ड ख

8. (क) जीवों के उस समूह का नाम लिखिए जिनसे सभी आहार शृंखलाओं का पहला पोषी स्तर बनता है । इन्हें यह नाम क्यों दिया गया है ?

(ख) मानव जैव-आवर्धन से सबसे अधिक दुष्प्रभावित क्यों होते हैं ?

(ग) किसी प्राकृतिक पारितंत्र से अपमार्जकों (अपघटकों) की अनुपस्थिति का एक दुष्परिणाम लिखिए । 3

9. (क) (i) विद्युत् शक्ति की परिभाषा दीजिए और इसका SI मात्रक लिखिए । $\frac{1}{2} + \frac{1}{2}$
(ii) 100 W; 220 V और 60 W; 220 V अनुमतांक के दो बल्ब 220 V के किसी विद्युत् मेन्स से पार्श्व में संयोजित हैं । बल्बों द्वारा मेन्स से ली गई विद्युत धारा ज्ञात कीजिए । 2

अथवा

(ख) (i) जूल का तापन नियम लिखिए । इसे गणितीय रूप में उस परिस्थिति में व्यक्त कीजिए जिसमें प्रतिरोध R की कोई युक्ति किसी V वोल्टता के स्रोत से संयोजित है तथा उससे समय t के लिए धारा I प्रवाहित होती है ।

(ii) कोई प्रतिरोधक जिसका प्रतिरोध 5Ω है, 6 वोल्ट की किसी बैटरी के सिरों से संयोजित है । 10 सेकण्ड में ऊष्मा के रूप में क्षयित ऊर्जा परिकलित कीजिए । 3

10. (क) किसी धातु के तार का प्रतिरोध परिकलित कीजिए जिसकी लम्बाई 2 m तथा अनुप्रस्थ-काट का क्षेत्रफल $1.55 \times 10^{-6} m^2$ है ।
(धातु की प्रतिरोधकता $2.8 \times 10^{-8} \Omega m$ है)

(ख) विद्युत् तापन युक्तियों के तापन अवयव बनाने के लिए शुद्ध धातुओं की तुलना में मिश्रातुओं को प्राथमिकता क्यों दी जाती है ? 2+1

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6. What is a Döbereiner triad ? Why can't the following three elements form such a triad ? 2

N (14); P (31); As (75)

(Atomic masses are given in parenthesis)

7. The molecular formulae of two alkynes, A and B are C_xH_2 and C_3H_y respectively.

(a) Find the values of x and y.

(b) Write the names of A and B.

$$\frac{1}{2} \times 4 = 2$$

SECTION B

8. (a) Name the group of organisms which form in the first trophic level of all food chains. Why are they called so ?

(b) Why are the human beings most adversely affected by bio-magnification ?

(c) State one ill-effect of the absence of decomposers from a natural ecosystem. 3

9. (a) (i) Define Electric Power and write its SI unit. $\frac{1}{2} + \frac{1}{2}$

(ii) Two bulbs rated 100 W; 220 V and 60 W; 220 V are connected in parallel to an electric mains of 220 V. Find the current drawn by the bulbs from the mains. 2

OR

(b) (i) State Joule's law of heating. Express it mathematically when an appliance of resistance R is connected to a source of voltage V and the current I flows through the appliance for a time t.

(ii) A 5Ω resistor is connected across a battery of 6 volts. Calculate the energy that dissipates as heat in 10 s. 3

10. (a) Calculate the resistance of a metal wire of length 2 m and area of cross-section $1.55 \times 10^{-6} \text{ m}^2$.

(Resistivity of the metal is $2.8 \times 10^{-8} \Omega \text{ m}$)

(b) Why are alloys preferred over pure metals to make the heating elements of electrical heating devices ? 2+1

