

**MARKING SCHEME  
CLASS X – DELHI**

**Code No. 31/1/1**

	Expected Answer/ Value point	Marks	Total
<b>SECTION – A</b>			
Q 1.	(i) C <sub>3</sub> H <sub>6</sub>	½	
	(ii) C <sub>5</sub> H <sub>8</sub>	½	1
Q2.	Leaf (notches)	1	1
Q3.	Natural ecosystem – Forest/ Lake/ Pond/ River (Any two)	½+½	1
Q4.	<ul style="list-style-type: none"> <li>• When the object is placed in front of the mirror –</li> <li style="padding-left: 20px;">(i) between its pole and focus</li> <li style="padding-left: 20px;">(ii) between the focus and centre of curvature</li> <li>• In case (i) the image is virtual and erect</li> <li style="padding-left: 20px;">In case (ii) the image is real and inverted</li> </ul>	½ ½ ½ ½	   2
Q5.	Advantages of watershed management – <ul style="list-style-type: none"> <li>(i) mitigates drought and floods</li> <li>(ii) increase the life of the dams and reservoirs downstream</li> <li>(iii) increases the biomass production and thereby the income of the watershed community.</li> <li>(iv) helps in maintaining ecological balance by scientific conservation of soil and water. or any other</li> </ul>	(Any four) 4 x ½	   2
Q6.	<ul style="list-style-type: none"> <li>• In West Bengal the Sal forests had been very badly degraded.</li> <li>• A forest officer involved villagers in protection of Sal forest and gave them employment in silviculture and harvesting operations.</li> <li>• Villagers were allowed to collect firewood and fodder on a nominal payment.</li> <li>• Within a period of 10 years the previously worthless forests became valuable.</li> </ul>	½ ½ ½ ½	   2
Q7.	<ul style="list-style-type: none"> <li>• Covalent compounds are those compounds which are formed by sharing of electrons between two atoms / which contain covalent bonds.</li> <li>• Covalent compounds are different from ionic compounds because the ionic compounds are formed by the transference of electrons.</li> <li>• Three characteristics of covalent compounds:</li> </ul>	1 ½	

	(i) Generally have low melting and boiling points.		
	(ii) Generally insoluble or less soluble in water but soluble in organic solvents.		
	(iii) Do not conduct electricity. (Or any other characteristic)	(Any three)	3 x ½      3
Q8.	(i) Esters		½
	<u>Chemical equation</u> –		
	$\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH} + \text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{Conc. H}_2\text{SO}_4} \text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{CH}_2-\text{CH}_3 + \text{H}_2\text{O}$		1
	Product's chemical name – Ethyl ethanoate		½
	(ii) Conc. H <sub>2</sub> SO <sub>4</sub> acts as a dehydrating agent (Helps in the removal of water formed in the reaction)		1      3
Q9.	(i) It is a metal		½
	Since it has two electrons in its outermost shell/ two valence electrons, which it can lose easily.		½
	(ii) K (19) is placed before Ca (20) in the same period/ fourth period.		½
	Since the atomic radius decreases along a period, the atomic radius of calcium is smaller than that of potassium.		½
	(iii) The formula of oxide of calcium is CaO, because the valency of calcium as well as that of oxygen is 2.		½+½      3
Q10.	• The electronic configuration (2, 8, 2) of the element 'M' suggests that it belongs to group 2 and period 3 of the Modern Periodic Table and its valency is 2.		½+½
	• The chemical formula of the compounds are –		
	M (NO <sub>3</sub> ) <sub>2</sub> / Mg (NO <sub>3</sub> ) <sub>2</sub> ; MSO <sub>4</sub> / MgSO <sub>4</sub> ; M <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> / Mg <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> .		3x½
	• 'M' will form ionic compounds by losing two electrons.		½      3
Q11.	• When organisms reproduce asexually, only mitotic divisions are involved and the chromosome number remains the same. // During asexual reproduction the DNA (in the chromosomes) of the cells involved are copied and then equally divided among the two daughter cells formed. Thus, chromosome number remains unchanged.		½
	• In sexual reproduction, organisms produce gametes through a special type of division, meiosis – reductional division, in which the original number of chromosomes becomes half. These two gametes combine to form the zygote and the original number of chromosomes is restored. // In sexual reproduction specialized cells/ germ cells with only half the number of chromosomes are formed. When these germ cells from two individuals combine to form a new individual, the original chromosome number is restored.		½

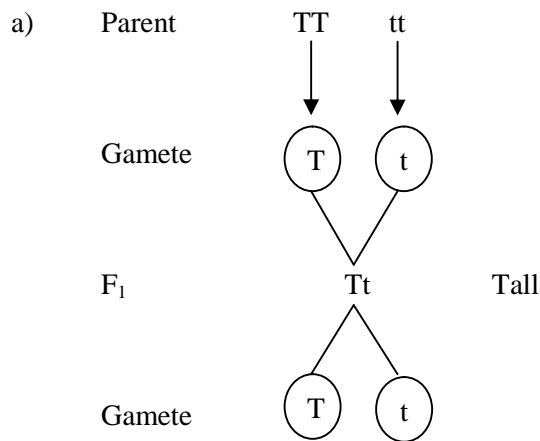
- Example:- In humans, the parents father and mother each have 46 or 23 pairs of chromosomes. In the gametes – the sperm has half the number of chromosomes i.e., 23 and the egg also has 23 chromosomes, when the sperm and the egg fuse, the zygote has 46 or 23 pairs of chromosomes. Thus, the chromosome number remains constant. ½  
½  
½      3

