Strictly Confidential- (For Internal and Restricted Use Only) **Secondary School Examination**
SUMMATIVE ASSESSMENT - II
July 2017

Marking Scheme – Science (Outside Delhi) 31/1

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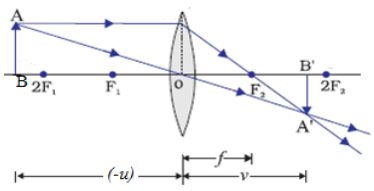
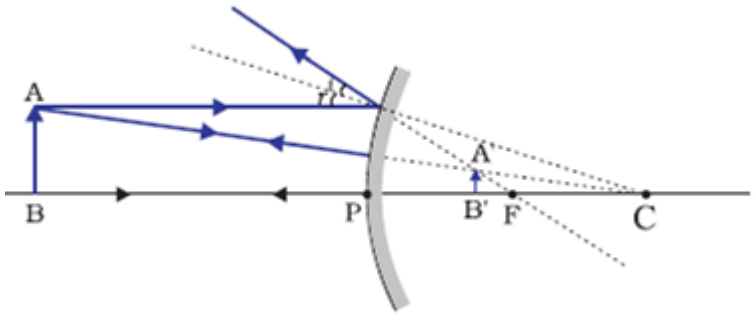
MARKING SCHEME **Code No. 31/1**

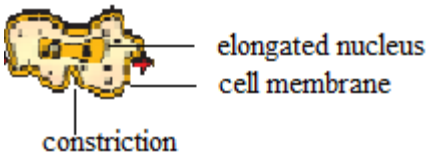
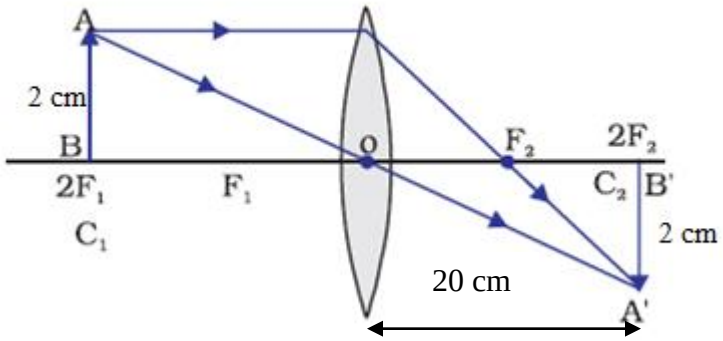
CLASS X – OUTSIDE DELHI

	Expected Answer/ Value point	Marks	Total
	SECTION – A		
Q1.	Properties of elements are a periodic function of their atomic number.	1	1
Q2.	i) Saves time/ energy in segregation ii) Biodegradable items can be directly sent for composting iii) Non–biodegradable items can be sent for appropriate reuse/ recycle (any two)	½ x 2	1
Q3.	Ability of a lens to converge or diverge light rays./ It is reciprocal of focal length in meters./ It is the degree of convergence or divergence of light rays	1	1
Q4.	• Speciation – Origin of a new species from pre-existing one.	1	
	• Factors – Mutation, Genetic drift, Geographical isolation, Reproductive isolation. (any two)	½ x 2	2
Q5.	Fission, Fragmentation, Regeneration, Budding, Vegetative Propagation, Spore formation. (any four)	½ x 4	2
Q6.	• Organisms that breakdown complex organic matter/ the dead remains and waste products of organisms.	1	
	• Role: Help in recycling of nutrients in nature. Replenishment of soil nutrients (any one)	1	2
Q7.	• The phenomenon in which a part of the light incident on a particle is redirected in different directions.	1	
	• When sunlight passes through the atmosphere, its fine particles scatter the blue colour more strongly than red. The scattered blue light enters our eyes. Hence the sky appears blue.	2	3
Q8.	Hypermetropia/ Longsightedness	1	
	$f = \frac{1}{P} \times 100$ ➔ $f = \frac{1}{0.5} \times 100$ = 200 cm	1	2
Q9.	• 		