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11. F_1 संतति के पौधे प्राप्त करने के लिए हरे तने वाले टमाटर के पौधों (GG) का संकरण बैंगनी तने वाले टमाटर के पौधों (gg) से कराया गया ।
- (क) F_1 संतति के पौधों में आप किस रंग के तने होने की अपेक्षा करते हैं और क्यों ?
- (ख) यदि F_2 संतति प्राप्त करने के लिए F_1 संतति में प्राप्त पौधों का स्वपरागण कराया जाता है, तो बैंगनी तने वाले पौधों की F_2 संतति में प्रतिशतता क्या होगी ?
- (ग) F_2 संतति में प्राप्त GG और gg पौधों के मध्य अनुपात लिखिए । 3
12. (क) उस संतृप्त हाइड्रोकार्बन, जिसके अणु में चार कार्बन परमाणु हैं, की संभावित दो विभिन्न संरचनाएँ खींचिए । समान आण्विक सूत्र के इस हाइड्रोकार्बन की दो संरचनाओं को क्या कहते हैं ? इस यौगिक का सामान्य नाम और आण्विक सूत्र लिखिए । इस यौगिक के ऐल्काइन का आण्विक सूत्र लिखिए । 3
- अथवा**
- (ख) (i) बेन्ज़ीन का आण्विक सूत्र लिखिए और इसकी संरचना खींचिए ।
- (ii) बेन्ज़ीन के अणु में उपस्थित एकल सहसंयोजी आबन्धों और द्वि सहसंयोजी आबन्धों की संख्या लिखिए ।
- (iii) किन यौगिकों को ऐल्काइन कहते हैं ? 3
13. (क) आधुनिक आवर्त सारणी में किसी तत्व की परमाणु संख्या को तत्वों के वर्गीकरण के आधार के रूप में अपनाने के दो लाभों की सूची बनाइए ।
- (ख) तत्वों X (परमाणु संख्या 13) और Y (परमाणु संख्या 20) के इलेक्ट्रॉनिक विन्यास लिखिए । 3

खण्ड ग

इस खण्ड में 2 प्रकरण-आधारित प्रश्न (14 और 15) हैं । प्रत्येक प्रकरण में 3 उप-भाग (क), (ख) और (ग) हैं । भाग (क) और (ख) अनिवार्य हैं । भाग (ग) में आंतरिक चयन प्रदान किया गया है ।

14. कोई छात्रा किसी चिपचिपे पदार्थ का उपयोग करके ड्राइंग बोर्ड पर एक सफेद कागज़ की शीट लगाती है । वह इसके बीचों-बीच एक छड़ चुम्बक रखती है तथा इस छड़ चुम्बक के चारों ओर, नमक-छितरावक का उपयोग करके, एकसमान रूप से कुछ लौह-चूर्ण छितराती है । बोर्ड को धीरे-धीरे थपथपाने पर वह यह प्रेक्षण करती है कि लौह-चूर्ण स्वयं ही एक विशेष पैटर्न में व्यवस्थित हो गया है ।
- (क) लौह-चूर्ण के इस पैटर्न को दर्शाने के लिए आरेख खींचिए । 1
- (ख) लौह-चूर्ण का यह पैटर्न क्या निरूपित करता है ? 1



11. A cross was made between green-stemmed tomato plants denoted by (GG) and purple-stemmed tomato plants denoted as (gg) to obtain F_1 progeny.
- (a) What colour of the stem would you expect in their F_1 progeny and why? 3
 - (b) Give the percentage of purple-stemmed plants if F_1 plants are allowed to self-pollinate to produce F_2 progeny. 3
 - (c) Write the ratio between GG and gg plants in the F_2 progeny? 3
12. (a) Draw two different possible structures of a saturated hydrocarbon having four carbon atoms in its molecule. What are these two structures of the hydrocarbon having same molecular formula called? Write the molecular formula and the common name of this compound. Also write the molecular formula of its alkyne. 3
- OR**
- (b) (i) Write the molecular formula of benzene and draw its structure. 3
 - (ii) Write the number of single and double covalent bonds present in a molecule of benzene. 3
 - (iii) Which compounds are called alkynes? 3
13. (a) List two advantages of adopting the atomic number of an element as the basis of classification of elements in the Modern Periodic Table. 3
- (b) Write the electronic configurations of the elements X (atomic number 13) and Y (atomic number 20). 3

SECTION C

This section has 2 case-based questions (14 and 15). Each case is followed by 3 sub-questions (a), (b) and (c). Parts (a) and (b) are compulsory. However, an internal choice has been provided in Part (c).