- Q12. A Anther – it produces pollen grains ½, ½  
 B Style – it provides the path through which the Pollen tube grows and reaches the ovary ½, ½  
 C Ovary – it contains ovules and each ovule has an egg cell/ female gamete. It develops into fruit after fertilization. ½, ½      3

- Q13 Three methods of contraception –  
 (i) Barrier method or mechanical method/ Condom/ Diaphragm, to prevent the meeting of sperms and ova.  
 (ii) Chemical method/ Oral pills, Changes the hormonal balance of the female partner so that the eggs are not released.  
 (iii) Surgical method – to block the vasdeferens in males/ vasectomy or the fallopian tube (oviduct) in females/ tubectomy, to prevent the transfer of sperms or egg and hence no fertilization takes place. 3x  
 (iv) IUCDs/ Loop or the copper-T placed in the uterus, to prevent pregnancy (Any three) (½+)  
½)      3

- Q14. a) The dwarf traits of the plants is not expressed in the presence of the dominant tall trait. 1  
 b) In the F<sub>2</sub> generation, both the tall and dwarf traits are present in the ratio of 3:1. This showed that the traits for tallness and dwarfness are present in the F<sub>1</sub> generation, but the dwarfness, being the recessive trait does not express itself in the presence of tallness, the dominant trait. 2      3

**OR**



b)

F <sub>2</sub>	(T)	TT Tall	Tt Tall
	(t)	Tt	tt

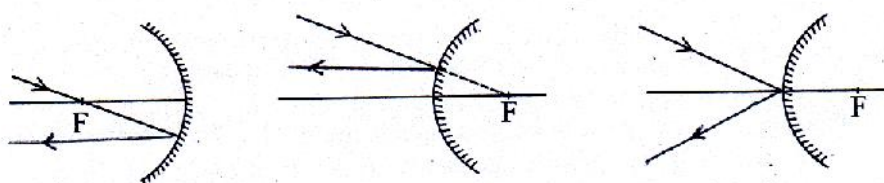
1  
  
1 + ½

		Tall	Dwarf
		Tall : Dwarf	
		3 : 1	

½

- |      |  |   |   |
|------|--|---|---|
| Q15. | Acquired traits                                | Inherited traits                        |   |
|      | Do not bring changes in the DNA of germ cells. | Bring changes in the DNA of germ cells. | 1 |
|      | 1. Cannot direct evolution                     | Can direct evolution                    | 1 |
|      | 2. Cannot be passed on to the progeny          | Can be passed on to the progeny         | 1 |
|      |  |   | 3 |

Q16.



3x1

3

- Q17. Early in the morning, the sun is near the horizon, sunlight reaches us after travelling a longer distance through thick layers of atmosphere. Thus most of the blue light and shorter wavelengths are scattered away by the particles in the atmosphere. The light that reaches us is of longer wavelengths giving a reddish appearance. 2
- This phenomenon will not be observed by an observer on the moon. ½
- Because of the absence of atmosphere on the moon. ½ 3

- Q18. a) The existence of decomposers is essential in a biosphere because they breakdown complex organic substances into simple inorganic substances that can be absorbed by the plants. Thus, decomposers ½
- replenish the soil naturally ½
  - helps in removing the biodegradable waste. ½
- b) In a food chain the energy moves progressively through the various trophic levels, it is no longer available to the previous level (autotrophs) and the energy captured by the autotrophs does not go back to the solar input. Hence, the flow of energy is unidirectional 1 ½ 3

- Q19. Pass the vapours of the given samples of saturated and unsaturated hydrocarbons into bromine water taken in two separate test tubes. The one which discharges the colour of bromine water is that of unsaturated hydrocarbon and the other represents saturated hydrocarbon. (or any other test) 2
- On burning ethane in air, the products obtained are carbon dioxide and water, along with heat and light. 1
- $2 \text{C}_2\text{H}_6 (\text{g}) + 7 \text{O}_2 (\text{g}) \rightarrow 4 \text{CO}_2 (\text{g}) + 6 \text{H}_2\text{O} (\text{l}) + \text{Heat} + \text{Light}$  1
- It is considered a substitution reaction because the hydrogen atoms of methane ( $\text{CH}_4$ ) are replaced by chlorine atoms one by one. 1 5

