Strictly Confidential- (For Internal and Restricted Use Only) **Secondary School Examination**
ANNUAL EXAMINATION
March 2018

Marking Scheme – Science (X) 31/2

1. The Marking Scheme provides general guidelines to reduce subjectivity in the marking. It carries only suggested value points for the answer. These are only guidelines and do not constitute the complete answer. Any other individual response with suitable justification should also be accepted even if there is no reference to the text.

2. 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.

3. If a question has parts, please award marks in the right-hand side for each part. Marks awarded for different parts of the question should then be totalled up and written in the left-hand margin.

4. If a question does not have any parts, marks be awarded in the left-hand side margin.

5. If a candidate has attempted an extra question, marks obtained in the question attempted first should be retained and the other answer should be scored out.

6. Wherever only two/three of a 'given' number of examples/factors/points are expected only the first two/three or expected number should be read. The rest are irrelevant and should not be examined.

7. There should be no effort at 'moderation' of the marks by the evaluating teachers. The actual total marks obtained by the candidate may be of no concern of the evaluators.

8. All the Head Examiners / Examiners are instructed that while evaluating the answer scripts, if the answer is found to be totally incorrect, the (X) should be marked on the incorrect answer and awarded '0' marks.

9. ½ mark may be deducted if a candidate either does not write units or writes wrong units in the final answer of a numerical problem.

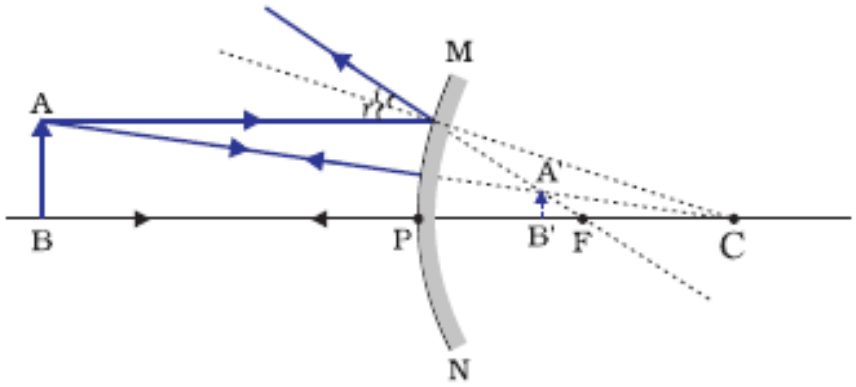
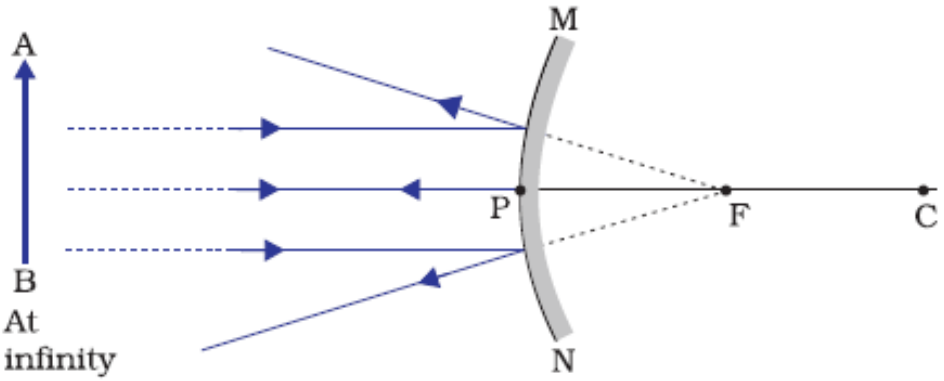
10. A full scale of mark 0 to 100 has to be used. Please do not hesitate to award full marks if the answer deserves it.