14. A student fixes a sheet of white paper on a drawing board using some adhesive materials. She places a bar magnet in the centre of it and sprinkles some iron filings uniformly around the bar magnet using a salt-sprinkler. On tapping the board gently, she observes that the iron filings have arranged themselves in a particular pattern.
- (a) Draw a diagram to show this pattern of iron filings. 1
 - (b) What does this pattern of iron filings demonstrate? 1

31/1/2



- (ग) (i) किसी बिन्दु पर चुम्बकीय क्षेत्र की दिशा क्षेत्र रेखाओं का उपयोग करके किस प्रकार ज्ञात की जाती है ? दो चुम्बकीय क्षेत्र रेखाएँ एक-दूसरे का प्रतिच्छेदन क्यों नहीं करती हैं ?

2

अथवा

- (ii) छोटी दिक्सूची का उपयोग करके किसी छड़ चुम्बक की चुम्बकीय क्षेत्र रेखाएँ कैसे खींची जाती हैं ? चुम्बक के दोनों ओर एक-एक चुम्बकीय क्षेत्र रेखा खींचिए ।

2

15. वह प्रक्रिया जिसके द्वारा किसी व्यष्टि का लिंग निर्धारित होता है, लिंग-निर्धारण कहते हैं । मानवों में किसी नवजात का लिंग-निर्धारण आनुवंशिक आधार पर किया जाता है, जबकि कुछ अन्य में ऐसा नहीं होता है । मानवों में 46 (23 जोड़े) गुणसूत्र होते हैं । इनमें से 44 (22 जोड़े) गुणसूत्र शारीरिक लक्षणों को नियंत्रित करते हैं तथा दो (एक जोड़ा) गुणसूत्र को लिंग गुणसूत्र कहते हैं । लिंग गुणसूत्र दो प्रकार के होते हैं — X गुणसूत्र और Y गुणसूत्र । निषेचन के समय नवजात शिशु का लिंग निर्धारण इस तथ्य पर निर्भर करता है कि नर युग्मक का कौन-सा प्रकार मादा युग्मक के साथ संलयन करता है ।

- (क) मानवों में लिंग गुणसूत्रों का जोड़ा, प्रकार और साइज़ के पदों में, परिपूर्ण जोड़ा क्यों नहीं होता है ? $\frac{1}{2} + \frac{1}{2}$
- (ख) यदि युग्मकों में सदैव ही गुणसूत्रों की संख्या आधी होती है, तो फिर जीव में गुणसूत्रों की मूल संख्या किस प्रकार पुनःस्थापित हो जाती है ? 1
- (ग) (i) उन दो जीवों के नाम लिखिए जिनका लिंग निर्धारण आनुवंशिक आधार पर नहीं होता । इनके लिंग निर्धारण की प्रक्रिया की व्याख्या कीजिए । 1+1

अथवा

- (ii) केवल प्रवाह आरेख की सहायता से, यह दर्शाइए कि मानवों में आनुवंशिक रूप से लिंग निर्धारण किस प्रकार होता है । 1+1



-
- (c) (i) How is the direction of magnetic field at a point determined using the field lines ? Why do two magnetic field lines not cross each other ? 2

OR

- (ii) How are the magnetic field lines of a bar magnet drawn using a small compass needle ? Draw one magnetic field line each on both sides of the magnet. 2

15. The mechanism by which the sex of an individual is determined is called sex-determination. In human beings, sex of a newborn is genetically determined, whereas in some others it is not. There are 46 (23 pairs) chromosomes in human beings. Out of these, 44 (22 pairs) control the body characters and 2 (one pair) are known as sex chromosomes. The sex chromosomes are of two types — X chromosome and Y chromosome. At the time of fertilisation, depending upon which type of male gamete fuses with the female gamete, the sex of the newborn child is decided.

- (a) Why is a pair of sex chromosomes in human beings called a mismatched pair in terms of type and size ? $\frac{1}{2} + \frac{1}{2}$
- (b) If the gametes always have half the number of chromosomes, then how is the original number of chromosomes restored in the organism ? 1
- (c) (i) Name two animals whose sex is not genetically determined. Explain the process of their sex determination. 1+1

OR

- (ii) With the help of a flowchart only, show how sex is genetically determined in human beings. 1+1



Strictly Confidential: (For Internal and Restricted use only)
Class : X Secondary School Term II Examination, 2022
Marking Scheme – Science SUBJECT CODE -086
(PAPER CODE –31/1/2)

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 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 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, marks should be awarded.**
4. 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. 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.
5. Evaluators will mark(\checkmark) wherever answer is correct. For wrong answer ‘X’ be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. 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.
7. 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.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks **40** has to be used. Please do not hesitate to award full marks if the answer deserves it.
11. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 30 answer books per day in main subjects and 35 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.