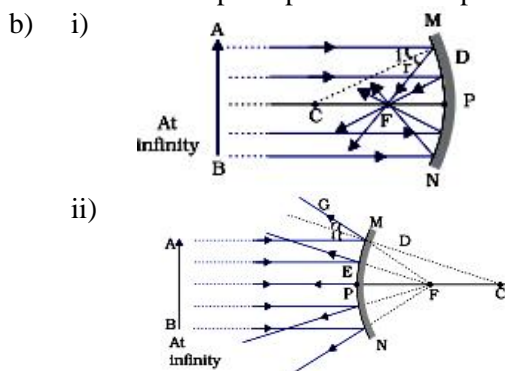
- Q20. a) (i) Ovary - (i) Production of female hormone  $\frac{1}{2}$   
(ii) Production of female gamete  $\frac{1}{2}$   
(ii) Oviduct - (i) Transfer of female gamete from the ovary  $\frac{1}{2}$   
(ii) Site of fertilization  $\frac{1}{2}$   
(iii) Uterus - (i) Implantation of the zygote  $\frac{1}{2}$   
(ii) Nourishment of the developing embryo/ placenta formation  $\frac{1}{2}$
- b) Structure of Placenta – it is a disc like structure embedded in the uterine wall connected to the embryo. It has villi on the embryo’s side of the tissue and on the mother side, it has blood spaces, which surround the villi.  $\frac{1}{2}$   
Function of Placenta – it provides a large surface area for nutrients/ glucose and oxygen to pass from the mother’s side to the embryo and waste substances from the embryo’s side to mother’s blood.  $\frac{1}{2}$

5

- Q21. • Speciation:- The process of formation of a new species from a pre-existing one. 1  
• Four factors:  
Genetic drift  
Mutation / Drastic change in the genes or DNA  
Natural selection  
Geographical isolation 4 x  $\frac{1}{2}$   
• Geographical isolation cannot be a major factor in the speciation of a self-pollinating plant species. 1  
• Reason:- Physical barrier cannot be created in self-pollinating plants. 1

5

- Q22. a) i) Pole – Centre of the reflecting surface of the mirror.  
ii) Centre of curvature – The centre of the hollow sphere of which the reflecting surface of mirror forms a part.  
iii) Principal axis – Straight-line passing through the pole and the centre of curvature of a spherical mirror.  
iv) Principal focus – Incident rays parallel to principal axis, after reflection, either converge to or appear to diverge from a fixed point on the principal axis called principal focus of the spherical mirror. 4x  $\frac{1}{2}$



1

- c) Concave mirror  
Image formed is virtual

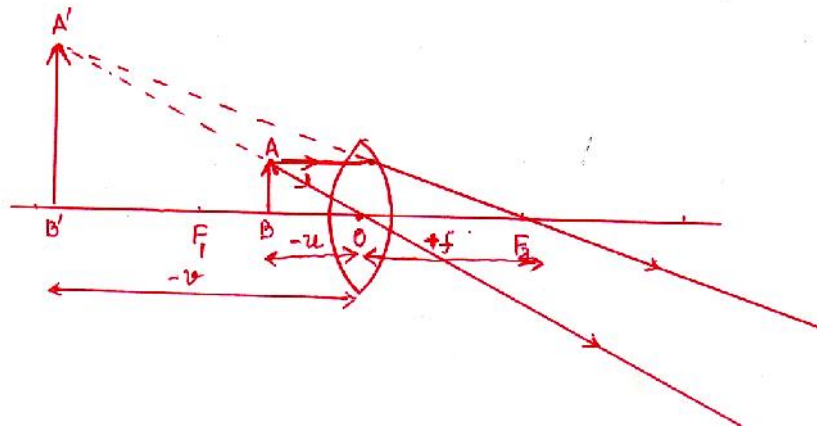
1

$\frac{1}{2}$

$\frac{1}{2}$

5

Q23. a)



b)

Diagram 1  
Marking of  $u$  &  $v$   $\frac{1}{2}, \frac{1}{2}$

Relation :  $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

$\frac{1}{2}$

c)  $m = -1; u = -20\text{cm}; v = ? \quad f = ?$

$m = \frac{v}{u} \quad \therefore v = +20\text{cm}$

$\frac{1}{2}$

Thus object is at  $2F$

i.e.  $2f = 20\text{cm}$

$\therefore f = 10\text{cm} = 0.1\text{m}$

1

$P = \frac{1}{f} = \frac{1}{0.1} = +10\text{D}$

1

5

Q24. a)

- Cornea – Refracts the rays of light falling on the eye  $\frac{1}{2}$
- Iris – Controls the size of the pupil  $\frac{1}{2}$
- Crystalline lens – Focuses the image of the object on the retina  $\frac{1}{2}$
- Ciliary muscles – Holds the eye lens and adjusts its focal length  $\frac{1}{2}$

b)

- i) Objectives – To make people aware and realize their duties towards society. 1
- ii) One person can give sight to two people  $\frac{1}{2}$   
Our eyes can live even after our death  $\frac{1}{2}$
- iii) Concern for others/ Responsible behavior/ Group work/ or any other

(Any two)  $2 \times \frac{1}{2}$  5

**SECTION – B**

25 (b)

26 (a)

27 (c)

28 (d)

29 (a)

30 (c)

31 (c)

32 (d)

33 (a)

$9 \times 1$

9

- Q34. (i) No change / or remains colourless  
(ii) No change  
(iii) Turns pink/orange  
(iv) Evolution of a colourless/ odorless gas with brisk effervescence

4 x ½ 2

Q35.