	Note: Give full credit if candidate draws ray diagram. for any other position of the object Diagram with direction of rays Marking '*u*', '*v*' and '*f*' in the diagram • $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$	 1 ½ x 3 ½	 3
Q10.	The ratio of sine of angle of incidence to the sin of angle of refraction is a constant, for the light of a given colour and for the given pair of media.	1	
	$\frac{\sin i}{\sin r}$ = constant	1	
	$n_m = \frac{\text{Speed of light in air/vacuum}}{\text{Speed of light in the medium}} = \frac{c}{v_m}$	1	3
Q11.	• The compounds that are formed due to sharing of electrons between two atoms/ compounds having covalent bonds.	1	
	• Ionic compounds are formed due to transfer of electrons from one atom to another / compounds having ionic bonds/ compounds having attraction between oppositely charged ions	1	
	• i) They are poor conductors of electricity ii) They have low melting and boiling point. (or any other)	½ , ½	3
Q12.	i) Pleasant/ fruity smell; Esters ii) $CH_3COOH + C_2H_5OH \xrightarrow[-H_2O]{\text{conc. } H_2SO_4} CH_3COOC_2H_5$ $_{\text{CONC.}}\ H_2SO_4$ acts as a catalyst/ dehydrating agent iii) Used in perfume industry / as flavouring agent	½ , ½ 1 ½ ½	3
Q13.	Electronic configuration of 'P' : 2,8,7 Group number: 17 Period number: 3 Electronic configuration of Q: 2,8,8,1 Group number : 1 Period number: 4	½ x 6	3
Q14.	i) Metal, Basic ii) $X(NO_3)_2$, XSO_4 These compounds are ionic/ electrovalent	½ , ½ ½ , ½ 1	3
Q15.	A → Anther: Produces pollen/ male gamete B → Style: Carries the pollen to the ovary C → Ovary: Produces ovules/ female gamete	½ x 6	3

Q16.	i) Because natural resources are limited, and it would be difficult to sustain a large population on limited resources ii) HIV-AIDS, Syphilis, Gonorrhoea, Warts (any two) iii) Manoj- Inquisitive, understands the need for healthy living (any one) Teacher – concerned, dutiful (any one)	1 ½ , ½ ½ ½	3
Q17.	• Homologous Organs - Organs with similar basic structure/ origin but modified to perform different functions. • Example: forelimbs of various vertebrates (or any other) • Wings of a butterfly and the wings of a bat cannot be regarded as homologous organs • Reason: Though they perform the similar function, they have different origin/ basic structure	1 ½ ½ 1	3
Q18.	i) Tall ii) 3:1 iii) Dwarf Reason: Being a recessive trait, dwarfness can only be expressed in the absence of dominant trait/ in its pure form.	1 ½ ½ 1	3
Q19.	• (i) The incident ray, the normal to the mirror at the point of incidence and the reflected ray, all lie in the same plane, and (ii) The angle of incidence is equal to the angle of reflection	½, ½	
	• 	2	
	• Virtual, erect, diminished (Any two)	1	
	• Rear view mirror as it gives wider field view/ Used in shops to avoid theft. (Any one)	1	5
Q20.	• The band of the coloured components of white light. • Refractive index/ speed of light is different for different colours. • By placing a second identical prism in an inverted position with respect to first prism (Proper explanation is to be given)./diagram with labelling	1 1 3	5
Q21.	a) Bromine water gets decolourised by unsaturated hydrocarbons but	1	5