12. 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 totalling 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 totalling on the title page.
 - Wrong totalling of marks of the two columns on the title page.
 - Wrong grand total.
 - Marks in words and figures not tallying.
 - 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.
13. 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.
14. Any unassessed portion, non-carrying over of marks to the title page, or totalling 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.
15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.
17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.



MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM-II, 2022
SUBJECT : SCIENCE CODE-086
[PAPER CODE : 31/1/2]

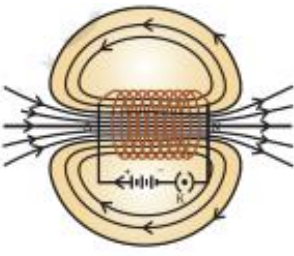
Instructions:-

- The marking scheme carries only suggested value points for the answers.
- These are only guidelines and do not constitute the complete answer.
- The students can have their own expression and if the expression is correct, the marks are awarded accordingly.

Maximum Marks : 40

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
SECTION—A			
1.	a) <ul style="list-style-type: none"> • Ozone is a molecule formed by three atoms of oxygen. • UV radiations split some molecular oxygen (O₂) into free oxygen atoms (O + O). These atoms then combine with molecular oxygen to form ozone. / $\text{O}_2 \xrightarrow{\text{UV}} \text{O} + \text{O}$ $\text{O} + \text{O}_2 \rightarrow \text{O}_3 \text{ (Ozone)}$ <ul style="list-style-type: none"> • Ozone layer shields the surface of the earth from damaging UV radiation of the sun. / Depletion of ozone layer causes harmful effects on the organism. <p style="text-align: center;">OR</p> b) <ol style="list-style-type: none"> Aquarium, crop field, gardens, etc. (any two) A pond is a natural ecosystem. It has decomposers whereas an aquarium is an artificial ecosystem and does not contain decomposers. Therefore it needs regular cleaning for proper functioning. 	½ 1 ½	2
2.	(a) i) <ul style="list-style-type: none"> • Fleming's left-hand rule • Stretch the thumb, forefinger and middle finger of your left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor. ii) South <p style="text-align: center;">OR</p> 2. (b) i) A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder.	½ 1 ½ 1	

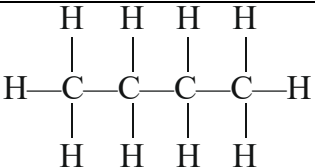
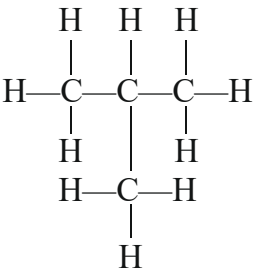
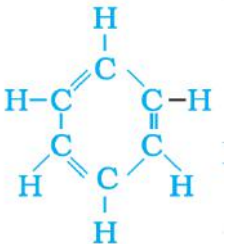


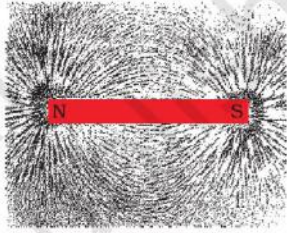
	ii)		1	2
3.	a) <ul style="list-style-type: none"> The differences in the traits shown by the individuals of a species. Two reasons : <ul style="list-style-type: none"> i) Inaccurate / Error in DNA copying ii) Sexual reproduction 	1 $\frac{1}{2}$ $\frac{1}{2}$		
3.	b) OR <ul style="list-style-type: none"> (i) F1 Progeny : Violet flowered plants (ii) F2 Progeny : Violet as well as white flowered plants (iii) 25 plants 	$\frac{1}{2}$ 1 $\frac{1}{2}$	2	
4.	a) Mustard and Hibiscus b) Stamens and Pistil / Carpel	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$	2	
5.	(a) <ul style="list-style-type: none"> Regeneration It is a process in which each cut or broken up pieces of an individual grows into a new individual through specialised cells. (b) <ul style="list-style-type: none"> Specialized cells 	$\frac{1}{2}$ 1 $\frac{1}{2}$	2	
6.	<ul style="list-style-type: none"> When three elements with similar properties are arranged in order of their increasing atomic masses, the atomic mass of the middle element is roughly the average of the atomic masses of the other two elements. The atomic mass of phosphorus is not the average of the atomic masses of nitrogen and arsenic. / <p>Average of atomic mass of N and As = $\frac{14+75}{2} = 44.5$</p> <p>But atomic mass of phosphorus is 31</p> <p>So N, P and As cannot be classified as Dobereiner's Triad</p>	1 1	2	
7.	(a) <ul style="list-style-type: none"> x is 2 y is 4 	$\frac{1}{2}$ $\frac{1}{2}$		