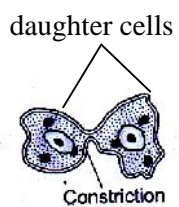


Diagram 1

Labelling ½, ½ 2

- Q36. (i) Lens towards the screen/ screen away from the lens  
(Note: one mark to be awarded for any other answer)  
(ii) Increase  
(iii) No image on the screen

1

½

½ 2

**MARKING SCHEME  
CLASS X – DELHI**

**Code No. 31/1/2**

Expected Answer/ Value point		Marks	Total
<b>SECTION – A</b>			
Q 1.	(a) Ethanol (b) Ethanal	½ + ½	1
Q2.	It is the carrier of hereditary information from parents to the next generation.	1	1
Q3.	Producers, consumers, decomposers OR Plants, animals, micro-organisms (Any two)	½, ½	1
Q4.		Tracing the reflected ray Marking ∠i & ∠r	1 ½, ½ 2
Q5.	<ul style="list-style-type: none"> <li>• In West Bengal the Sal forests had been very badly degraded.</li> <li>• A forest officer involved villagers in protection of Sal forest and gave them employment in silviculture and harvesting operations.</li> <li>• Villagers were allowed to collect firewood and fodder on a nominal payment.</li> <li>• Within a period of 10 years the previously worthless forests became valuable.</li> </ul>	½ ½ ½ ½	2
Q6.	Advantages of watershed management – <ol style="list-style-type: none"> <li>mitigates drought and floods</li> <li>increase the life of the dams and reservoirs downstream</li> <li>increases the biomass production and thereby the income of the watershed community.</li> <li>helps in maintaining ecological balance by scientific conservation of soil and water. or any other</li> </ol> (Any four)	4 x ½	2
Q7.	<ul style="list-style-type: none"> <li>• It is a substance which can give oxygen to other substances.</li> <li>• <math display="block">\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{OH} \xrightarrow[\text{OR Acidified K}_2\text{Cr}_2\text{O}_7 + \text{Heat}]{\text{Alkaline KMnO}_4 + \text{Heat}} \text{CH}_3 - \text{CH}_2 - \overset{\text{O}}{\underset{\text{  }}{\text{C}}} - \text{OH}</math> <p align="center">Propanol <span style="margin-left: 100px;">Propanoic acid</span></p> </li> <li>• Propanol is oxidised to Propanoic acid.</li> </ul>	1 1 1	3
Q8.	<ul style="list-style-type: none"> <li>• Covalent compounds are those compounds which are formed by sharing of electrons between two atoms / which contain covalent bonds.</li> <li>• Covalent compounds are different from ionic compounds because the ionic</li> </ul>	1 ½	



	compounds are formed by the transference of electrons.			
	<ul style="list-style-type: none"> <li>• Three characteristics of covalent compounds:               <ul style="list-style-type: none"> <li>(i) Generally have low melting and boiling points.</li> <li>(ii) Generally insoluble or less soluble in water but soluble in organic solvents.</li> <li>(iii) Do not conduct electricity. (Or any other characteristic) (Any three)</li> </ul> </li> </ul>	3 x ½	3	
Q9.	<ul style="list-style-type: none"> <li>• The electronic configuration (2, 8, 2) of the element 'M' suggests that it belongs to group 2 and period 3 of the Modern Periodic Table and its valency is 2.</li> <li>• The chemical formula of the compounds are –</li> </ul>	½+½		
	M (NO <sub>3</sub> ) <sub>2</sub> / Mg (NO <sub>3</sub> ) <sub>2</sub> ; MSO <sub>4</sub> / MgSO <sub>4</sub> ; M <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> / Mg <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> .	3x½		
	<ul style="list-style-type: none"> <li>• 'M' will form ionic compounds by losing two electrons.</li> </ul>	½	3	
Q10.	<ul style="list-style-type: none"> <li>• Two elements of group 1 are Na, K / sodium, potassium</li> </ul>	2 x ½		
	Electronic configurations Na = 2,8,1; K = 2,8,8,1	2 x ½		
	<ul style="list-style-type: none"> <li>• Similarity: Both have one valence electron / One electron in outermost shell</li> <li>• Oxide – Na<sub>2</sub>O / K<sub>2</sub>O</li> </ul>	½	3	
Q11.	Functions of testis –			
	(i) Produce sperms	½		
	(ii) Produces male hormone/ testosterone	½		
	<ul style="list-style-type: none"> <li>• These are located outside the human body, as sperms need lower temperature than the normal body temperature to mature.</li> <li>• Testosterone</li> </ul>	1	1	3
Q12	Three methods of contraception –			
	(i) Barrier method or mechanical method/ Condom/ Diaphragm, to prevent the meeting of sperms and ova.			
	(ii) Chemical method/ Oral pills, Changes the hormonal balance of the female partner so that the eggs are not released.			
	(iii) Surgical method – to block the vasdeferens in males/ vasectomy or the fallopian tube (oviduct) in females/ tubectomy, to prevent the transfer of sperms or egg and hence no fertilization takes place.			
	(iv) IUCDs/ Loop or the copper-T placed in the uterus, to prevent pregnancy (Any three)	3x (½+½)	3	
Q13	Multiple fission:- The process of reproduction in which many individuals are formed or produced from the parent cell.	1		
	In this process, the nucleus divides repeatedly to produce large number of nuclei. Each nucleus gathers a bit of cytoplasm around itself, develops a membrane around each structure. Many daughter cells develop which on liberation grow into adult organism.	1 ½		
	Plasmodium exhibits this type of fission.	½	3	
Q14.	Mendel conducted breeding experiments on Pea plants.			
	<ul style="list-style-type: none"> <li>• He selected pure bred tall and dwarf plants.</li> <li>• He cross-pollinated these plants.</li> <li>• In the F<sub>1</sub> generation obtained only tall plants. Tallness is the dominant trait.</li> <li>• Then, he produced F<sub>2</sub> generation by selfing of hybrids / F<sub>1</sub></li> </ul>	½	½	½