	remains unaffected (reddish brown) by saturated hydrocarbons. (or any other test) b) Carbon dioxide/ CO_2 and Water/ H_2O $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$ + Heat + Light c) $CH_4 + Cl_2 \xrightarrow{\text{sunlight}} CH_3Cl + HCl$ Because hydrogen atom is replaced by chlorine atom.	1 1 1 1	
Q22.	a) i) Ovary: Produces female gamete / ovum Produces oestrogen/ female sex hormones ii) Fallopian tube: Carries ovum from ovary to the uterus Site of fertilization iii) Uterus: Site for implantation and nourishment of the future embryo.	½ , ½ ½ , ½ 1	
	b) Structure of placenta: Disc like structure embedded in the uterine wall. It has villi on the embryo's side and blood species on the mother's side which surround the villi Function of placenta: Transports oxygen and nutrition from the mother's blood to the embryo. Removes the excretory substances from embryo into the mother's blood	½ , ½ ½ , ½	5
Q23.	• Evolution: Gradual accumulation of variations and its selection by nature leading to formation of new species. • Variations may arise in a population due to mutations or sexual reproduction. Sub-populations are formed due to genetic drift and geographical isolation. When natural selection acts on them, most suitable variation survives leading to evolution of a new species. • Fossils provide missing link between the species /who has evolved from whom. They provide information about prehistoric organisms.	1 2 1, 1	5
Q24.	a) i) Reduce: Less use of natural resources/ avoid wastage of food, water, electricity etc. ii) Recycle: Collection of materials like plastic, glass, metals, paper etc. and recycle these materials to make required items instead of synthesizing fresh ones. This would save natural resources iii) Reuse: Still better than recycling as no energy is required here and the already used things /items are used again and again.	1 1 1	
	b) i) Essential for living organisms ii) It has limited availability iii) Conservation of water allows its equitable distribution. iv) Essential for sustainable development (any other relevant point)	½ x 4	5
	SECTION – B		
	25) B | 26) C | 27) D		
	28) A | 29) B | 30) D		
	31) B | 32) C | 33) D		

Q34.	No reaction with distilled water. Chemical reaction occurs with solution of $NaHCO_3$ Two Observations: i) Evolution of a colourless, odourless gas. ii) The gas is evolved with brisk effervescence	½ ½ ½ ½	2
Q35.	 Diagram Labelling	½ ½ x 3	2
Q36.	 Diagram Correct labeling	1 ½, ½	2

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Marking Scheme – Science (Outside Delhi) 31/2

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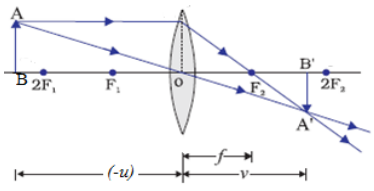
	SECTION – A		
Q1.	18, Groups	½ , ½	1
Q2.	Plants, animals, microorganisms (any two)	½ x 2	1
Q3.	f = 200cm	1	1
Q4.	• Analogous organs- Organs with dissimilar basic structure or origin, but performing same functions. • Because though they perform similar function, they have different origin/ basic structure.	1 1	2
Q5.	• Plants raised by vegetative propagation bear fruits and flowers earlier than those raised by seeds. • Such methods also make possible the propagation of seedless plants • Used for raising genetically similar progeny/ Clones • A rare variety can be propagated by this method while maintaining the quality.	½ x 4	2
Q6.	$SUN \xrightarrow{1\%\ Energy} PRODUCER / PLANT \xrightarrow{10\%\ Energy} PRIMARY\ \ CONSUMER / HERBIVORE$ $\xrightarrow{10\%\ Energy} SECONDARY\ \ CONSUMER / CARNIVORE \xrightarrow{10\%\ Energy} TOP\ CARNIVORE$ The above concept explained with the help of an example highlighting 1) At each trophic level only 10 % of the energy is passed on to the next and the rest is either utilized for its own metabolic activities or is lost in the environment as heat. 2) Lost energy is not returned to the previous level/ Solar input	1 1	2
Q7.	The ratio of sine of angle of incidence to the sin of angle of refraction is a constant, for the light of a given colour and for the given pair of media.	1	
	$\frac{\sin i}{\sin r}$ = constant	1	
	$n_m = \frac{\text{Speed of light in air/vacuum}}{\text{Speed of light in the medium}} = \frac{c}{v_m}$	1	3
Q8.	• 		

