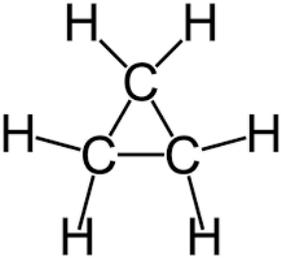
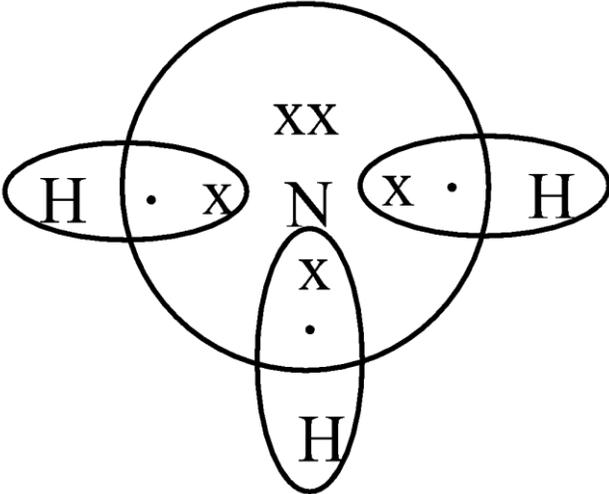


MARKING SCHEME OF PREBOARD QUESTION PAPER

CLASS X Science (086)

Term 2 (2021-22)

SECTION A

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| 1. | <p>Cyclopropane (1)</p>  <p>$\text{CH}_3\text{-CH=CH}_2$, Propene ($\frac{1}{2} + \frac{1}{2}$)</p> | 2 |
| 2. | <p>1. Physical barrier method - the creation of a mechanical barrier so that sperm does not reach the egg. Condoms on the penis or similar coverings worn in the vagina</p> <p>2. Chemical methods – by changing the hormonal balance of the body so that eggs are not released and fertilization cannot occur. These drugs commonly need to be taken orally as pills.</p> <p>3. Surgical methods - If the vas deferens in the male is blocked, sperm transfer will be prevented. If the fallopian tube in the female is blocked, the egg will not be able to reach the uterus. In both cases fertilization will not take place.</p> <p>(any two) (1+1)</p> | 2 |
| 3. | <p>Element = N (Nitrogen) ($\frac{1}{2}$)</p>  <p>($\frac{1}{2}$)</p> | 2 |
| 4. | <p>Plasmodium reproduces by Multiple fission. (1)</p> <p>The newly formed daughter cells remains protected till the conditions are favorable. (1)</p> | 2 |

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| 5. | <p>Egg is not fertilized in human females.</p> <ul style="list-style-type: none"> i) The egg lives for about one day. ($\frac{1}{2}$) ii) The lining of the uterus breaks down and comes out of vagina as blood and mucous($\frac{1}{2}$) iii) This cycle takes place every month and is called menstrual cycle. ($\frac{1}{2}$) iv) It lasts for about two to three days. ($\frac{1}{2}$) <p style="text-align: center;">OR</p> <p>Pollen grains are transferred on the stigma of a flower.</p> <ul style="list-style-type: none"> i) After the pollen lands on a suitable stigma, a tube grows out of it and travels the style to reach ovary. ($\frac{1}{2}$) ii) After fertilization, the zygote divides several times to form an embryo within the ovule. ($\frac{1}{2}$) iii) Ovule forms a tough coat and is converted into a seed, ovary grows rapidly and ripens to form fruit. ($\frac{1}{2}$) iv) The petals, sepals, stamens, style and stigma may shrivel off and seed germinates. ($\frac{1}{2}$) | 2 |
| 6. | <p>Right hand thumb rule – ($\frac{1}{2}$) Imagine that you are holding a current-carrying straight conductor in your right hand such that the thumb points towards the direction of current. Then your fingers will wrap around the conductor in the direction of the field lines of the magnetic field ($\frac{1}{2}$)</p> <p>When the voltage source is increased to 24V, then the current will also increase and so the magnetic field strength will increase and the lamp will glow brighter. ($\frac{1}{2} + \frac{1}{2}$)</p> <p style="text-align: center;">OR</p> <p>A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder is called a solenoid. (1) For the same current flowing through a solenoid and a straight conductor, the magnetic field produced by a solenoid is much stronger than the magnetic field produced by a straight current carrying conductor. This is because as the number of turns increase, magnetic field strength also increases. (1)</p> | 2 |
| 7. | <ul style="list-style-type: none"> a) Domestic wastes like vegetable peels – Land filling /composting (1) b) Industrial wastes like metallic cans- Recycling (1) <p style="text-align: center;">OR</p> <p>The chemicals responsible for the depletion of ozone layer are CFC's. (1)</p> | 2 |

