

CLASS X

Science (086)

Term 2 (2021-22)

Max. Marks:40

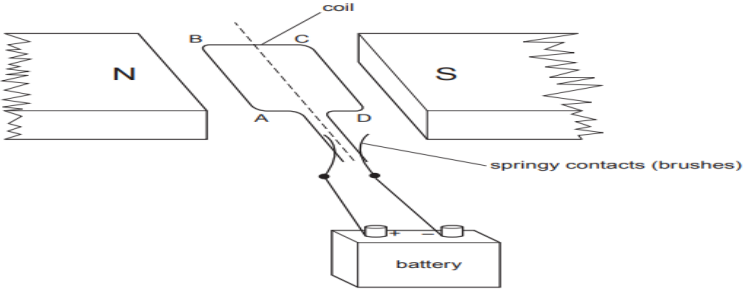
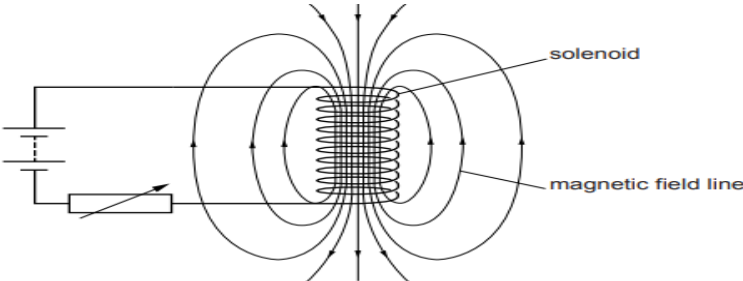
Time allowed: 2 hours

General Instructions:

- i) All questions are compulsory.
- ii) The question paper has **three sections** and **15 questions**. All questions are compulsory.
- iii) Section–A has 7 questions of 2 marks each; Section–B has 6 questions of 3 marks each; and Section–C has 2 case based questions of 4 marks each.
- iv) Internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

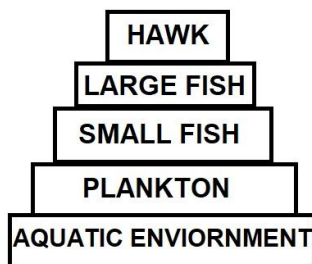
SECTION - A

1	<p>The table shows the electronic structures of four elements.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Element</th> <th style="text-align: center;">Electronic Structure</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">P</td> <td style="text-align: center;">2,6</td> </tr> <tr> <td style="text-align: center;">Q</td> <td style="text-align: center;">2,8,1</td> </tr> <tr> <td style="text-align: center;">R</td> <td style="text-align: center;">2,8,7</td> </tr> <tr> <td style="text-align: center;">S</td> <td style="text-align: center;">2,8,8</td> </tr> </tbody> </table> <ol style="list-style-type: none"> a. Identify which element(s) will form covalent bonds with carbon. b. “Carbon reacts with an element in the above table to form several compounds.” Give suitable reason. 	Element	Electronic Structure	P	2,6	Q	2,8,1	R	2,8,7	S	2,8,8	2
Element	Electronic Structure											
P	2,6											
Q	2,8,1											
R	2,8,7											
S	2,8,8											
2	<p>The diagram below shows part of the periodic table.</p> <ol style="list-style-type: none"> a. Which elements would react together to form covalent compounds? b. Between the two elements W and Z, which will have a bigger atomic radius? Why? <div style="text-align: center;"> </div>	2										
3	<ol style="list-style-type: none"> a. Trace the path a male gamete takes to fertilise a female gamete after being released from the penis. b. State the number of sets of chromosomes present in a zygote. 	2										

