MARKING SCHEME

GENERAL INSTRUCTIONS

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. The candidates can have their own expression and if the expression is correct, the marks may be awarded accordingly.

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.

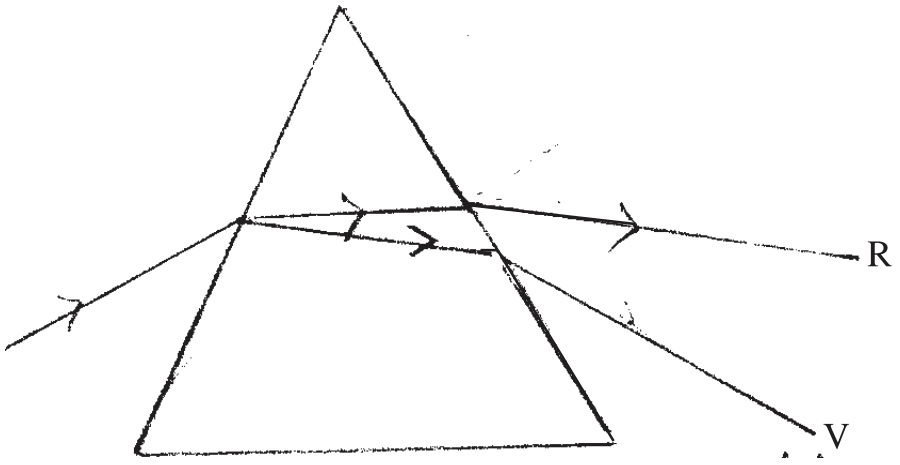
7. There should be no effort at 'moderation' of the marks by the evaluating teachers. The actual total marks obtained by the candidate may be of no concern of the evaluators.

8. 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.

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

MARKING SCHEME
CODE NO. 31/1/1
SECTION - A

1.	7 (seven)	1	1
2.	Tyndall effect - scattering of light by the colloidal particles.	1	1
3.	It will cause imbalance in the ecosystem.	1	1
4.	To freeze CFC production at 1986 levels as CFC depletes the ozone at the higher levels of the atmosphere.	1	1
5.	Valency is equal to the number of electrons in the outermost shell or 8 minus the number of electrons in the outermost shell.	1	
	Electronic configuration of X = 2, 7		
	Hence valency of X = 8 - 7 = 1	1	2
6.	The number of valence electrons indicate the group number of the element.	1	
	Example : $_{11}Na$ = 2,8,1		
	It belongs to the first group of the Periodic Table.	1	2
7.	Laws of reflection of light :		
	i) The incident ray, reflected ray and the normal at the point of incidence, all lie in the same plane.	1	
	ii) At the point of incidence, angle of incidence is equal to angle of reflection / $\angle i = \angle r$	1	2
8.	Dispersion of light : splitting up of white light into its constituent colours.	1	



1 2

9. Planets, being much closer to the earth are considered as extended source of light. Stars, being distant, are taken as point sized sources of light. The light coming from stars goes on varying due to atmospheric refraction producing twinkling effect. 1 1 2

10.

	Binary Fission		Multiple Fission
a)	Two (equal sized) daughter cells are produced.	a)	Several daughter cells are produced simultaneously.
b)	No cyst (protective covering) is formed around the parent cell.	b)	A cyst is formed around the parent cell.

2 2

11. Unisexual flowers are those which contain either stamens or carpels. ½
eg. papaya, watermelon (any one) OR any other suitable example. ½
Bisexual flowers one those which contains both stamens and carpels. ½
eg. Hibiscus, mustard (any one) OR any other suitable example. ½ 2

12. Characteristics of a good fuel :
Environment friendly
Pollution free
High efficiency
Easily accessible
Economical
Easy to store
Easy to transport
Any four 1,1 2

13. Non-renewable sources of energy :- sources of energy that can not be replenished in nature in a short period of time. 1
Examples – coal, petroleum, wood
or any other suitable example Any two 1 2

14. i) $CH_3COOH + C_2H_5OH \xrightarrow[-H_2O]{Acid} CH_3COOC_2H_5$

ii) $CH_3COO\,C_2H_5 \xrightarrow{NaOH} CH_3COOH + C_2H_5OH$

iii) $CH_4 + Cl_2 \xrightarrow{Sunlight} CH_3Cl + HCl$ 3x1 3

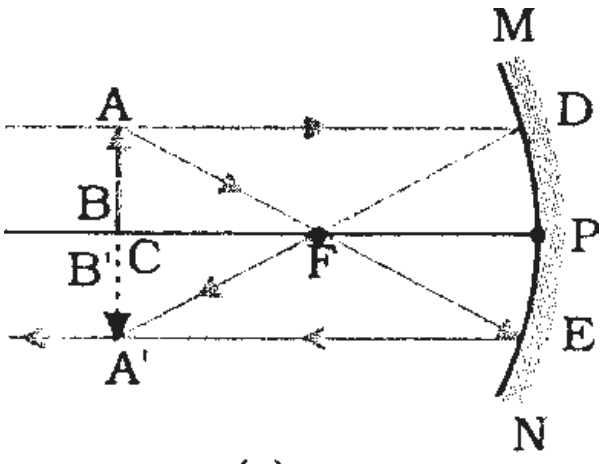
(or any other example)

15.