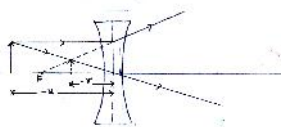
	<ul style="list-style-type: none"> <li>• He found that <math>\frac{3}{4}</math><sup>th</sup> of the plants were tall and <math>\frac{1}{4}</math><sup>th</sup> were dwarf.</li> <li>• The trait which remains hidden in F<sub>1</sub> generation plants is the recessive traits.</li> </ul>	$\frac{1}{2}$	3																					
Q15.	<table border="0"> <thead> <tr> <th>Acquired traits</th> <th>Inherited traits</th> </tr> </thead> <tbody> <tr> <td>Do not bring changes in the DNA of germ cells.</td> <td>Bring changes in the DNA of germ cells.</td> </tr> <tr> <td>1. Cannot direct evolution</td> <td>Can direct evolution</td> </tr> <tr> <td>2. Cannot be passed on to the progeny</td> <td>Can be passed on to the progeny</td> </tr> </tbody> </table>	Acquired traits	Inherited traits	Do not bring changes in the DNA of germ cells.	Bring changes in the DNA of germ cells.	1. Cannot direct evolution	Can direct evolution	2. Cannot be passed on to the progeny	Can be passed on to the progeny	1	3													
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Q16.	<ul style="list-style-type: none"> <li>• Scattering of light – Phenomenon of spreading of light (diffused reflection) by minute particles in a medium.</li> <li>• The sky appears blue because the blue colour of sunlight scatters much more strongly than the red colour by particles in atmosphere/ air due to its shorter wave length.</li> <li>• At sun-rise and sun-set most of the blue light and shorter wavelengths are scattered away by the particles in the atmosphere as the light from the sun near the horizon passes through thick layers of air and larger distance. The light that reaches us is of longer wavelength (red colour) giving a reddish appearance.</li> </ul>	1	3																					
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Function of Placenta – it provides a large surface area for nutrients/ glucose and oxygen to pass from the mother’s side to the embryo and waste substances from the embryo’s side to mother’s blood. ½  
½      5

- Q20. • Speciation:- The process of formation of a new species from a pre-existing one. 1
- Four factors:  
 Genetic drift  
 Mutation / Drastic change in the genes or DNA  
 Natural selection  
 Geographical isolation 4 x ½
- Geographical isolation cannot be a major factor in the speciation of a self-pollinating plant species. 1
- Reason:- Physical barrier cannot be created in self-pollinating plants. 1      5

- Q21. Pass the vapours of the given samples of saturated and unsaturated hydrocarbons into bromine water taken in two separate test tubes. The one which discharges the colour of bromine water is that of unsaturated hydrocarbon and the other represents saturated hydrocarbon. (or any other test) 2
- On burning ethane in air, the products obtained are carbon dioxide and water, along with heat and light. 1
- $2 \text{C}_2\text{H}_6 (\text{g}) + 7 \text{O}_2 (\text{g}) \rightarrow 4 \text{CO}_2 (\text{g}) + 6 \text{H}_2\text{O} (\text{l}) + \text{Heat} + \text{Light}$  1
- It is considered a substitution reaction because the hydrogen atoms of methane ( $\text{CH}_4$ ) are replaced by chlorine atoms one by one. 1      5

Q22. a)



b) Diagram      1  
 Marking  $-u$  and  $-v$  ½, ½

Relation :

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

c) As,  $m = -1$       hence, the lens is convex. ½

$$\therefore m = \frac{v}{u} \quad \therefore v = -u$$

Thus, object is at 2F

$$2f = 40 \text{ cm}$$

$$\therefore f = 20 \text{ cm} = 0.2 \text{ m}$$

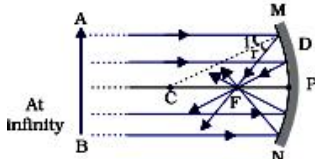
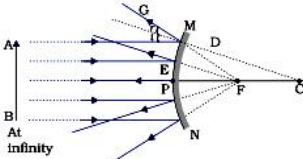
$$P = \frac{1}{f} = \frac{1}{0.2} = +5\text{D} \text{ (convex lens)}$$

1

1

5

- Q23. a) i) Pole – Centre of the reflecting surface of the mirror.  
 ii) Centre of curvature – The centre of the hollow sphere of which the reflecting surface of mirror forms a part.  
 iii) Principal axis – Straight-line passing through the pole and the centre of curvature of a spherical mirror.

	iv) Principal focus – Incident rays parallel to principal axis, after reflection, either converge to or appear to diverge from a fixed point on the principal axis called principal focus of the spherical mirror.	4x ½	
b) i)		1	
ii)		1	
c)	Concave mirror Image formed is virtual	½ ½	5
Q24. a)	• Cornea – Refracts the rays of light falling on the eye • Iris – Controls the size of the pupil • Crystalline lens – Focuses the image of the object on the retina • Ciliary muscles – Holds the eye lens and adjusts its focal length	½ ½ ½ ½	
b) i)	Objectives – To make people aware and realize their duties towards society.	1	
ii)	One person can give sight to two people Our eyes can live even after our death	½ ½	
iii)	Concern for others/ Responsible behavior/ Group work/ or any other		
	(Any two)	2x ½	5