<p>4</p>	<p>Rajesh observed a patch of greenish black powdery mass on a stale piece of bread.</p> <p>a. Name the organism responsible for this and its specific mode of asexual reproduction.</p> <p>b. Name its vegetative and reproductive parts.</p>	<p>2</p>
<p>5</p>	<p>Mustard was growing in two fields- A and B. While Field A produced brown coloured seeds, field B produced yellow coloured seeds.</p> <p>It was observed that in field A, the offsprings showed only the parental trait for consecutive generations, whereas in field B, majority of the offsprings showed a variation in the progeny.</p> <p>What are the probable reasons for these?</p> <p>OR</p> <p>In an asexually reproducing species, if a trait X exists in 5% of a population and trait Y exists in 70% of the same population, which of the two trait is likely to have arisen earlier? Give reason.</p>	<p>2</p>
<p>6</p>	<p>A simple motor is made in a school laboratory. A coil of wire is mounted on an axle between the poles of a horseshoe magnet, as illustrated.</p>  <p>In the example above, coil ABCD is horizontal and the battery is connected as shown.</p> <p>a. For this position, state the direction of the force on the arm AB.</p> <p>b. Why does the current in the arm BC not contribute to the turning force on the coil?</p> <p>OR</p> <p>A circuit contains a battery, a variable resistor and a solenoid. The figure below shows the magnetic field pattern produced by the current in the solenoid.</p>  <p>a. State how the magnetic field pattern indicates regions where the magnetic field is stronger.</p>	<p>2</p>

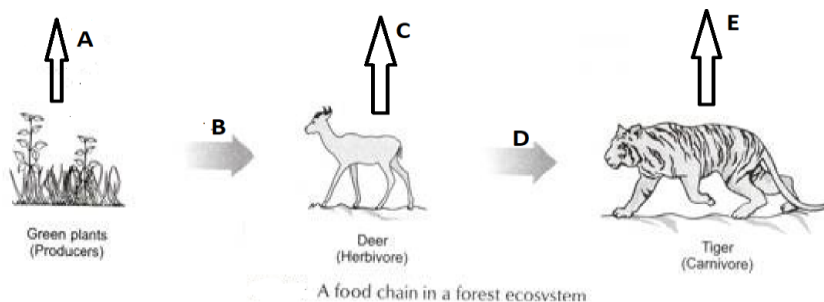
b. What happens to the magnetic field when the current in the circuit is reversed?

7 DDT was sprayed in a lake to regulate breeding of mosquitoes. How would it affect the trophic levels in the following food chain associated with a lake? Justify your answer.



OR

In the following food chain, vertical arrows indicate the energy lost to the environment and horizontal arrows indicate energy transferred to the next trophic level. Which one of the three vertical arrows (A, C and E) and which one of the two horizontal arrows (B and D) will represent more energy transfer? Give reason for your answer.



SECTION - B

8 Choose an element from period 3 of modern periodic table that matches the description given below in each instance. Give reason for your choice.

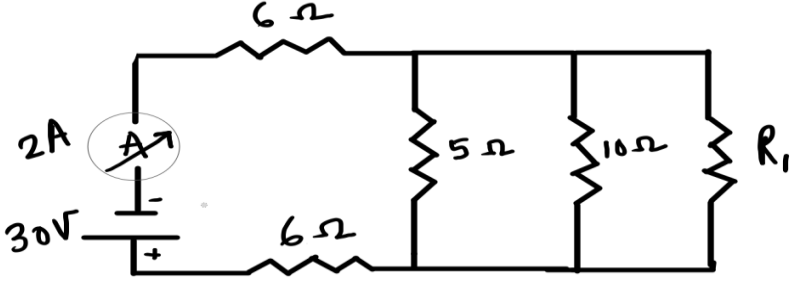
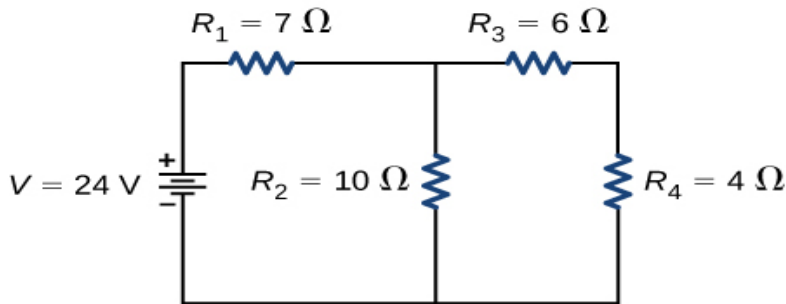
- It has a similar structure to diamond.
- It has same valency as Lithium.
- It has variable valency and is a member of the Oxygen family (group 16).

9 a. How many isomers are possible for the compound with the molecular formula C_4H_8 ? Draw the electron dot structure of branched chain isomer.
b. How will you prove that C_4H_8 and C_5H_{10} are homologues?