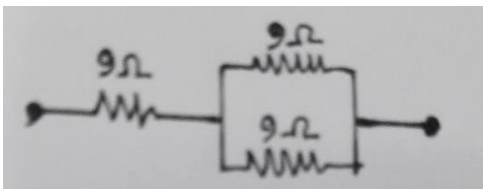
11. As per orders of the Hon'ble Supreme Court the candidates would now be permitted to obtain photocopy of the Answer Book on request on payment of the prescribed fee. All Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points given in the marking scheme.

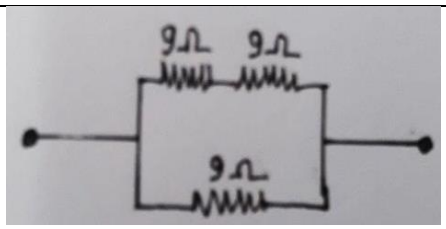
MARKING SCHEME OF SCIENCE (086) OF AISSE 2018

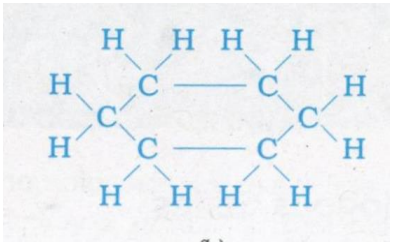
SET – 31/2

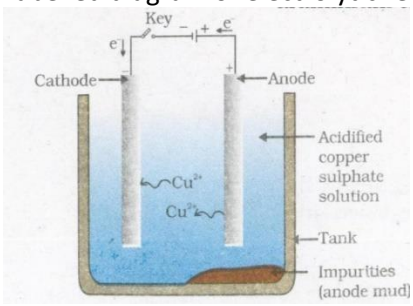
Max. Marks: 80

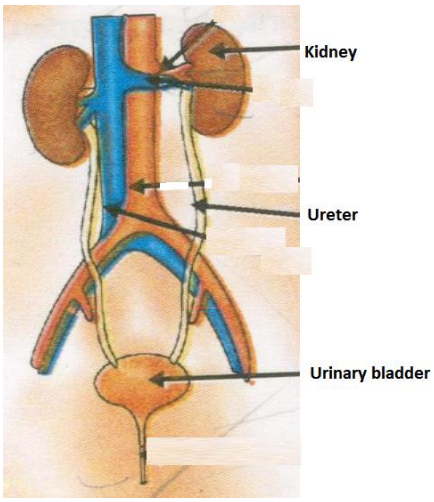
Q No	Value Points/ Expected Answers	Marks	Total
	SECTION – A		
1.	Potential /Kinetic/ Mechanical Energy into Electrical energy.	1	1
2.	Violet flowers	1	1
3.	(a) Due to ambiguity in the question award 1 mark whether attempted or not. (b) a) Cell body/ cyton b) Axon	½ x 2 ½ x 2	2
4.	• Convex Mirror • Labelled Ray diagram for any position of object  **OR**  Note: If arrows not marked, ½ mark to be deducted.	½ 1 ½	2