**SECTION – B**

25 (a)	26 (d)	27 (a)		
28 (d)	29 (c)	30 (c)		
31 (a)	32 (b)	33 (c)	9 x 1	9
Q34. (i)	Lens towards the screen/ screen away from the lens (Note: one mark to be awarded for any other answer)		1	
(ii)	Increase		½	
(iii)	No image on the screen		½	2
Q35. (i)	No change / or remains colourless			
(ii)	No change			
(iii)	Turns pink/orange			
(iv)	Evolution of a colourless/ odorless gas with brisk effervescence		4 x ½	2
Q36.	daughter cells			



Diagram	1	
Labelling	½, ½	2

**MARKING SCHEME**  
**CLASS X – DELHI**

**Code No. 31/1/3**

	Expected Answer/ Value point	Marks	Total
<b>SECTION – A</b>			
Q 1.	C <sub>4</sub> H <sub>10</sub> ; C <sub>6</sub> H <sub>14</sub>	½, ½	1
Q2.	Each piece regenerates into a new Planaria.	1	1
Q3.	Because the green plants prepare food by photosynthesis by using solar energy.	1	1
Q4.	• Ability of lens to converge or diverge the light rays.	½	2
	• +ve sign → converging lens/ convex lens		
	–ve sign → diverging lens/ concave lens	½	
	• S.I. unit – dioptre 1 dioptre = 1/ focal length ( m)	½	
Q5.	Advantages of watershed management – (i) mitigates drought and floods (ii) increase the life of the dams and reservoirs downstream (iii) increases the biomass production and thereby the income of the watershed community. (iv) helps in maintaining ecological balance by scientific conservation of soil and water. or any other	(Any four) 4 x ½	2
Q6.	Reuse refers to the use of the same material again and again.	½	2
	In reuse of materials no energy is consumed and the resources are saved.	½	
	In recycling certain used materials are converted into other useful materials.	½	
	In recycling of materials, energy is consumed and the resources may be wasted	½	
Q7.	• Ethene		2
	• $\text{C}_2\text{H}_5\text{OH} \xrightarrow[443\text{K}]{\text{Conc. H}_2\text{SO}_4 + \text{Heat}} \text{H}_2\text{C} = \text{CH}_2 + \text{H}_2\text{O}$ ethene		
	• Conc. H <sub>2</sub> SO <sub>4</sub> acts as a dehydrating agent/ removes water from the reactant		
	• Ethane/ C <sub>2</sub> H <sub>6</sub> will be formed	½ x 4	
Q8.	(i) Esters	½	3
	<u>Chemical equation –</u> $\text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{OH} + \text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{Conc. H}_2\text{SO}_4} \text{CH}_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{O} - \text{CH}_2 - \text{CH}_3 + \text{H}_2\text{O}$	1	
	Product's chemical name – Ethyl ethanoate	½	
	(ii) Conc. H <sub>2</sub> SO <sub>4</sub> acts as a dehydrating agent (Helps in the removal of water formed in the reaction)	1	

Q9.	Characteristics	A	B		
(a)	Number of electrons in their atoms	4 or 12 or 20	5 or 13 or 21		
(b)	Size of their atoms	Bigger	Smaller		
(c)	Their tendencies to lose electrons	More	Less		
(d)	The formula of their oxides	AO	B <sub>2</sub> O <sub>3</sub>		
(e)	Their metallic character	More metallic	Less metallic		
(f)	The formula of their chlorides	ACl <sub>2</sub>	BCl <sub>3</sub>	6 x ½	3
Q10.	<ul style="list-style-type: none"> <li>The electronic configuration (2, 8, 2) of the element 'M' suggests that it belongs to group 2 and period 3 of the Modern Periodic Table and its valency is 2.</li> <li>The chemical formula of the compounds are –</li> </ul>			½+½	
	M (NO <sub>3</sub> ) <sub>2</sub> / Mg (NO <sub>3</sub> ) <sub>2</sub> ; MSO <sub>4</sub> / MgSO <sub>4</sub> ; M <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> / Mg <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> .			3x½	
	'M' will form ionic compounds by losing two electrons.			½	3
Q11.	<p>Pollination – The transfer of pollen grains from the anther to the stigma is called pollination.</p> <p>The two types of pollination :</p> <p>Self pollination – When the pollen grains from the stamens of a flower fall on the stigma of the same flower, then self pollination occurs.</p> <p>Cross pollination – When pollen grains from the stamens of a flower fall on the stigma of another flower, then cross pollination occurs.</p>			1	
				½, ½	
				½, ½	3
Q12	<p>Three methods of contraception –</p> <p>(i) Barrier method or mechanical method/ Condom/ Diaphragm, to prevent the meeting of sperms and ova.</p> <p>(ii) Chemical method/ Oral pills, Changes the hormonal balance of the female partner so that the eggs are not released.</p> <p>(iii) Surgical method – to block the vasdeferens in males/ vasectomy or the fallopian tube (oviduct) in females/ tubectomy, to prevent the transfer of sperms or egg and hence no fertilization takes place.</p> <p>(iv) IUCDs/ Loop or the copper-T placed in the uterus, to prevent pregnancy</p>			3x (½+½)	
	(Any three)			½)	3
Q13.	<p>A Anther – it produces pollen grains</p> <p>B Style – it provides the path through which the Pollen tube grows and reaches the ovary</p> <p>C Ovary – it contains ovules and each ovule has an egg cell/ female gamete. It develops into fruit after fertilization.</p>			½, ½	
				½, ½	
				½, ½	3
Q14.	<p>Yes, the scientist may arrive at the law of dominance according to which the trait that is expressed in the F<sub>1</sub> generation is the dominant trait, although both the dominant and recessive traits are present in the F<sub>1</sub> generation. In the F<sub>2</sub> generation the recessive traits is also expressed along with the dominant traits.</p>			1	
				1	
				1	3