S.N.	Property	X	Y
(i)	Valence Electrons	1	2
(ii)	Valency 1	2	
(iii)	Metallic character	more	less
(iv)	Size of atoms	bigger	smaller
(v)	Formula of oxides	X_2O	YO
(vi)	Formula of chlorides	XCl	YCl_2

Note : ½ mark for each part to be awarded only if comparison is correct 6x½ 3

16.



ray diagram 1

directions of rays ½

Position of image – at C (centre of curvature) ½

Size – same size as the object ½

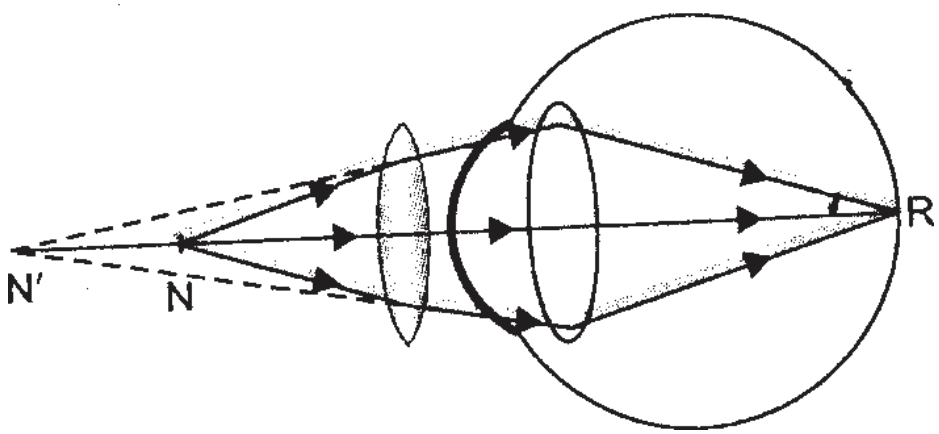
Nature – real and inverted ½ 3

17. Refractive index – Ratio of speed of light in vacuum (air) to the speed of light in the given transparent medium / refractive index = $\frac{\sin i}{\sin r}$ 1

It does not have any unit 1

Glass has higher refractive index 1 3

18. Defect of vision in which the person can clearly see distant objects but can not see nearby objects clearly. 1



1

The defect can be corrected using convex lens of appropriate focal length. 1 3

19. a) i) Bacterial diseases : Gonorrhoea, Syphilis

ii) Viral diseases : warts, HIV-AIDS 4x½

b) By using a covering called condom. 1 3

20. i) Study of homologous organs suggests that the organisms having same structure of organs but performing different functions have evolved from a common ancestor. ½

eg. forelimbs of a frog, lizard, bird and man ½

ii) Analogous organs show adaptations of organs for common use ½

eg. wings of butterfly and wings of bat ½

iii) The fossil Archaeopteryx looks like a bird but bears a number of other features found in reptiles. This observation provides a clue that the birds have evolved from reptiles. 1 3

21. i) Speciation is evolution of a new species from a group of individuals of a species.

This occurs due to variations / genetic drift / geographical barrier (mountains, rivers etc.) leading to incapability to reproduce amongst themselves in a population. 1 ½

ii) Natural Selection: is a process by which the organisms that are adapted suitably to their environmental conditions are allowed to survive and

reproduce while those which are not adapted to their environment are eliminated. 1

In a population of beetles, a new variation (green colour) gets survival advantage to red beetles whereas others (red) perish. ½ 3

22. 1) Both male and female parent contribute equally to the DNA of the progeny during sexual reproduction. 1

2) Each parent contributes one set of genes / chromosomes through its germ cell / gamete. 1

3) When the two germ cells/gametes of male and female parent combine during sexual reproduction (fertilisation) normal number / two sets of chromosomes containing genes / DNA is restored to in the progeny. 1

(Thus equal genetic contribution of male and female parent is ensured) 3

23.