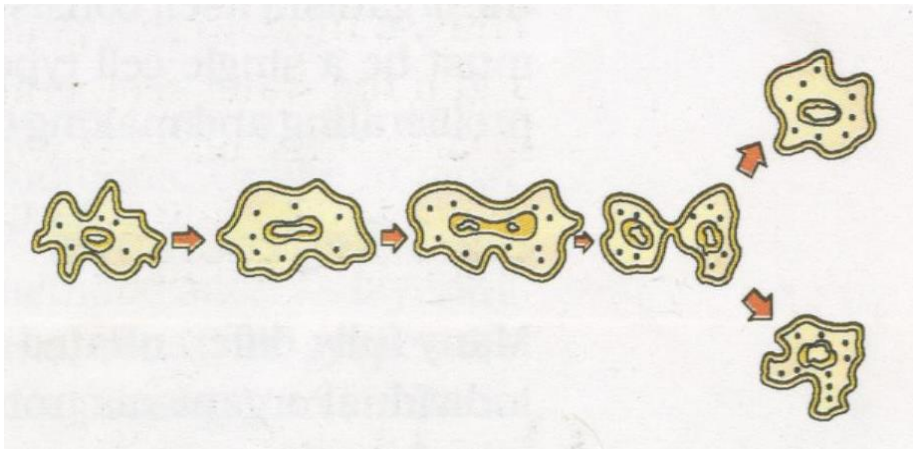
5.	• X-Ethanol/ (C_2H_5OH)/Ethyl Alcohol • Y- Ethene / (C_2H_4) • Z- Hydrogen/ (H_2) (any two) • $CH_3\text{-}CH_2OH \xrightarrow{\text{Conc } H_2SO_4} CH_2= CH_2+H_2O$ • Role of sulphuric acid –dehydrating agent	½ + ½ ½ ½	2
6.	1st law: the incident ray, refracted ray and normal to the interface at the point of incidence lie in the same plane. 2nd law: The sine of angle of incidence bears a constant ratio with sine of angle of refraction for a given pair of media. **Or** $\frac{\sin i}{\sin r} = \text{constant}$ Absolute Refractive Index of a medium = $\frac{\text{Speed of light in air or vacuum}}{\text{Speed of light in the medium}}$ (Award full marks if the same thing is given in the form of statement) **OR** Power of lens = Ability to converge/ diverge light rays passing through it/ reciprocal of the focal length in metres / $\frac{1}{f}(in\ meters)$ SI unit of power is Dioptre Power of 1st lens $P_1 = \frac{100}{f1} = \frac{100}{40\text{ cm}}$ = +2.5 D Nature: Converging lens / Convex lens Power of 2nd lens $P_2 = \frac{100}{f2} = \frac{100}{-20\text{ cm}}$ = -5 D Nature: Diverging lens / Concave lns	1 1 1 ½ ½ ½ ½ ½ ½	3
7.	Any one of the following difference: (i) In sexual reproduction two opposite sexes are involved where as in asexual reproduction only one individual is involved. (ii) In sexual reproduction male and female gamete formation takes place where as in asexual no gamete formation occurs. • Sexually reproducing organisms have better chances of survival • Because more variations are generated.	1 1 1	3
8.	(i)  Two 9 ohm resistors in parallel connected to one 9 ohms in series $\frac{1}{R_p} = \frac{1}{9} + \frac{1}{9} = \frac{2}{9}$ $\therefore R_p = \frac{9}{2}\Omega$ $R = 9\Omega + \frac{9}{2}\Omega = 13.5\Omega$	1 ½	