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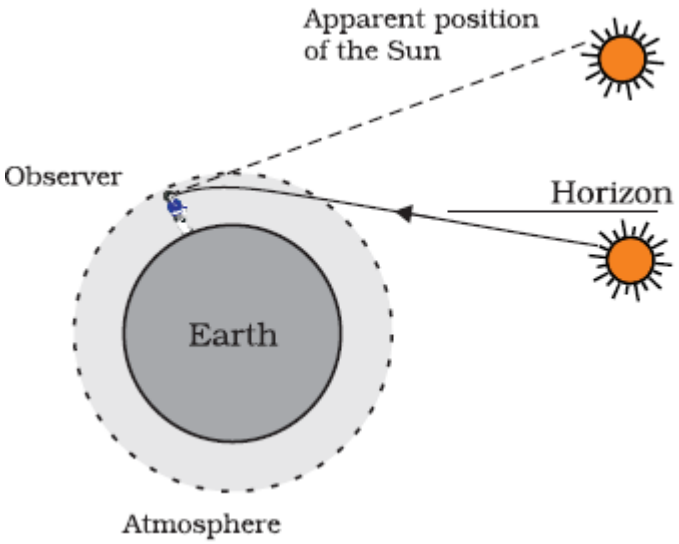
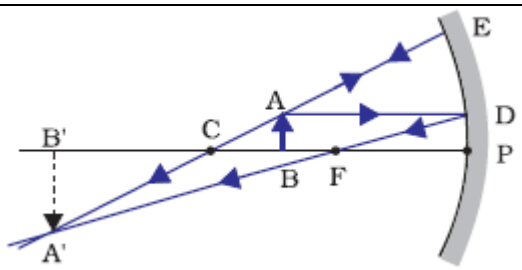
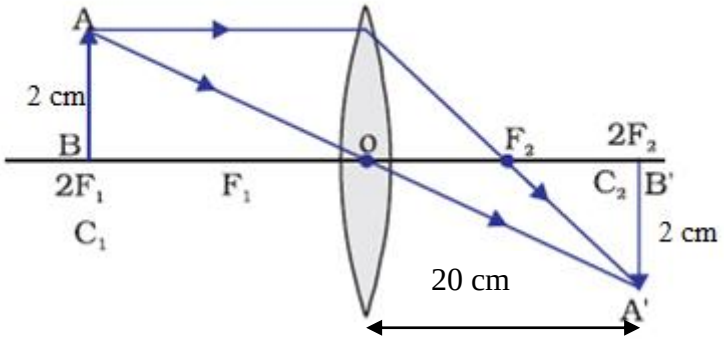
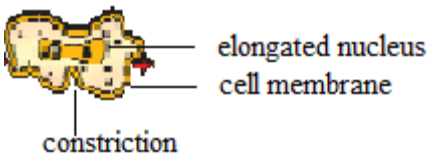
Q9.	Hypermetropia/ Longsightedness	1	
	$f = \frac{1}{P} \times 100$ ➔ $f = \frac{1}{0.5} \times 100$ = 200 cm	1	2
Q10.	• Atmospheric refraction	½	
		1 ½	
	The sun is visible to us about 2 minutes before the actual sunrise, and about 2 minutes after the actual sunset because of atmospheric refraction.	1	3
Q11.	A group of organic compounds having the same functional group and similar structures in which two successive members differ by $-CH_2$ group.	1	
	C_4H_9OH and $C_5H_{11}OH$	½ , ½	
	i) They differ by a mass of 14 u/ show gradation in properties. ii) Their boiling point increases with increase in molecular mass (or any other)	½ , ½	3
Q12.	i) Pleasant/ fruity smell; Esters ii) $CH_3COOH + C_2H_5OH \xrightarrow[-H_2O]{\text{conc. } H_2SO_4} CH_3COOC_2H_5$ conc. H_2SO_4 acts as a catalyst/ dehydrating agent iii) Used in perfume industry / as flavouring agent	½ , ½ 1 ½ ½	3