S.N.	Property	Ethanol	Ethanoic Acid
(i)	Physical state	liquid	liquid
(ii)	Taste	pungent / bitter or any other answer	sour
(iii)	$NaHCO_3$ Test	No reaction	Evolution of CO_2 brisks effervescence
(iv)	Ester Test	forms ester with ethanoic acid	forms ester with ethanol

4x1

b) $CH_3CH_2OH \xrightarrow{\text{conc. } H_2SO_4} CH_2 = CH_2 + H_2O$ 1 5

OR

a) Soap is the sodium / potassium salt of a long chain carboxylic acid. 1

Soaps are not suitable for washing in hard water due to formation of scum / insoluble precipitates which are formed due to reaction between soap and calcium / magnesium ions present in hard water. 2

b) Soap molecules suspend in water to form miscelles, i.e., the ionic part entraps the oily dirt particles. The dirt gets lifted with water and is washed off. 2

24. a) Concave lens 1

b) Optical centre 1

c) i) $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

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

$= \frac{1}{(+20)} + \frac{1}{(-30)}$

$= \frac{1}{20} - \frac{1}{30} = \frac{3-2}{60}$

$\frac{1}{v} = \frac{+1}{60}$

$\therefore v = +60$ cm 1

ii) $m = \frac{v}{u}$

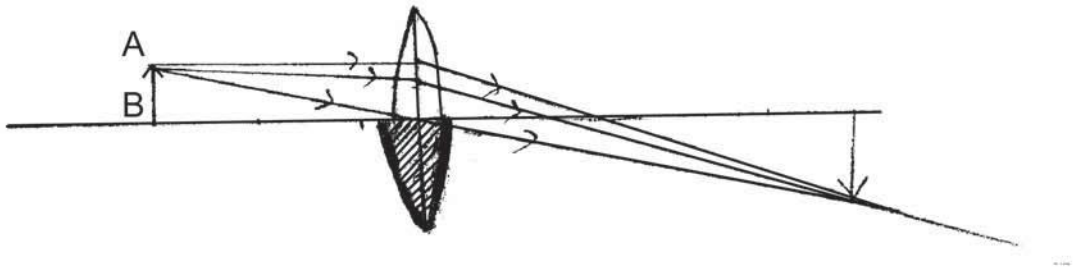
$= \frac{+60 \text{ cm}}{-30 \text{ cm}}$