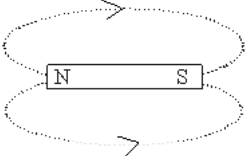
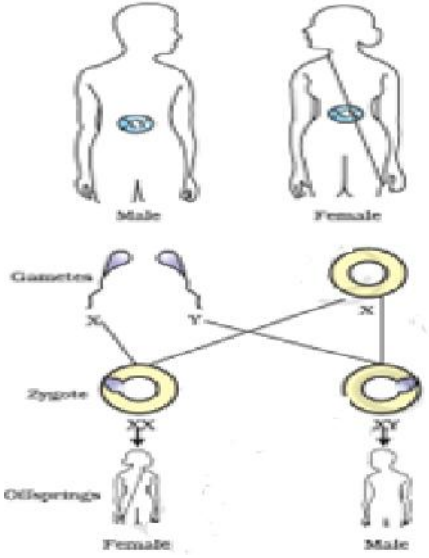
	(b) <ul style="list-style-type: none"> • A is Ethyne • B is Propyne 	½ ½	2
SECTION—B			
8.	(a) Producers, as they can manufacture food by the process of photosynthesis. (b) When non-degradable harmful chemicals (pesticides / DDT, etc.) enter a food chain, they get progressively accumulated at each trophic level. Human beings occupy the top level in any food chain, therefore the maximum concentration of these chemicals get accumulated in their bodies. (c) Ill effects of absence of decomposers from natural ecosystem : (i) Earth would be covered with dead bodies & foul smell (ii) Recycling of minerals will not take place (iii) Soil will not get replenished (iv) Ecosystem will get disrupted (any other relevant point) (any one)	½ + ½ 1 1	 3
9.	(a) (i) The rate at which electric energy is dissipated or consumed in an electric circuit. S.I. unit—watt / V.A / joule per second (a) (ii) • Current drawn by first bulb $I_1 = \frac{100 \text{ W}}{220 \text{ V}} = \frac{100}{220} \text{ ampere}$ • Current drawn by second bulb $I_2 = \frac{60 \text{ W}}{220 \text{ V}} = \frac{60}{220} \text{ ampere}$ Both the bulbs are in parallel Total current, $I = I_1 + I_2$ $= \left(\frac{100}{220} + \frac{60}{220} \right) \text{ ampere} = \frac{160}{220} \text{ A} = 0.73 \text{ A}$ (Accept any other method)	½ ½ ½ ½ ½	 3
9.	OR		
	(b) i) This law states that heat produced in a resistor is—		