Q13.	i) Metal, Basic ii) $X(NO_3)_2$, XSO_4 These compounds are ionic/ electrovalent	½ , ½ ½ , ½ 1	3
Q14.	Electronic Configuration of 'P': 2,8,1 Group number : 1 Period number : 3	½ x 3	
	Electronic configuration of 'Q' : 2,8,8,1 Group number : 1 Period number : 4	½ x 3	3
Q15.	i) Because natural resources are limited, and it would be difficult to sustain a large population on limited resources ii) HIV-AIDS, Syphilis, Gonorrhoea, Warts (any two) iii) Manoj- Inquisitive, understands the need for healthy living (any one) Teacher – concerned, dutiful (any one)	1 ½ , ½ ½ ½	3
Q16.	A → Anther: Produces pollen/ male gamete B → Style: Carries the pollen to the ovary C → Ovary: Produces ovules/ female gamete	½ x 6	3
Q17.	i) Tall ii) 3:1 iii) Dwarf Reason: Being a recessive trait, dwarfness can only be expressed in the absence of dominant trait/ in its pure form.	1 ½ ½ 1	3
Q18.	Formation : On certain occasions, a dead body or at least some parts may be in an environment that does not let it decompose completely and gets preserved, subsequently either the part or its impression becomes a fossil.	2	
	Role of fossils: • Provides missing link between the species/ who has evolved from whom. • They tell us about prehistoric organisms (any one)	1	3
Q19.	a) • The relative extent to which the image of an object is magnified with respect to the object size/ The ratio of height of the image to the height of the object. $m = -(v/u)$ • 1) A positive sign indicates that the image is virtual/ erect 2) A negative sign indicates that the image is real/ inverted	1 1 ½ ½	
	b) • Diagram	1	

	 Image is real, inverted and magnified (any two)	1	5
Q20.	• The band of the coloured components of white light. • Refractive index/ speed of light is different for different colours. • By placing a second identical prism in an inverted position with respect to first prism (Proper explanation is to be given)./diagram with labelling	1 1 3	5
Q21.	a) i) Reduce: Less use of natural resources/ avoid wastage of food, water, electricity etc. ii) Recycle: Collection of materials like plastic, glass, metals, paper etc. and recycle these materials to make required items instead of synthesizing fresh ones. This would save natural resources iii) Reuse: Still better than recycling as no energy is required here and the already used things /items are used again and again.	1 1 1	
	b) i) Essential for living organisms ii) It has limited availability iii) Conservation of water allows its equitable distribution. iv) Essential for sustainable development (any other relevant point)	½ x 4	5
Q22.	a) Bromine water gets decolourised by unsaturated hydrocarbons but remains unaffected (reddish brown) by saturated hydrocarbons. (or any other test) b) Carbon dioxide/ CO_2 and Water/ H_2O $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$ + Heat + Light c) $CH_4 + Cl_2 \xrightarrow{\text{sunlight}} CH_3Cl + HCl$ Because hydrogen atom is replaced by chlorine atom.	1 1 1 1 1	5
Q23.	a) i) Ovary: Produces female gamete / ovum Produces oestrogen/ female sex hormones ii) Fallopian tube: Carries ovum from ovary to the uterus Site of fertilization iii) Uterus: Site for implantation and nourishment of the future embryo.	½ , ½ ½ , ½ 1	
	b) Structure of placenta: Disc like structure embedded in the uterine wall. It has villi on the embryo's side and blood species on the mother's side which surround the villi Function of placenta: Transports oxygen and nutrition from the mother's blood to the embryo. Removes the excretory substances from embryo into the mother's blood	½ , ½ ½ , ½	5

Q24.	• Evolution: Gradual accumulation of variations and its selection by nature leading to formation of new species. • Variations may arise in a population due to mutations or sexual reproduction. Sub-populations are formed due to genetic drift and geographical isolation. When natural selection acts on them, most suitable variation survives leading to evolution of a new species. • Fossils provide missing link between the species /who has evolved from whom. They provide information about prehistoric organisms.	1 2 1, 1	5
	SECTION – B		
	25) d 26) b 27) b 28) d 29) c 30) c 31) b 32) a 33) d	1 × 9	9
Q34.	 Diagram Correct labeling	1 ½, ½	2
Q35.	No reaction with distilled water. Chemical reaction occurs with solution of $NaHCO_3$ Two Observations: i) Evolution of a colourless, odourless gas. ii) The gas is evolved with brisk effervescence	½ ½ ½ ½	2
Q36.	 Diagram Labelling	½ ½ x 3	2