OR

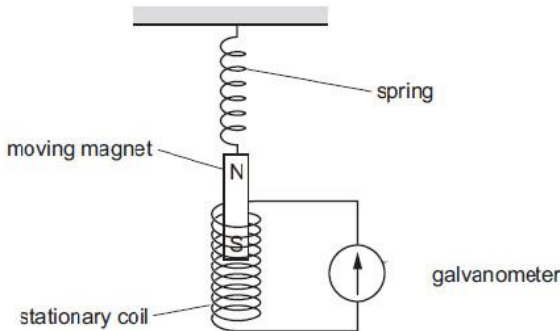
A carbon compound 'A' having melting point 156K and boiling point 351K, with molecular formula C_2H_6O is soluble in water in all proportions.

- Identify 'A' and draw its electron dot structure.
- Give the molecular formulae of any two homologues of 'A'.

<p>10</p>	<p>Two pea plants - one with round yellow seeds (RRYY) and another with wrinkled green (rryy) seeds produce F1 progeny that have round, yellow (RrYy) seeds.</p> <p>When F1 plants are self-pollinated, which new combination of characters is expected in F2 progeny? How many seeds with these new combinations of characters will be produced when a total 160 seeds are produced in F2 generation? Explain with reason.</p>	<p>3</p>
<p>11</p>	<p>a. It would cost a man Rs. 3.50 to buy 1.0 kW h of electrical energy from the Main Electricity Board. His generator has a maximum power of 2.0 kW. The generator produces energy at this maximum power for 3 hours. Calculate how much it would cost to buy the same amount of energy from the Main Electricity Board.(1 Mark)</p> <p>b. A student boils water in an electric kettle for 20 minutes. Using the same mains supply he wants to reduce the boiling time of water. To do so should he increase or decrease the length of the heating element? Justify your answer.(2 Marks)</p>	<p>3</p>
<p>12</p>	<div style="text-align: center;">  </div> <p>In the above circuit, if the current reading in the ammeter A is 2A, what would be the value of R_1?</p> <p>OR</p> <div style="text-align: center;">  </div> <p>Calculate the total resistance of the circuit and find the total current in the circuit.</p>	<p>3</p>
<p>13</p>	<p>Gas A, found in the upper layers of the atmosphere, is a deadly poison but is essential for all living beings. The amount of this gas started declining sharply in the 1980s.</p> <p>a. Identify Gas A. How is it formed at higher levels of the atmosphere?</p> <p>b. Why is it essential for all living beings? State the cause for the depletion of this gas.</p>	<p>3</p>

SECTION - C

This section has 02 case-based questions (14 and 15). Each case is followed by 03 sub-questions (a, b and c). Parts a and b are compulsory. However, an internal choice has been provided in part c.

<p>14</p>	<p>Sahil performed an experiment to study the inheritance pattern of genes. He crossed tall pea plants (TT) with short pea plants (tt) and obtained all tall plants in F1 generation.</p> <p>a. What will be set of genes present in the F1 generation? (1 Mark)</p> <p>b. Give reason why only tall plants are observed in F1 progeny. (1 Mark)</p> <p>c. When F1 plants were self - pollinated, a total of 800 plants were produced. How many of these would be tall, medium height or short plants? Give the genotype of F 2 generation. (2 Marks)</p> <p>OR</p> <p>When F1 plants were cross - pollinated with plants having tt genes, a total of 800 plants were produced. How many of these would be tall, medium height or short plants? Give the genotype of F 2 generation.</p>	<p>4</p>
<p>15</p>	<p>Ansari Sir was demonstrating an experiment in his class with the setup as shown in the figure below.</p>  <p>A magnet is attached to a spring. The magnet can go in and out of the stationary coil.</p> <p>He lifted the Magnet and released it to make it oscillate through the coil. Based on your understanding of the phenomenon, answer the following questions.</p> <p>a. What is the principle which Ansari Sir is trying to demonstrate?</p> <p>b. What will be observed when the Magnet starts oscillating through the coil. Explain the reason behind this observation.</p> <p>c. Consider the situation where the Magnet goes in and out of the coil. State two changes which could be made to increase the deflection in the galvanometer.</p> <p>OR</p> <p>Is there any difference in the observations in the galvanometer when the Magnet swings in and then out of the stationary coil? Justify your answer.</p>	<p>4</p>