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| | This continuous thinning of ozone layer allows the harmful UV rays to penetrate the earth's atmosphere and cause skin cancer or cataract in humans. (1) | |
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SECTION B

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| 8. | <p>a) The most metallic element is C because it has the largest size and the valence electrons can be lost easily. (1)</p> <p>b) The most electronegative element is F because it has the smallest size and the hold of nucleus to the outermost electrons is the strongest. (1)</p> <p>c) Elements D and E can form a dipositive ions as they are placed in group 2 and can lose two electrons easily. (1)</p> | 3 |
| 9. | <p>In the case of carbon, it has four electrons in its outermost shell and needs to gain or lose four electrons to attain noble gas configuration. If it were to gain or lose electrons –</p> <p>(i) It could gain four electrons forming C^{4-} anion. But it would be difficult for the nucleus with six protons to hold on to ten electrons, that is, four extra electrons. (1)</p> <p>(ii) (ii) It could lose four electrons forming C^{4+} cation. But it would require a large amount of energy to remove four electrons leaving behind a carbon cation with six protons in its nucleus holding on to just two electrons. (1)</p> <p>Carbon overcomes this problem by sharing its valence electrons with other atoms of carbon or with atoms of other elements and forming covalent compounds. Since the bonding in these compounds does not give rise to any ions, these compounds are largely non-conductors of electricity. (1)</p> | 3 |
| 10. | <p>a) There would be very minor differences between them, generated due to small inaccuracies in DNA copying. (1)</p> <p>b) During reproduction, there are inaccuracies in DNA copying which lead to variations. If these variations are favourable, they help the individuals to survive and pass them to the progeny. Depending upon the nature of variations, different individuals have different advantages, which promotes their survival like bacteria that can withstand heat will survive better in a heat wave. (2)</p> | 3 |
| 11. | <p>a) Each step or level of the food chain forms a trophic level. (1)</p> <p>b) Pesticides and other chemicals are either washed down into the soil or into the water bodies. From the soil, these are absorbed by the plants along with water and minerals, and from the water bodies these are taken up by aquatic plants and animals. This is one of the ways in which they enter the food chain. (1)</p> <p>As these chemicals are not degradable, these get accumulated progressively at each trophic level. As human beings occupy the top level in any food chain, the</p> | 3 |

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| | maximum concentration of these chemicals get accumulated in our bodies. This phenomenon is known as biological magnification. (1) | |
| 12. | <p>Resistance is directly proportional to length and inversely proportional to area of cross section : (1)</p> <p>(i) same length and half thickness – Resistance doubles and hence current is reduced to half. (1)</p> <p>(ii) half-length and same thickness, Resistance is halved and hence current is doubled. (1)</p> <p>OR</p> $R_A = \rho l / \pi r^2 \quad (1/2)$ $R_B = \rho 2l / \pi (2r)^2 = \rho l / 2\pi r^2 \quad (1/2)$ $R_B = 1/2 R_A$ $R_p = R_A / 3 \quad (1)$ $R_p / R_A = 1 : 3 \quad (1)$ | 3 |
| 13. | <p>(a) Joules law of heating: The law implies that heat produced in a resistor is (i) directly proportional to the square of current for a given resistance, (ii) directly proportional to resistance for a given current, and (iii) directly proportional to the time for which the current flows through the resistor. (1½)</p> <p>(b) Calculate the heat energy produced across a resistance of 40 ohms connected to 4 volts source for 5 minutes. $H = V^2 t / R = 4 \times 4 \times 300 / 40 = 120J \quad (1½)$</p> <p>OR</p> <p>Equivalent resistance = 4 ohm (1) ammeter reading = $V/R = 10/4 = 2.5 A \quad (1)$ voltmeter reading = $IR = 2.5 \times 2 = 5V \quad (1)$</p> | 3 |

