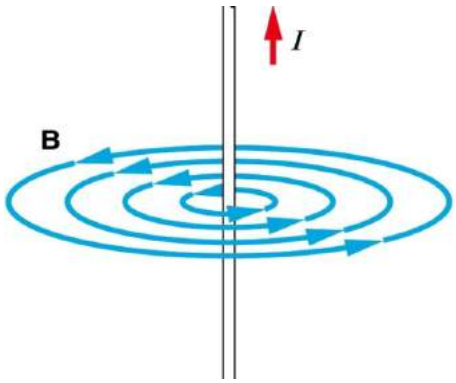
MARKING SCHEME

SAMPLE QUESTION PAPER 2020-21

CLASS X (SCIENCE)

No.	Value Points	Marks
1	• Initial light green colour changes to reddish brown colour • Colourless gas is evolved • Gas with choking smell is evolved *(Any two)* **OR** Sodium Chloride and Hydrogen gas	1
2.	Sodium Carbonate decahydrate, $Na_2CO_3.10H_2O$	1
3.	a. Change in chemical properties It does not occur due to the presence of the same functional group.	1
4.	The light is least scattered at noon.	1
5.	Both are concave. Alternative answer that should be given credit: Plano-concave lens	1
6	Between the principal focus and the centre of curvature. **OR** Optical centre.	1
7	There are momentary galvanometer deflections that die out shortly; the deflections are in opposite directions.	1
8	The field consists of concentric circles centred on the wire 	1
9	Voltage-drop is same across both **OR** W=QV	1
10	Veins have thin walls because the blood there is no longer under pressure and they have valves to ensure blood flow in one direction.	1

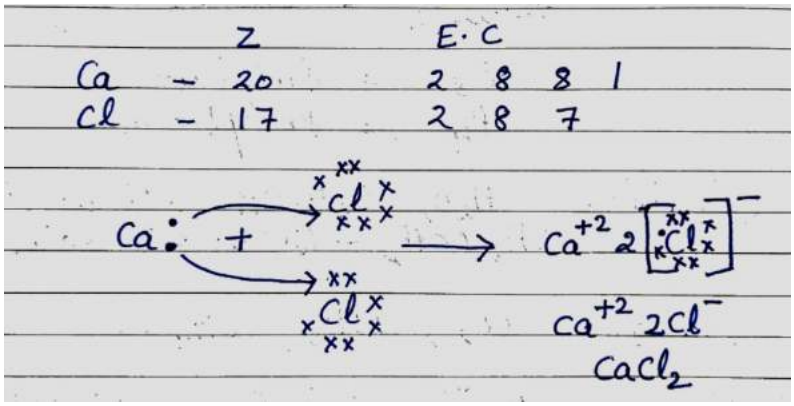
<table>
<tr><td>11</td><td>The inner lining of the small intestine has numerous finger-like projections called villi which increase the surface area for absorption.

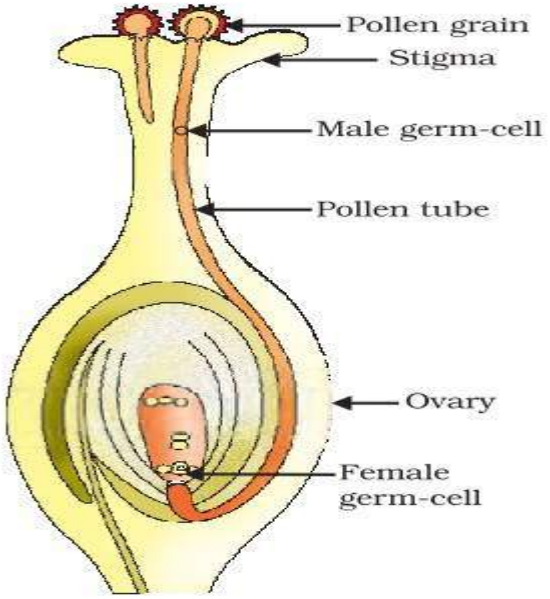
OR
Goat because herbivores eating grass need a longer small intestine to allow the cellulose to be digested.</td><td>1</td></tr>
<tr><td>12</td><td>Ozone layer protects us from harmful effects of UV radiation.
OR
The loss of energy at each step is so great that very little usable energy remains after four trophic levels.</td><td>1</td></tr>
<tr><td>13</td><td>The pancreas secretes digestive juice which contains enzymes like trypsin for digesting proteins and lipase for breakdown of emulsified fats.</td><td>1</td></tr>
<tr><td>14</td><td>c) Assertion is True & Reason is False</td><td>1</td></tr>
<tr><td>15</td><td>b) Both Assertion & Reasoning are correct, Reason is not correct explanation of Assertion
OR
b) Both Assertion & Reasoning are correct, Reason is not correct explanation of Assertion</td><td>1</td></tr>
<tr><td>16</td><td>a) Both Assertion & Reasoning are correct & Reason is the correct explanation of Assertion</td><td>1</td></tr>
<tr><td>17 (i)</td><td>b) Tissue respiration</td><td>1</td></tr>
<tr><td>(ii)</td><td>b) Anaerobic respiration</td><td>1</td></tr>
<tr><td>(iii)</td><td><table><tr><td>b)</td><td>Aerobic</td><td>Anaerobic</td><td>Amount of energy is high and consistent in aerobic and low in anaerobic</td></tr></table></td><td>1</td></tr>
<tr><td>(iv)</td><td>c) ii), iii), iv) only</td><td>1</td></tr>
<tr><td>(v)</td><td>a) Location Aerobic-Cytoplasm and Anaerobic-Mitochondria</td><td>1</td></tr>
<tr><td>18 (i)</td><td>c) Cs>Rb>K>Na>Li</td><td>1</td></tr>
<tr><td>(ii)</td><td>b) As Hydrogen can easily lose one electron like alkali metals to form positive ion</td><td>1</td></tr>
<tr><td>(iii)</td><td>a) F</td><td>1</td></tr>
<tr><td>(iv)</td><td>c) Electronegativity decreases down the group due to increase in atomic radius/ tendency to gain electron decreases.</td><td>1</td></tr>
<tr><td>(v)</td><td>d) F and Li are in the same period and across the period atomic</td><td>1</td></tr>
</table>