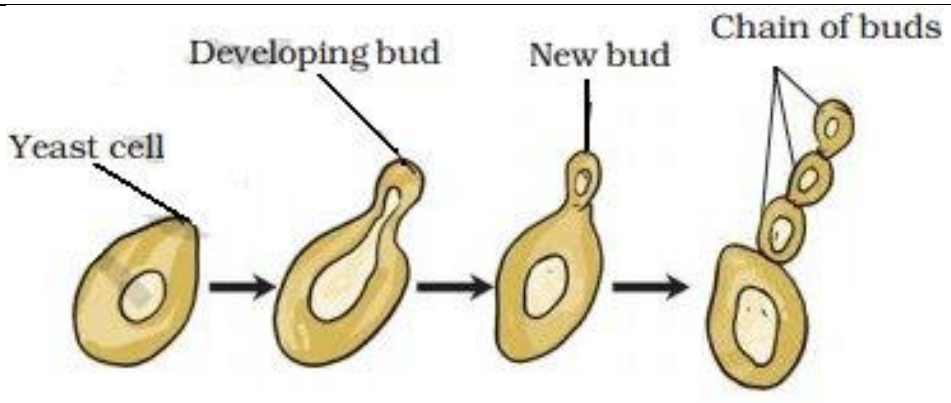
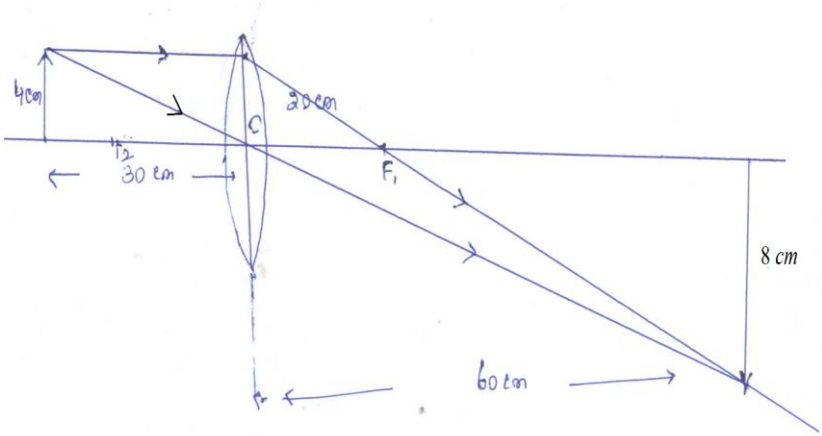
	(ii)  Two 9 ohm resistors in series connected to one 9 ohms in parallel $R_s = 9\Omega + 9\Omega = 18\Omega$ $\frac{1}{R} = \frac{1}{18} + \frac{1}{9} = \frac{3}{18}$ $\therefore R = 6\Omega$ Note: Deduct ½ mark if calculations are not given.	1 ½	
	OR (a) Joule's law of heating – Heat produced in a resistor is (i) directly proportional to the square of current for a given resistance, (ii) directly proportional to the resistance for a given current and (iii) directly proportional to the time for which the current flows through the resistor / H = I^2Rt where, H = Heat produced, I = current, R = Resistance of the conductor and t = Time for which the current flows through the resistor ***Note :If the candidate gives only the expression H = I^2Rt award ½ mark only.*** (b) Current in 1st bulb, $I_1 = \frac{P1}{V} = \frac{100}{220} = \frac{5}{11}$A *or* 0.45 A Current in 2nd bulb, $I_2 = \frac{P2}{V} = \frac{60}{220} = \frac{3}{11}$A *or* 0.27 A	1 1 1	3
9.	a. Thyroxine, regulates carbohydrate protein and fat metabolism/ controls metabolism for balance of body growth b. Growth hormone, regulates growth and development of body (or any other correct answer) c. Insulin, regulates/ decreases blood sugar level Or Glucagon, regulates / increases blood sugar	½ + ½ ½ + ½ ½ + ½	3
10.	• Zn + 2NaOH → Na_2ZnO_2 + H_2 • When a burning splinter is brought near the gas, it burns with a Pop Sound. • Gas – Hydrogen / H_2 **OR** • $NaHCO_3$(Sodium Hydrogen Carbonate/ Sodium Bicarbonate) • NaCl +H_2O+CO_2+NH_3→ NH_4Cl+$NaHCO_3$ Uses: For making baking powder As ingredient of antacid. Soda-acid fire extinguishers (Any two) ***Note: As no salt can have pH = 14, give full credit for any attempt of the candidates.***	1 1 1 1 1 ½ + ½	3