$m = -2$ 1

iii) Nature : Real and inverted 1 5

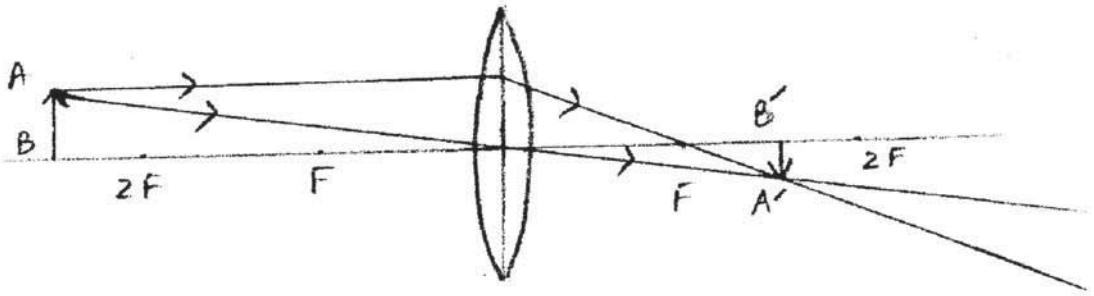
OR

a) Yes ½



1

b) i) 1



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

$\therefore \frac{1}{v} = \frac{1}{f} + \frac{1}{u}$

$= \frac{1}{(+10)} + \frac{1}{(-25)} = \frac{5-2}{50} = \frac{+3}{50}$

$\therefore v = \frac{+50}{3} = +16.67$ cm 1

$\frac{h'}{h} = \frac{v}{u}$

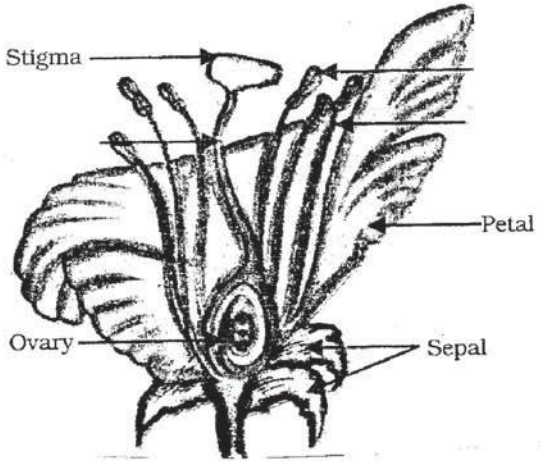
$h' = \frac{v}{u} \times h$

$= \frac{+50}{3} \times \frac{1}{(-25)} \times (+5)$

$h' = \frac{-10}{3} = -3.33$ cm 1

Nature : real and inverted ½ 5

25. Correct diagram of (bisexual / unisexual female flower) 1



4 labels 4x½

Male part : stamen. 1

Female part : Carpel / Pistil 1

5

OR

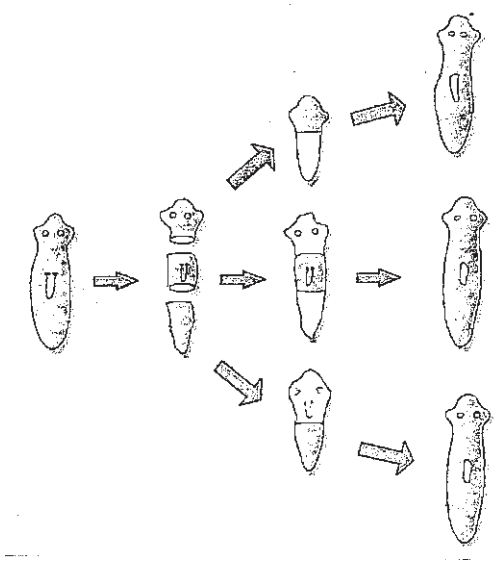
a) Fragmentation is a mode of reproduction in which an individual breaks up into a (multiple) number of pieces/fragments. Each fragment grows into a new individual ½,½

Example : Spirogyra reproduces by this method / any other suitable example. 1

b) Regeneration is the ability of an organism to replace its lost body parts. 1

If Planaria is cut into pieces, a small fragment (about 1/6 mm) is capable of regenerating into a complete individual. 1

Diagram 1



SECTION - B

26. (4) 1x16 16

27. (1)

28. (4)

29. (2)

30. (1)

31. (4)

32. (4)

33. (2)

34 (1)

35. (3)

36. All options correct- 1 mark to be awarded for any option

37. (2)

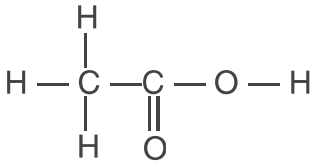
38. (3)

39. (3)

40. (1)

41. (4)

MARKING SCHEME
CODE NO. 31/1
SECTION - A

1.  1 1

2. Reddening of the sun at sunrise and sunset / appearance of blue colour of sky / passing of light through a colloidal solution / beam of light enters a smoke filled room through a small hole, particles of smoke become visible. 1 1
or any other suitable example.

3. Progressive accumulation of harmful nonbiodegradable chemicals in the bodies of living organisms at each trophic level / in a food chain. ½, ½ 1

4. Indiscriminate use of DDT / pesticide has led to degradation of soil / water bodies. 1 1

5. It remains the same. 1
ii) It first increases and then decreases 1 2

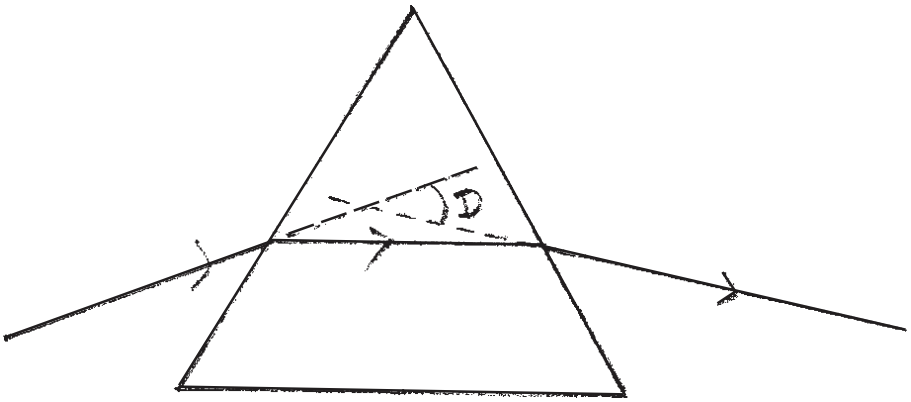
6. The element with atomic number 12 / 38 (or both) 1
Reason : These elements have same number of valence elements as calcium. 1 2

7. i) Erect
ii) Laterally inverted
iii) Same size as the object
iv) As far behind the mirror as the object in front of it / image distance = object distance

v) Virtual

Any 4 characteristics 4x½ 2

8.