	size/radius decreases from left to right.	
19 (i)	b) Convex	1
(ii)	P=1/f $P_1=1/f_1$ and $P_2=1/f_2$ $P_1/P_2=4/1$, hence $(1/f_1)/(1/f_2) = 4/1$ Hence $f_1/f_2=1/4$ b) ¼	1
(iii)	a) Ratio of height of image to height of object	1
(iv)	m=v/u 3=24/u Hence u = 8cm c) 8 cm	1
(v)	c) Not-so-thick lenses would not make the telescope very heavy and they will also allow considerable amount of light to pass through them.	1
20 (i)	c. Electrical to Mechanical	1
(ii)	b. The bar will be magnetised as long as there is current in the circuit.	1
(iii)	a. A bar magnet	1
(iv)	d. Only II	1
(v)	a. For a current of 0.8A the magnetic field is 13 mT	1
Section B		
21	Bile juice makes the acidic food coming from the stomach alkaline for the action of pancreatic enzymes. Bile salts break the large globules of fat in the intestine to smaller globules increasing the efficiency of enzyme action. This is similar to the emulsifying action of soaps on dirt. **OR** The separation keeps oxygenated and deoxygenated blood from mixing allowing a highly efficient supply of oxygen to the body. This is useful in animals that have high energy needs (birds and mammals) which constantly use energy to maintain their body temperature.	2
22	$6CO_2$ (Carbon dioxide) + $6H_2O$ (water) $\xrightarrow{\text{Sunlight, chlorophyll}}$ $C_6H_{12}O_6$ (carbohydrate) + $6O_2$ (oxygen) Absorption of light energy by chlorophyll. • Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen. • Reduction of carbon dioxide to carbohydrates.	2

	These steps need not take place one after the other immediately. For example, desert plants take up carbon dioxide at night and prepare an intermediate which is acted upon by the energy absorbed by the chlorophyll during the day	
23	- Burn compound in air/ oxygen; Gas evolved turns lime water milky - By sharing its four valence electrons with other elements. **OR** • Due to self linking ability of carbon/catenation • Since carbon has a valency of four it can form bonds with four other atoms of carbon or atoms of some other mono-valent element. • Due to small size of carbon it forms very strong and (or) stable bonds with other elements *(Any two)*	1 1 1 + 1
24	i. S>R>P>Q ii. Cu and QSO_4	1 1
25	The phenomenon is called dispersion. Speed of Violet Light inside the prism is slowest and that of Red is highest. Hence, deviation of Violet Light is maximum and that of Red is minimum.	1 1
26	The overall current needed = 9A. The voltage is 12V Hence by Ohm's Law V=IR, The resistance for the entire circuit = 12/9 = 4/3 Ω. = R R_1 and R_2 are in parallel. Hence, $R=(R_1 R_2)/(R_1 + R_2) = 4R_2/(4+R_2) = 4/3$ $R_2 = 2\Omega$	2
Section- C		
27	The ratio obtained is 9:3:3:1 in which parental as well as new combinations are observed. This indicates that progeny plants have not inherited a single whole gene set from each parent. Every germ cell takes one chromosome from the pair of maternal and paternal chromosomes. When two germ cells combine, segregation of one pair of characters is independent of other pair of characters. **OR** In human beings, the genes inherited from our parents decide whether we will be boys or girls. Women have a perfect pair of sex chromosomes (XX). But, men have a mismatched pair (XY).	3