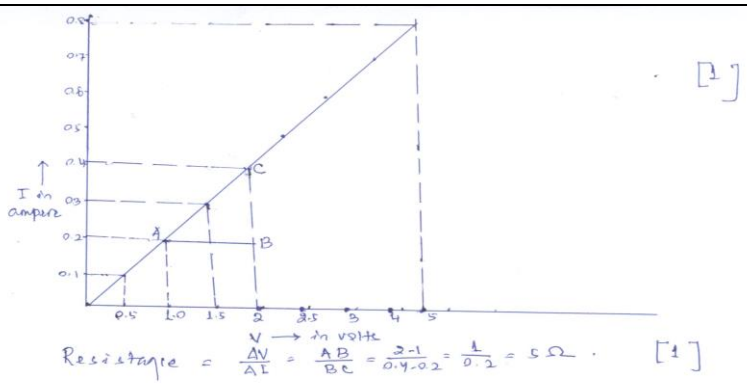
11.	a) Carbon compounds form Covalent bonds/ do not dissociate into ions/ do not have charged particles (ions) b) Cyclohexane  Total No. of single bonds=18 (**OR** any other cycloalkane with corresponding number of bonds)	1 1 ½ ½	3
12.	• $CaCO_3 \xrightarrow{heat} CaO + CO_2$ $2FeSO_4 \xrightarrow{heat} Fe_2O_3 + SO_2 + SO_3$ $2Pb(NO_3)_2 \xrightarrow{heat} 2PbO + 4NO_2 + O_2$ Any one • $2AgCl \xrightarrow{sunlight} 2Ag + Cl_2$ $2AgBr \xrightarrow{Sunlight} 2Ag + Br_2$ Any one • $2H_2O \xrightarrow{electricity} 2H_2 + O_2$ (or any other equation for above decomposition reaction.) ***Note: No marks to be deducted if equations are not balanced.***	1 1 1	3
13.	1. Dam is a barrier that is built across a river or a stream for storage of water. 2. Large dam can ensure the storage of adequate water for irrigation and also for generating electricity. 3. Social problem, economic problem and environmental problem	½ ½ + ½ 1 ½	3
14.	a. Incineration/ Waste compaction/ Biogas generation/ Composting/ Segregation and safe disposal/Vermicomposting (Any other) (any two) b. Reuse of empty bottles, books etc. Reduce the use of non-biodegradable substances like polythene, thermocol etc. (Any other) c. Awareness about environment, scientific attitude, Concern for community health and personal health (Any two)	½ + ½ ½ ½ ½, ½	3

15.	a. Factors on which resistance of a conductor depends: i. Length of conductor [or $R \alpha \ell$] ii. Area of cross-section of the conductor [or $R \alpha 1/A$] b. Metals are good conductor of electricity –as they have low resistivity/ have free electrons Glass is a bad conductor of electricity – as it has high resistivity/have no free electrons c. Reason: Alloys have high resistivity /high melting point / alloys do not oxidize (Or burn) readily at high temperatures. (any one)	½ ½ ½ ½ 1	3
16.	• Fleming's left-hand rule: stretch the forefinger, middle finger and thumb of left hand in such a way that they are mutually perpendicular to each other. If the forefinger point in the direction of magnetic field, middle finger point in the direction of current then the thumb show the direction of force or motion on the current carrying conductor. • Principle of working of electric motor: A coil carrying electric current placed in an external magnetic field experiences a force. • Function of armature: Enhances the power of the motor/ induces motion. • Function of brushes: Helps easy transfer of charge between the coil and the external circuit. • Function of split rings: Reverses the direction of current after each half rotation of the coil so that the coil can keep rotating continuously.	1 1 1 1 1	5
17.	a. i) Ovary – releases egg/ female gamete/ ovum releases oestrogen/ female hormones (any one) ii) Oviduct- Transportation of ovum/ egg from ovary to the uterus/ Site of fertilization iii) Uterus – Development of embryo/ foetus a) Placenta- It is a disc embedded in uterine wall which contains villi on the embryo side of the tissue and blood space on mother side. Function of placenta: Provides nourishment to embryo from mother's blood / Removal of waste from embryo to mother's blood. (Any one)	1 1 1 1 1	5
18.	a. (i) Calcination (ii) Reduction (iii) Purification (in the given sequence only)) b. Sulphide ore of copper is heated in air $2Cu_2S+3O_2 \rightarrow 2Cu_2O +2SO_2$ $2Cu_2O+Cu_2S \rightarrow 6Cu + SO_2$ (Note: Full marks to be awarded even when only equations are written.) c. Labelled diagram of electrolytic refining of copper  	1 ½ 2 1½	5