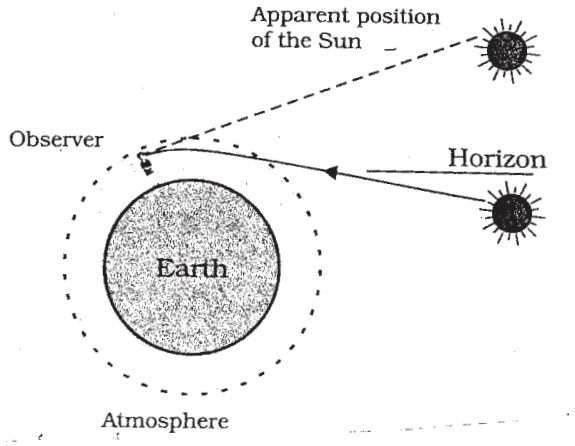
a) PQ – incident ray

b) RS – emergent ray

c) ∠D – angle of deviation

Diagram (above) with directions 4x½ 2

9. Diagram 1



Since atmosphere near the earth is denser so ray of light when enters from rarer to denser medium keeps bending towards the normal.

To the observer, these rays appear to come from apparent position which is above the horizon. 1 2

10 ´ it is the only method of multiplication of those plants which do not produce viable seeds.

- they can bear flowers and fruits earlier than those produced from seeds.
- cheaper, easier and rapid method of propagation
- all plants are genetically similar to the parent plant. 4x½ 2

11. a) The egg is carried from the ovary to the womb through the fallopian tubes. 1
    b) Fertilisation takes place in the fallopian tubes. 1 2

12. 1. The fossil fuels are non-renewable sources of energy.
    2. Air-pollution is caused by burning of fossil fuels.
    3. The oxides of C, S and N are released on burning fossil fuels which lead to acid rain.
    4. CO_2 produced by burning these fuels causes green house effect. 2

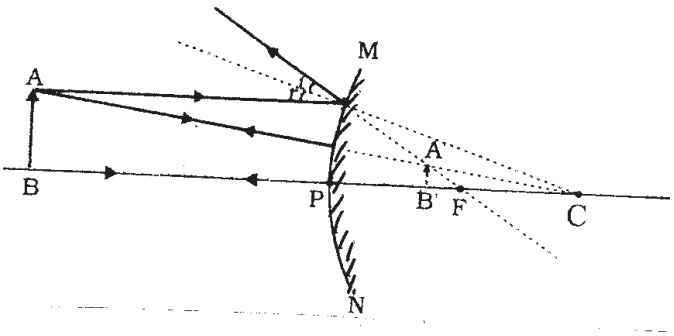
    4x½

13. Renewable resources : Forest, Sun (any other)
    Non-renewable resources : coal, petroleum (any other) 4x½ 2

14. i) $2\ CH_3COOH + 2\ Na \longrightarrow 2\ CH_3COONa + H_2$
    ii) $2\ CH_3COOH + Na_2CO_3 \longrightarrow 2\ CH_3COONa + H_2O + CO_2$
    iii) $CH_3COOH + NaOH \longrightarrow CH_3COONa + H_2O$ 3x1 3

    Note : Full marks to be awarded if the products are correct.

15. i) 6
    ii) 2
    iii) 16^{th}
    iv) Non-metal
    v) Acidic
    vi) X Cl_2 (any other symbol in place of X may be accepted) 6x½ 3

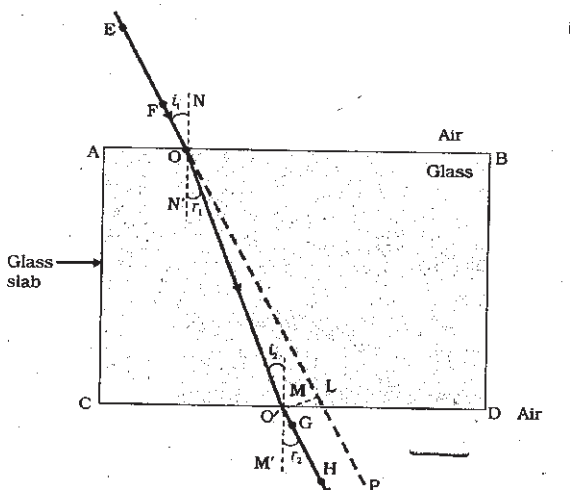
16. 

{ Diagram with correct directions & image to be shown as dotted 1½

Position	–	Between P and F behind the mirror	½	
Size	–	Diminished	½	
Nature	–	Virtual and erect	½	3

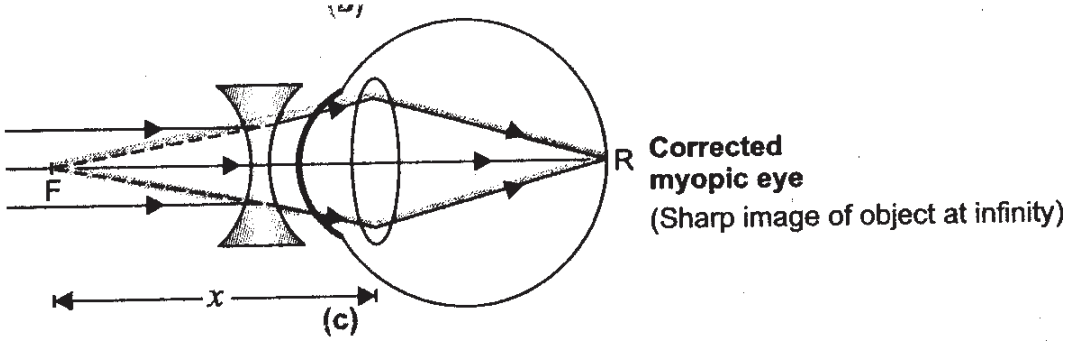
17. Principle of reversibility of light –