	All children will inherit an X chromosome from their mother regardless of whether they are boys or girls. Thus, the sex of the children will be determined by what they inherit from their father. A child who inherits an X chromosome from her father will be a girl, and one who inherits a Y chromosome from him will be a boy.	
28	Use of Plastic cups raised the concern towards hygiene thus they were replaced by *disposable plastic cups*. Plastic cups are non-biodegradable and harm the environment friendly. They were thus replaced by *Kulhads*. Making *Kulhad* made of clay on a large scale resulted in the loss of top fertile soil. Now, disposable paper cups are used because - the paper can be recycled, it is biodegradable and is eco-friendly material which does not cause environmental pollution.	3
29	- Blood passes through filtration units in the kidney called nephron - Passes through glomerulus in the Bowman's capsule - Ultra filtration - Filtrate initially has glucose, amino acids, water, salts and nitrogenous waste - Reabsorption – Water (as per the need of the body), Glucose and amino acids are all reabsorbed – - Secretion of excess water, salts and urea (nitrogenous waste) which makes up the urine	3
30	a. Heating of lead nitrate; and electrolysis of acidified water b. $2AgCl_{(s)} \xrightarrow{\text{Sunlight}} 2Ag_{(s)} + Cl_{2\ (g)}$ (No deduction for not mentioning state of reactants and products.)	2 1
31	(i) D, As it is on the left side of the table in group 2 (ii) C, as it is in the group 18/ Noble gas (iii) E, as we move from left to right across a period, atomic radius decreases	1 1 1

32	a.  b. Ionic compounds do not conduct electricity in solid state due to absence of free ions but they conduct electricity in molten and aqueous state due to presence of free ions	2 1
33	Refractive index = speed of light in vacuum / speed of light in medium. Since the refractive index of diamond is more, hence the speed of light is lesser in diamond. Let speed of light in water vev$_w$ and in diamond bev$_d$. Refractive index of diamond w.r.t water is say ***n*** = Speed of light in water / speed of light in diamond. **n = v_w/v_d** Dividing both numerator and denominator by speed of light [c] we get n = (v_w/c) ÷ (v_d/c) = Inverse Ratio of refractive index of water and diamond. n= 2.42/1.33 = 1.82 (approx.)	1 0.5 1 0.5
34	• Milk of magnesia 10 • Gastric juices 1 • Brine 7 • Aqueous Sodium hydroxide 13 Baking soda undergoes thermal decomposition to form Na_2CO_3, CO_2 and H_2O; CO_2 makes the cake fluffy & soft Heat $NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O$ Uses Used in fire extinguishers/ antacid to neutralize excess acid in stomach / to neutralize the effect of acid in insect sting.	2 2 1

	OR (i) a) B b) C,A,D,B (ii) Due to moisture in the atmosphere it converted into Gypsum $CaSO_4+1½\ H_2O \longrightarrow CaSO_4.2H_2O$ (iii) Making toys/dolls or statues /fixing broken limbs/making decorative materials.	5
35	 *Germination of pollen on stigma* *[Diagram drawn and annotated with the following points will also be considered]* - Stamen is the male reproductive part and it produces pollen grains. ·The ovary contains ovules and each ovule has an egg cell. ·The pollen needs to be transferred from the stamen to the stigma. ·If this transfer of pollen occurs in the same flower, it is referred to as self-pollination./ On the other hand, if the pollen is transferred from one flower to another, it is known as cross-pollination. After the pollen lands on a suitable stigma, it has to reach the female germ-cells which are in the ovary. For this, a tube grows out of the pollen grain and travels through the style to reach the ovary/Figure ·The male germ-cell produced by pollen grain fuses with the female gamete present in the ovule. ·This fusion of the germ-cells or fertilisation gives the zygote. ·After fertilisation, the zygote divides several times to form an embryo	5

	within the ovule. ·The ovule develops a tough coat and is gradually converted into a seed. The ovary grows rapidly and ripens to form a fruit. ·Meanwhile, the petals, sepals, stamens, style and stigma may shrivel and fall off.	
36	The lamps are in parallel. Advantages: If one lamp is faulty, it will not affect the working of the other lamps. They will also be using the full potential of the battery as they are connected in parallel. The lamp with the highest power will glow the brightest. P=VI In this case, all the bulbs have the same voltage. But lamp C has the highest current. Hence, for Lamp C P=5 x 60 Watt = 300 W. (the maximum). The total current in the circuit = 3+4+5+3 A = 15A The Voltage = 60V V=IR and hence R = V/I = 60/15 A = 4A **OR** (i) The magnetic field lines produced is into the plane of the paper at R and out of it at S. (ii) Field at S > Field at P Magnetic field strength for a straight current carrying conductor is inversely proportional to the distance from the wire. (iii) The current will be going from top to bottom in the wire shown and the magnetic field lines are now in the clockwise direction on the plane which is perpendicular to the wire carrying current. (iv) Right hand thumb rule. The thumb is aligned to the direction of the current and the direction in which the fingers are wrapped around the wire will give the direction of the magnetic field.	1 1 1 1 1 1 2 1 1