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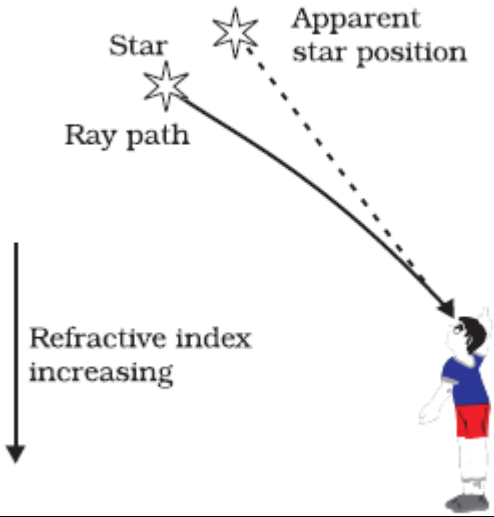
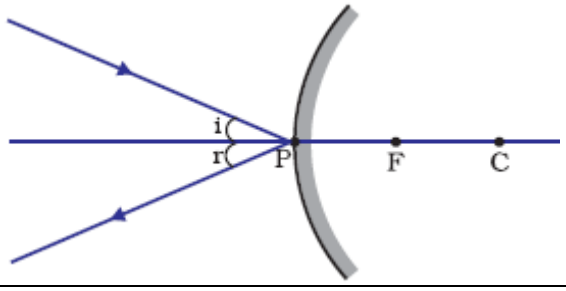
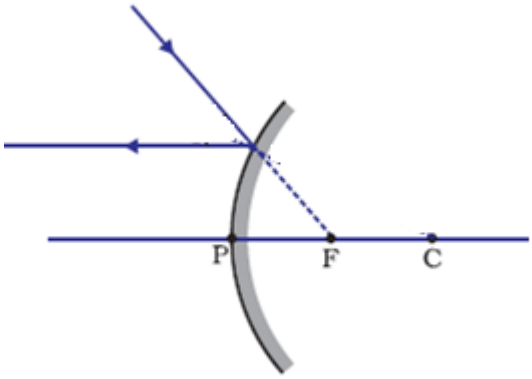
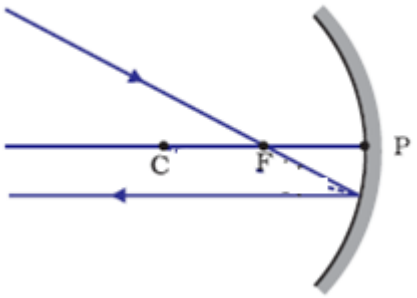
MARKING SCHEME **Code No. 31/3**

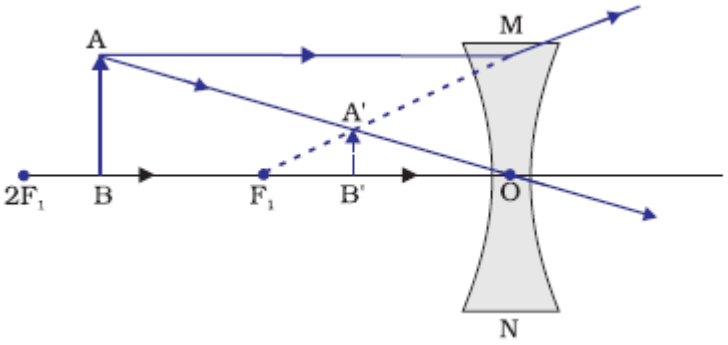
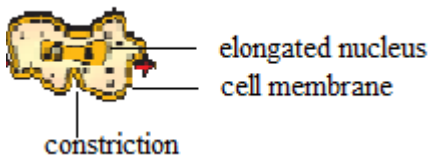
CLASS X – OUTSIDE DELHI