If the path of a ray of light is reversed after suffering a number of refractions then it retraces its path ie. the path of a ray of light is reversible 1



2 3

18. Defect of vision in which the person can clearly see nearby objects but distant objects can't be seen clearly by him. 1



1

It can be corrected by using a concave lens / diverging lens of suitable power. 1 3

19. • HIV : Human Immunodeficiency Virus 1

• Yes 1

- Modes of spread

1) use of infected needles and syringes.

2) transfusion of infected blood.

3) from infected mother to the child.

4) unsafe sexual contact with the AIDS infected partner 1 3

Note : One Marks to be awarded to any one mode

20. 1) Survival Advantage / Natural selection: For eg. in a population of red and green beetles, green got a survival advantage and increased in number. ½,½

2) Accidental advantage / genetic drift, taking example of natural or man-made calamities whereby a population decreases in number, few survive and increase in number. ½,½

3) Suitable adaptation ability to cope up in adverse environmental conditions. ½,½ 3

21. Award 3 marks to the candidate even if not attempted. 3

22. • Fossils are the remains or traces of animals and plants of the past found embedded in rocks. 1

• Pre-historic organisms existed in the past and now extinct. 1

• Evolutionary relationship of organisms can be studied. 1 3

23. 1) Catenation

2) Tetravalency

3) Isomerism

4) Multiple bond formation (any two) 1+1

The ionic part (hydrophillic part) of the soap molecule dissolves in water due to its similar (polar) nature to water, so miscelles are formed. 2

Since there is no ionic / charged part in ethanol molecule, no miscelle is formed 1 5

OR

The phenomenon due to which organic compounds having the same molecular formula have different structures is called isomerism. 1

Characteristics :

1. Isomers have same molecular formula.
2. Isomers have different structural formulae.
3. Isomers have same molecular mass.
4. Isomers have different physical properties.
5. Isomers have different chemical properties.

Note : Any four characteristics 4×½

Two structures :

1) $CH_3 — CH_2 — CH_2 — CH_3$ 1

2) $CH_3 — \underset{\displaystyle CH_3}{\underset{|}{CH}} — CH_3$ 1 5

24. a) Reciprocal of focal length of a lens / Degree of convergence or divergence of light rays achieved by a lens. 1

b) Unit – dioptre 1

1 dioptre is the power of a lens whose focal length is 1 metre 1

c) $f_1 = +25 \text{ cm} = \frac{+25}{100} \text{ m}$

$P_1 = \frac{1}{f_1} = + \frac{100}{25} = + 4D$ 1

$f_2 = – 10 \text{ cm} = \frac{-10}{100} \text{ m}$

$P_2 = \frac{1}{f_2} = \frac{-100}{10} = – 10 \text{ D}$

$P = P_1 + P_2 = + 4D – 10D = – 6D$ 1 5

OR

a)