	<ul style="list-style-type: none"> • directly proportional to the square of current for a given resistance / ($H \propto I^2$) • directly proportional to the resistance for a given current / ($H \propto R$) • directly proportional to the time for which the current flows through the resistor / ($H \propto t$) • $H = V I t$ <p>ii) $V = 6 \text{ V}; R = 5 \text{ } \Omega; t = 10 \text{ s}$ Energy dissipated as heat in $t = 10 \text{ s}$ is $H = \frac{V^2}{R} t$ $= \frac{(6 \text{ V})^2}{5 \text{ } \Omega} \times 10 \text{ s}$ $= 72 \text{ J}$</p>	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	3
10.	<p>(a) Given :</p> <p>Length of the wire = 2 m</p> <p>Area of cross section = $1.55 \times 10^{-6} \text{ m}^2$</p> <p>Resistivity, $\rho = 2.8 \times 10^{-8} \text{ } \Omega \text{ m}$</p> $R = \rho \frac{l}{a}$ $= \frac{2.8 \times 10^{-8} \text{ ohm metre} \times 2 \text{ metre}}{1.55 \times 10^{-6} (\text{metre})^2} \text{ } \Omega$ $= 3.6 \times 10^{-2} \text{ } \Omega$ <p>(deduct half mark if no or incorrect unit is given)</p> <p>(b) Alloys used for heating element have generally high melting point / high resistivity / Do not get oxidised at high temperature.</p>	$\frac{1}{2}$ $\frac{1}{2}$ 1 1	3
11.	<p>(a) Green; It is the dominant trait</p> <p>(b) Purple stemmed plants in F2 progeny are 25%</p> <p>(c) GG : gg</p> <p>1:1</p>	$\frac{1}{2} + \frac{1}{2}$ 1 1	3
12.	a) •	$\frac{1}{2}$	

	<p style="text-align: center;">  </p> <p>•</p> <p style="text-align: center;">  </p> <ul style="list-style-type: none"> • Isomers • C₄H₁₀ • Butane • C₄H₆ <p style="text-align: center;">OR</p> <p>b)</p> <p>i) • C₆H₆</p> <p>•</p> <p style="text-align: center;">  </p> <p>ii) • Single bond 9</p> <ul style="list-style-type: none"> • Double bond 3 <p>iii) Hydrocarbons containing triple bond</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1</p>	<p>3</p>
<p>13.</p>	<p>(a)</p> <ul style="list-style-type: none"> • Atomic number is more fundamental property and it decides the properties of an element. • Atomic number increases by one in going from one element to the next, so arrangement of elements becomes more systematic. 		

	<ul style="list-style-type: none"> Prediction of properties of elements could be made with more precision when the elements are arranged in increasing order of their atomic numbers. (Any Two) 	1+1	
	(b) Electronic configuration of X - 2, 8, 3 Electronic configuration of Y - 2, 8, 8, 2	$\frac{1}{2} + \frac{1}{2}$	3
SECTION—C			
14.	(a) 	1	
	(b) <ul style="list-style-type: none"> Iron filings experience a force due to which they arrange themselves along the direction of force experienced . Force is maximum at poles. 	1	
	(c) i) <ul style="list-style-type: none"> By placing a compass needle on magnetic field lines, direction of north pole will give direction of magnetic field. If they cross or intersect , it means that at the point of intersection the compass needle would point into two directions, which is not possible. / <p>If they cross or intersect, it means that at the point of intersection there will be direction of two resultant fields which is not possible.</p> <p style="text-align: center;">OR</p>	1	
	(c) ii) <ul style="list-style-type: none"> Take a small bar magnet, place it in the centre of the drawing sheet fixed on a drawing board and mark its boundary. 	$\frac{1}{2}$	
	<ul style="list-style-type: none"> Place a small compass needle near the north pole of the magnet, south pole of the compass needle points towards the north pole. 	$\frac{1}{2}$	
	<ul style="list-style-type: none"> Mark the position of two ends of the needle. Now move the needle to a new position such that the south pole of needle occupies the position previously occupied by the north pole and again mark the new position of the north pole. In this way proceed step by step till you reach the south pole of the magnet. Join the points marked to get a field line. Similarly draw one more field line on the other side of the magnet. 	$\frac{1}{2}$	



		$\frac{1}{2}$	4
15.	<p>(a)</p> <ul style="list-style-type: none"> • XY • Y is shorter than X <p>(b) Fusion of egg with sperm (female gamete with male gamete) results in formation of zygote which restores the original number of chromosomes. /</p> <p>Egg (n) + Sperm (n) = Zygote (2 n)</p> <p>(where n is number of chromosomes)</p> <p>(c) i) • Reptiles & Snails</p> <ul style="list-style-type: none"> • In reptiles, the temperature at which fertilised eggs are kept determines whether the animal developing in the eggs would be a male or a female. In snails, they can change their sex during their life time. <p style="text-align: center;">OR</p> <p>(c) ii)</p>  <p style="text-align: right;">Diagram Labelling</p>	$\frac{1}{2} + \frac{1}{2}$ 1 $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 1	4

* * *