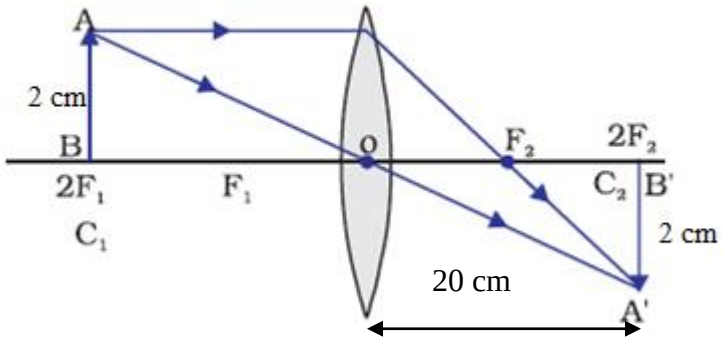
	Expected Answer/ Value point	Marks	Total
	SECTION – A		
Q1.	• 7 • Period	½ ½	1
Q2.	Ozone layer shields the earth's surface from UV radiation from the sun. UV radiations are damaging to organisms / may cause skin cancer.	½ , ½	1
Q3.	4D	1	1
Q4.	• When the body of *Planaria* by any means is cut into two or more number of pieces. • Each piece contains specialized cells • These cells proliferate and make large number of cells • From this mass of cells different cells undergo changes to become various cell types and tissues finally developing into new organism.	½ x 4	2
Q5.	<table><tr><th>Acquired Traits</th><th>Inherited Traits</th></tr><tr><td>• Do not bring changes in the DNA of germ cells • Cannot direct evolution • Cannot be passed on to the progeny</td><td>• Bring changes in the DNA of germ cells • Can direct evolution • Can be passed on to the progeny (any two)</td></tr></table>	1 x 2	2
Q6.	• Segregation of waste at the point of its generation for convenient disposal. • Change in attitude producing less waste by adopting 3 R's policy	1 x 2	2
Q7.	$2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + H_2O + CO_2$		
	$NaOH + CH_3COOH \rightarrow CH_3COONa + H_2O$		
	$CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$	1 x 3	3
Q8.	i) Pleasant/ fruity smell; Esters ii) $CH_3COOH + C_2H_5OH \xrightarrow[-H_2O]{\text{conc. } H_2SO_4} CH_3COOC_2H_5$ $_{\text{CONC.}}\ H_2SO_4$ acts as a catalyst/ dehydrating agent iii) Used in perfume industry / as flavouring agent	½ , ½ 1 ½ ½	3
Q9.	a) i) K ii) Be and Ca, Group -2 b) CaX_2	1 ½ , ½ 1	3

Q10.	i) Metal, Basic ii) $X(NO_3)_2$, XSO_4 These compounds are ionic/ electrovalent	½ , ½ ½ , ½ 1	3
Q11.	• Atmospheric refraction in a medium of gradually varying refractive index	1	
		1	
	The twinkling of a star is due to atmospheric refraction of starlight. Since the atmosphere bends starlight towards the normal, the apparent position of the star is slightly different from its actual position. Further, this apparent position of the star is not stationary, but keeps on changing slightly.	1	3
Q12.	Hypermetropia/ Longsightedness	1	
	$f = \frac{1}{P} \times 100$ ➔ $f = \frac{1}{0.5} \times 100$ = 200 cm	2	3
Q13.		1	