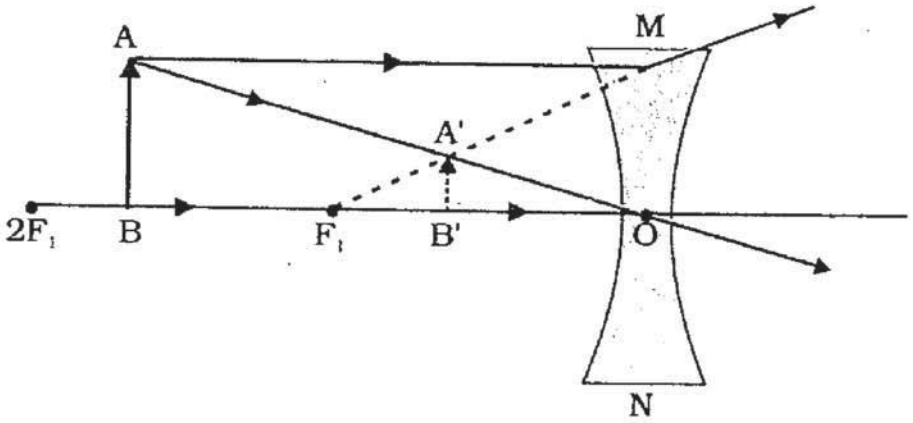


diagram 1½
correct directions ½

b) i) $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

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

$= \frac{1}{(-10)} - \frac{1}{(-15)}$

$= \frac{-3+2}{30}$

$= -\frac{1}{30}$

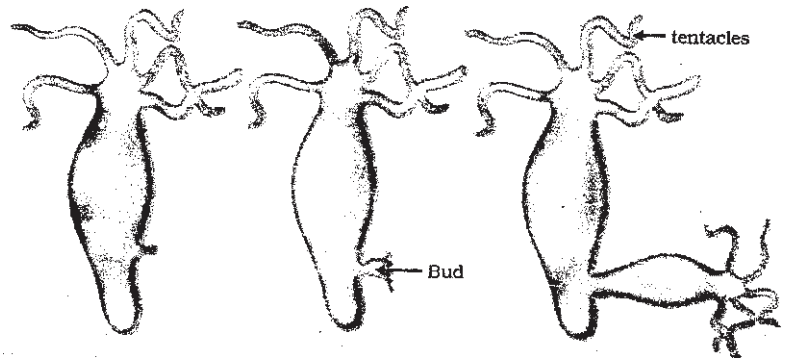
$\therefore u = -30$ cm 1

ii) $m = \frac{v}{u}$

$= \frac{-10 \text{ cm}}{-30 \text{ cm}} = +\frac{1}{3}$ 1

iii) Nature : virtual and erect 1 5

25.



3

1) In Hydra, a bud develops as an outgrowth due to repeated cell division at a specific site. 1

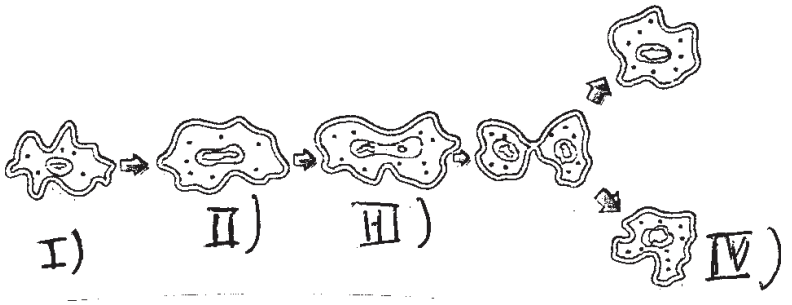
2) These buds develop into tiny individuals and when fully mature, detach from the parent body and become a new independent individual. 1 5

OR

Binary fission in Amoeba :

It is a mode of asexual reproduction in which one cell divides into two daughter cells from a parent cell.

1



I) Parent cell (II) parent cell with constricted nucleus.

III) two nuclei in parent cell showing cytoplasmic constriction (IV) two daughter cells 4x½

Note : Only two marks to be given if diagram without labelling of four steps

Four labels on the diagram OR described as below :

1) The nucleus elongates and divides into two nuclei.

2) A constriction then appears on the cell membrane, which gradually increases inwards and divides the cytoplasm into two parts.

3) Finally the two daughter cells are formed

4) Each daughter amoeba develops into an adult organism. 4x½ 5

SECTION - B

26.	(D)		16x1	16
27.	(A)			
28.	(A)			
29.	(D)			
30.	(C)	/ If the candidate writes 'none of these' 1 mark to be awarded		
31.	(B)			
32.	(A)			
33.	(A)			
34	(B)			
35.	(C)			
36.	(B)			
37.	(A)			
38.	(C)			
39.	(D)			
40.	(C)			
41.	(B)			

MARKING SCHEME

CODE NO. 31(B)

SECTION - A

1.	4		1	1
2.	Production of new plant from the vegetable parts (root, stem and leaves) of a parent plant.		1	1
3.	Inheritence of characters from parents to off springs.		1	1
4.	(i)	Behind the mirror	½	
	(ii)	Virtual and erect	½	1
5.	Hydrogen can be placed in group 1 because it has 1 electron is its outermost shell		1	
	Hydrogen can be placed in group 17 because it needs 1 electron to achieve stable noble gas configuration		1	2
6.	(a)	2,8,2	1	
	(b)	$2X + O_2 \rightarrow 2X\,O$ / $2Mg + O_2 \rightarrow 2\,MgO$	1	2
7.	The pair of chromosomes that determines the sex of an individual x and y		½,½	
	Sex Chromosome of male x y		½	
	Sex Chromosome of female x x		½	2
8.	The direction of propagation of light in the 2nd medium changes. Change in the speed of light as it moves from one medium to another of different optical density.		1 1	2
9.	(i)	40^o	½	
	(ii)	55^o	½	
	Alternate angles are equal.		½	
	$\angle i = \angle e$ or incident ray and emergent ray are parallel.		½	2
10.	(i)	Near the horizon, most of the blue light is scattered away. The light that reaches our eye is red. (longer wavelength)	1	
	(ii)	Blue colour of the light is scattered more and it reaches our eye.	1	