19.	a. Plasma, red blood cells, white blood cells, platelets (any two) b. Lungs → Left side of the heart → aorta → body organs Note : Give weightage even if same thing is explained in the form of paragraph. c. Prevent back flow of blood d. Artery has thick elastic wall and vein is thin walled/ valves are present in the veins and not in arteries **OR** a. Process involved in removal of nitrogenous / harmful metabolic waste from the body. b. Nephron. c) Diagram of Human Excretory System: Labelling of the following parts i) kidney ii) ureter iii) urinary bladder  Drawing Labelling	½, ½ ½ x 4 1 1 1 1 1 ½ 1 ½	5
20.	**Dobereiner Periodic Table** Advantage: To predict the atomic mass of middle element in each triad Limitation: Dobereiner could identify only three triads **Newland Periodic table** Advantage: Every eighth element had properties similar to that of first/ co-related the properties of elements with their atomic mass., Limitation: It was only applicable up to Calcium / only 56 elements and no future element **Mendeleev's Periodic Table** Advantage: Elements with similar properties could be grouped / He predicted the existence of new elements that had not been discovered at that time. Limitation: No fixed position for hydrogen/ position of isotopes/ Atomic masses do not increase in a regular manner. Henry Moseley Properties of elements are a periodic function of their atomic number	½ + ½ ½ + ½ ½ + ½ 1 1	5

21.	a. <u>Defect of vision</u> – Myopia or short sightedness or near sightedness Causes of myopia: i) Excessive curvature of eye lens/eye lens becomes more converging ii) Elongation of eye ball Methods of correction: By the use of concave lens of suitable power or focal length the defect is corrected. / suitable diagrammatic representation. b. <u>Due to atmospheric refraction</u> The density of different layers of air keeps on changing due to which the apparent image of the stars keeps on changing. This changing position of stars appears as twinkling of stars. **OR** a. Function of: • <u>Cornea</u>: focuses light rays / permits the light to enter the eye.. • <u>Iris</u>: Controls amount of light entering the eye. / controls the size of pupil. • <u>Crystalline Lens</u>: Converges light rays onto retina. • <u>Cilliary Muscles</u>: Adjusts focal length of eye lens by contraction and relaxation so that sharp image can be obtained on the retina. / helps in accommodation b. In early morning, sun light has to cover larger distance in the atmosphere. So, the shorter wavelengths scatter out. Only the longer wavelengths like red reach our eye. On moon – No Cause: Moon has no atmosphere	1 ½ + ½ 1 1 1 ½ x 4 1 ½ ½ 1	5
	SECTION – B		
22.	• Binary fission • Diagram  **OR**	½ 1 ½	2

			
23.	Ray diagram  Position of O and F Ratio=hi/ho approximately 2:1	1 ½ ½	2
24.	In the test tube A, B, D she will observe colour change (No splitting of marks) Aluminum is the most reactive metal, because it displaces Iron, Zinc and Copper from their aqueous salt solutions.	1 ½ + ½	2
25.	White precipitate is observed $Na_2SO_4(aq) + BaCl_2(aq) \rightarrow BaSO_4(s) + 2NaCl(aq)$ Double displacement reaction	½ 1 ½	2

26.	 Resistance = $\frac{\Delta V}{\Delta I} = \frac{AB}{BC} = \frac{2-1}{0.4-0.2} = \frac{1}{0.2} = 5\ \Omega$ [1] Plotting of correct graph Calculation of resistance	 1 1	 2
27.	The steps are: i. Removal of peel from leaf ii. Stain with safranin iii. Put the stained peel on a clean slide iv. Mount it with glycerine and cover slip	 ½ ½ ½ ½	 2