		1	
		1	3
Q14.	The ratio of sine of angle of incidence to the sin of angle of refraction is a constant, for the light of a given colour and for the given pair of media.	1	
	$\frac{\sin i}{\sin r}$ = constant	1	
	$n_m = \frac{\text{Speed of light in air/vacuum}}{\text{Speed of light in the medium}} = \frac{c}{v_m}$	1	3
Q15.	i) Tall ii) 3:1 iii) Dwarf Reason: Being a recessive trait, dwarfness can only be expressed in the absence of dominant trait/ in its pure form.	1 ½ ½ 1	3
Q16.	• Homologous Organs - Organs with similar basic structure/ origin but modified to perform different functions. • Example: forelimbs of various vertebrates (or any other) • Wings of a butterfly and the wings of a bat cannot be regarded as homologous organs • Reason: Though they perform the similar function, they have different origin/ basic structure	1 ½ ½ 1	3
Q17.	Creating a new copy of DNA in a reproducing cell Importance: Since DNA is the carrier of the blue print of the genetic characters, its copying is essential to pass on this blue print to the offsprings.	1 2	3

Q18.	i) Because natural resources are limited, and it would be difficult to sustain a large population on limited resources ii) HIV-AIDS, Syphilis, Gonorrhoea, Warts (any two) iii) Manoj- Inquisitive, understands the need for healthy living (any one) Teacher – concerned, dutiful (any one)	1 ½ , ½ ½ ½	3
Q19.	a) i) Reduce: Less use of natural resources/ avoid wastage of food, water, electricity etc. ii) Recycle: Collection of materials like plastic, glass, metals, paper etc. and recycle these materials to make required items instead of synthesizing fresh ones. This would save natural resources iii) Reuse: Still better than recycling as no energy is required here and the already used things /items are used again and again. b) i) Essential for living organisms ii) It has limited availability iii) Conservation of water allows its equitable distribution. iv) Essential for sustainable development (any other relevant point)	1 1 1 ½ x 4	5
Q20.	a) i) Ovary: Produces female gamete / ovum Produces oestrogen/ female sex hormones ii) Fallopian tube: Carries ovum from ovary to the uterus Site of fertilization iii) Uterus: Site for implantation and nourishment of the future embryo. b) Structure of placenta: Disc like structure embedded in the uterine wall. It has villi on the embryo's side and blood species on the mother's side which surround the villi Function of placenta: Transports oxygen and nutrition from the mother's blood to the embryo. Removes the excretory substances from embryo into the mother's blood	½ , ½ ½ , ½ 1 ½ , ½ ½ , ½	5
Q21.	• Evolution: Gradual accumulation of variations and its selection by nature leading to formation of new species. • Variations may arise in a population due to mutations or sexual reproduction. Sub-populations are formed due to genetic drift and geographical isolation. When natural selection acts on them, most suitable variation survives leading to evolution of a new species. • Fossils provide missing link between the species /who has evolved from whom. They provide information about prehistoric organisms.	1 2 1, 1	5
Q22.	a) Bromine water gets decolourised by unsaturated hydrocarbons but remains unaffected (reddish brown) by saturated hydrocarbons. (or any other test) b) Carbon dioxide/ CO_2 and Water/ H_2O $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$ + Heat + Light	1 1 1 1	

	c) $CH_4 + Cl_2 \xrightarrow{\text{sunlight}} CH_3Cl + HCl$ Because hydrogen atom is replaced by chlorine atom.	1	5
Q23.	(i) The incident ray, the refracted ray and the normal to the interface of two transparent media at the point of incidence, all lie in the same plane. (ii) The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for the given pair of media.  • Virtual, erect, diminished (any two) Image is virtual / erect and half the size of object	½ , ½ 2 ½ , ½ 1	5
Q24.	• The band of the coloured components of white light. • Refractive index/ speed of light is different for different colours. • By placing a second identical prism in an inverted position with respect to first prism (Proper explanation is to be given)./diagram with labelling	1 1 3	5
	SECTION – B		
	25) d / 26) c / 27) b		
	28) c / 29) a / 30) d		
	31) d / 32) b / 33) b	1 ×9	9
Q34.	 Diagram Labelling	½ ½ x 3	2

Q35.	 Diagram Correct labeling	1 ½, ½	2
Q36.	No reaction with distilled water. Chemical reaction occurs with solution of $NaHCO_3$ Two Observations: i) Evolution of a colourless, odourless gas. ii) The gas is evolved with brisk effervescence	½ ½ ½ ½	2