Q15.	Acquired traits	Inherited traits		
	Do not bring changes in the DNA of germ cells.	Bring changes in the DNA of germ cells.	1	
1.	Cannot direct evolution	Can direct evolution	1	
2.	Cannot be passed on to the progeny	Can be passed on to the progeny	1	3
3.				

Q16. a)

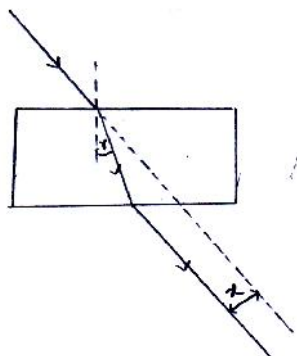


Diagram 1  
Marking  $\angle r$  and  $x$   $\frac{1}{2}, \frac{1}{2}$

b)

$${}_a n_g = \frac{3}{2}$$

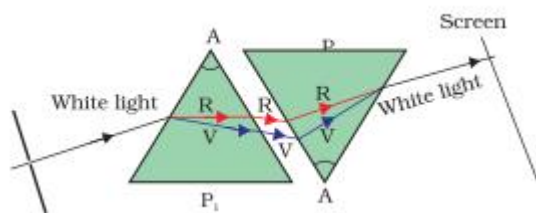
$$\therefore {}_g n_a = \frac{1}{{}_a n_g} = \frac{1}{\frac{3}{2}} = \frac{2}{3}$$

Alternately,

$$\frac{c_{air}}{c_{glass}} = \frac{3}{2} \quad \therefore \frac{c_{glass}}{c_{air}} = \frac{2}{3}$$

1 3

Q17. Cause of dispersion of white light – Different colours of light bend through different angles with respect to the incident ray as they pass through a prism. Violet light bends the most and red the least. Thus, the each colour emerges along different paths.

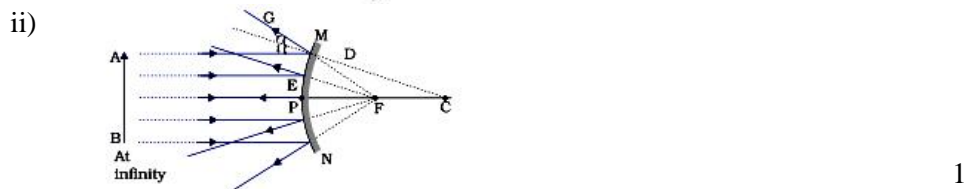
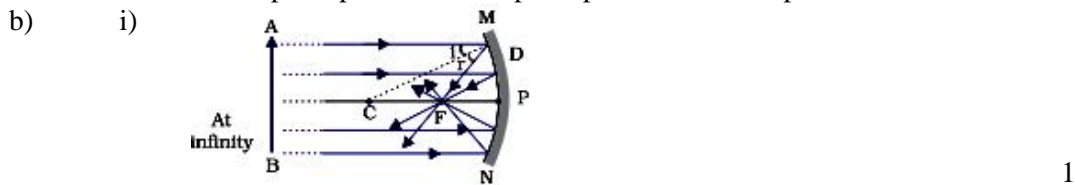


2 3

- Q18. a) The existence of decomposers is essential in a biosphere because they breakdown complex organic substances into simple inorganic substances that can be absorbed by the plants. Thus, decomposers
- replenish the soil naturally 1/2
  - helps in removing the biodegradable waste. 1/2
- b) In a food chain the energy moves progressively through the various trophic levels, it is no longer available to the previous level (autotrophs) and the energy captured by the autotrophs does not go back to the solar input. Hence, the flow of energy is unidirectional 1 1/2