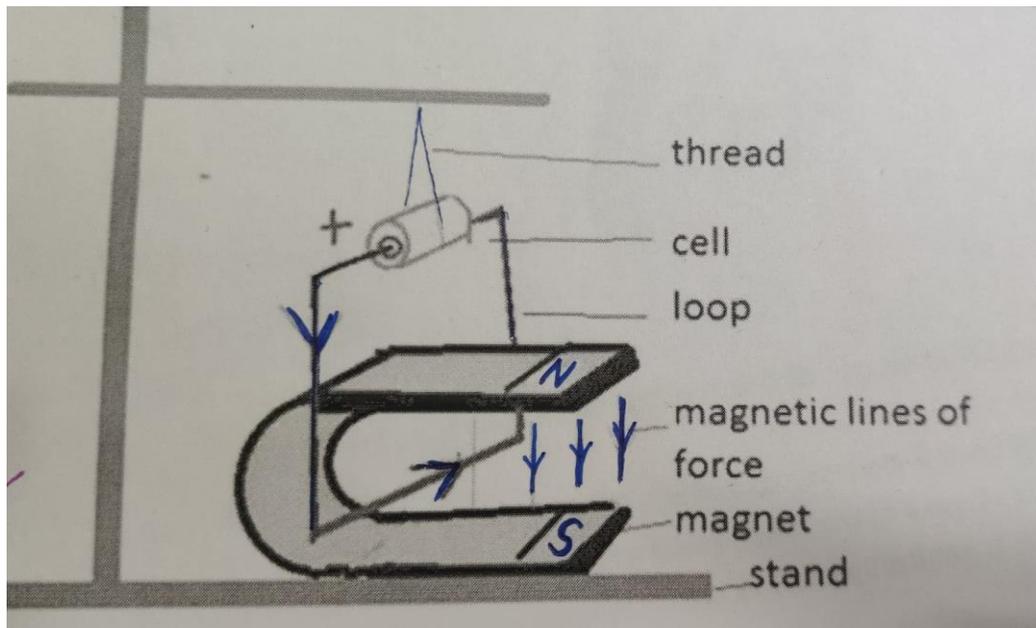
SECTION C

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| 14. | <p>a) It is a monohybrid cross. (1)</p> <p>b) The data of the column marked F₁ indicates that red is the dominant colour. (1)</p> <p>c) The genotype of the (i) Parents = male : RR Female : rr (ii) F₁ Progeny : Rr (iii) F₂ Progeny: RR, Rr and rr Genotype ratio of F₂ Progeny 1 : 2 : 1 (½ + ½ + ½ + ½)</p> <p>OR</p> <p>Mendel choose garden pea plant because</p> <p>i) Garden pea plant has a short life cycle. ii) It shows number of contrasting characteristics.</p> | 4 |
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iii) It produces large number of seeds any two (1+1)

15. (a)

4



(a) The wire experiences a force because the current carrying conductor behave as a magnet and experiences a force due to another magnet. (1)

(b) If the current through the wire is reduced to half, the magnitude of force on the wire will also reduce to half, because magnetic field around a current carrying conductor depends on current flowing through it. (1)

(c) The wire experiences a force towards left.

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 the magnetic field and the second finger in the direction of current, then the thumb would point in the direction of motion or the force acting on the conductor. (2)

OR

The factors on which the force acting on a current carrying conductor when placed in a magnetic field depend are :

Length of the conductor – directly proportional

Current flowing through the conductor- directly proportional

Strength of the magnet - directly proportional Any two (2)