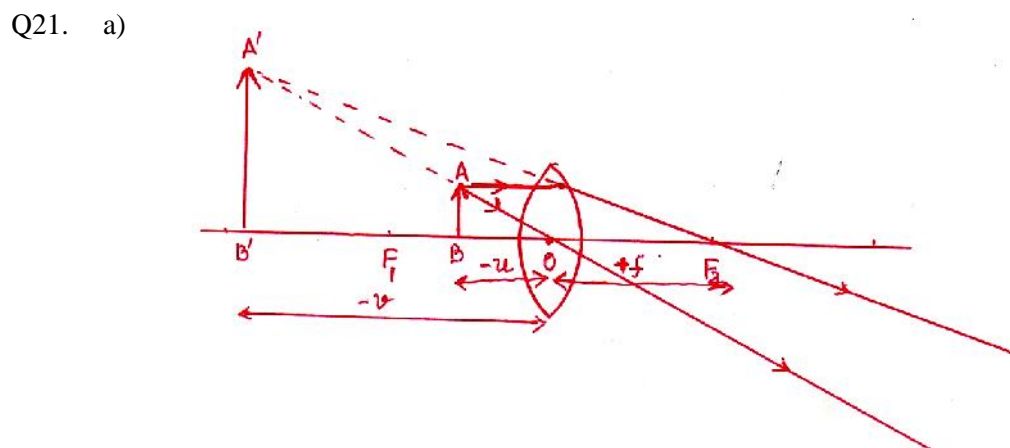
3

- Q19. a) i) Pole – Centre of the reflecting surface of the mirror.  
 ii) Centre of curvature – The centre of the hollow sphere of which the reflecting surface of mirror forms a part.  
 iii) Principal axis – Straight-line passing through the pole and the centre of curvature of a spherical mirror.  
 iv) Principal focus – Incident rays parallel to principal axis, after reflection, either converge to or appear to diverge from a fixed point on the principal axis called principal focus of the spherical mirror. 4x ½



- c) Concave mirror ½  
 Image formed is virtual ½ 5

- Q20. a) • Cornea – Refracts the rays of light falling on the eye ½  
 • Iris – Controls the size of the pupil ½  
 • Crystalline lens – Focuses the image of the object on the retina ½  
 • Ciliary muscles – Holds the eye lens and adjusts its focal length ½
- b) i) Objectives – To make people aware and realize their duties towards society. 1  
 ii) One person can give sight to two people ½  
 Our eyes can live even after our death ½  
 iii) Concern for others/ Responsible behavior/ Group work/ or any other 2x ½ 5  
 (Any two)



- b) Diagram 1  
Marking of u & v ½, ½

Relation :  $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$  ½



c)	$m = -1; u = -20\text{cm}; v = ? \quad f = ?$			
	$m = \frac{v}{u} \therefore v = +20\text{cm}$		1/2	
	Thus object is at 2F			
	i.e. $2f = 20\text{cm}$			
	$\therefore f = 10\text{cm} = 0.1\text{m}$		1	
	$P = \frac{1}{f} = \frac{1}{0.1} = +10\text{D}$		1	5
Q22.	a)	(i) Ovary -	(i) Production of female hormone	1/2
			(ii) Production of female gamete	1/2
		(ii) Oviduct -	(i) Transfer of female gamete from the ovary	1/2
			(ii) Site of fertilization	1/2
		(iii) Uterus -	(i) Implantation of the zygote	1/2
			(ii) Nourishment of the developing embryo/ placenta formation	1/2
	b)	<u>Structure of Placenta</u> – it is a disc like structure embedded in the uterine wall connected to the embryo. It has villi on the embryo’s side of the tissue and on the mother side, it has blood spaces, which surround the villi.		1/2
		<u>Function of Placenta</u> – it provides a large surface area for nutrients/ glucose and oxygen to pass from the mother’s side to the embryo and waste substances from the embryo’s side to mother’s blood.		1/2
Q23.				5
		• <u>Speciation</u> :- The process of formation of a new species from a pre-existing one.		1
		• <u>Four factors</u> :		
		Genetic drift		
		Mutation / Drastic change in the genes or DNA		
		Natural selection		
		Geographical isolation		4 x 1/2
		• Geographical isolation cannot be a major factor in the speciation of a self-pollinating plant species.		1
		• <u>Reason</u> :- Physical barrier cannot be created in self-pollinating plants.		1
				5
Q24.				
		Pass the vapours of the given samples of saturated and unsaturated hydrocarbons into bromine water taken in two separate test tubes. The one which discharges the colour of bromine water is that of unsaturated hydrocarbon and the other represents saturated hydrocarbon. (or any other test)		2
		On burning ethane in air, the products obtained are carbon dioxide and water, along with heat and light.		1
		$2\text{C}_2\text{H}_6(\text{g}) + 7\text{O}_2(\text{g}) \rightarrow 4\text{CO}_2(\text{g}) + 6\text{H}_2\text{O}(\text{l}) + \text{Heat} + \text{Light}$		1
		It is considered a substitution reaction because the hydrogen atoms of methane ( $\text{CH}_4$ ) are replaced by chlorine atoms one by one.		1
				5

### SECTION – B

25 (c)	26 (d)	27 (a)		
28 (c)	29 (b)	30 (a)		
31 (c)	32 (a)	33 (d)	9 x 1	9

Q34.

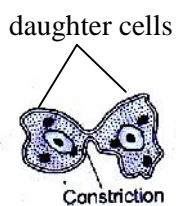


Diagram	1	
Labelling	½, ½	2

Q35. (i) Lens towards the screen/ screen away from the lens  
(Note: one mark to be awarded for any other answer)

(ii) Increase

(iii) No image on the screen

1	
½	
½	2

Q36. (i) No change / or remains colourless

(ii) No change

(iii) Turns pink/orange

(iv) Evolution of a colourless/ odorless gas with brisk effervescence

4 x ½	2
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