11. Use of non renewable sources. Need for conservation so that it can last longer. ½+½ 1

Air pollution, acid rain, global warming/green house effect. (any two) ½+½ 1

12. Phytoplankton/Algae → Zooplankton fish or any other aquatic

consumers → Aquatic bird / Big fish ½x4 2

13. In reuse strategy, energy is saved whereas in recycling some amount of energy is used. 1

example : reuse of jam bottles/plastic containers/used envelopes (any one example) 1 2

14. C_2H_5OH and CH_3COOH ½,½ 1

Physical properties

Ethanol Ethanoic acid 2x½ 1

(i)	Sweet Smell	Purgent smell like vinegar.
(ii)	Melting point/boiling point low	metting point/boiling point high.

Chemical Properties

	Ethanol	Ethanoic acid
(i)	No evolution of gas with Na_2CO_3 or $NAHCO_3$	Evolution of CO_2 with brisk effervescence on reaction with Na_2CO_3 or $NAHCO_3$
(ii)	No change in the colour of litmus	Turns blue litmus red.

2x½ 1

15. (i) K, Ca, Sc 1

(ii) Mg/Sr/both 1

(iii) Sr 1 3

16. Generation of a similar DNA molecule/replica by the cellular DNA, before cell division is called DNA copying 1

Two copies 1

DNA contains the blue print/information of the body design of an organism. Therefore its copying becomes essential for the transmission of characters from the parents to the offsprings / next generation. 1 3

17. Reproduction in which no gamete formation is involved/only one individual is involved in production of offsprings. 1

Mode in unicellular organisms : binary fission (amoeba), multiple fission (Plasmrodium), budding (yeast) (any two) 1

Mode in multicellular organisms: fragmentation, budding, vegetative propagation (any two) 1 3

18. $f = +10$ cm, $v = +15$ cm, $h_1 = +6$ cm, $u = ?$, $h = ?$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \text{ or } \frac{1}{u} = \frac{1}{v} - \frac{1}{f}$$ ½

$$\frac{1}{u} = \frac{1}{15} - \frac{1}{10} = \frac{2-3}{10} = \frac{-1}{30}$$ ½+1

$\Rightarrow u = -30$ cm

$$h_2 = \frac{v}{u} \times h_1$$

$$h_2 = \frac{15}{-30} \times 6 = -3 \text{ cm}$$ 1 3

19. The preserved traces of living organisms are called fossils. 1

When the body of an organism or its part gets trapped in hot mud, for example, it does not get decompose quickly and the mud will eventually harden and retain the impression of the body part to make it fossil. 1

The fossils which are closer to the surface of the earth are recent than the fossils which are found in the deeper layers.

By detecting the ratio of different isotopes of the same element in the fossil material. (any one) 1 3

20. The ancestors of **Homo Sapiens** can be traced to Africa from where some migrated to other parts of the world. 1

There was lot of forward and backward migrations for several thousands of years 1
and mixing with each other resulting into new combinatons and variations. 1 3

21. Defect of vision in which a person can see distant objects clearly and not the nearby objects clearly. 1

Causes :- focal length of the eye lens too long. ½

eye ball too small. ½ 3

22. Myopia/Short Sightedness 1

(i) Diverging ½

(ii) – 2 m ½

(iii) $P = \frac{1}{2} = -0.5D.$ 1 3

23. (a) Part of a hollow sphere whose one side is made reflecting ½

Concave
Convex ½

(i) Pole - Centre of the reflecting surface of the mirror. ½

(ii) Centre of curvature - Centre of the hollow sphere of which the mirror forms a part. ½

(ii) Principal axis - Straight line passing through the pole and centre of curvature. ½

(iv) Principal focus - Point on the principal axis at which all the rays parallel and close to the principal axis meet or appear to have diverged from after reflection. ½ 3

(b) u = – 40 cm

real, inverted and same sized image is formed only when the object is placed at 2F. 1

i.e. 2F = – 40 cm

f = – 20 cm

r = – 40 cm 1 2

OR

(a) A 1

(b) normal to the reflecting surface. 2

(c) Size increases 1

Nature remains the same. 1 5

24. (a) Conc. H_2SO_4 acts as a dehydrating agent/catalyst. 1

1

$C_2H_5OH \xrightarrow{Conc.H_2SO_4} C_2H_4 + H_2O$ 1

(b) Soap is the sodium/potassium salt of a long chain carboxylic acid. 1

Soap does not form lather with hard water./Soap forms insoluble precipitate (scum) in hard water. ½

A detergent is the ammonium of sulphonate salts of long chain carboxylic acid ½ 5

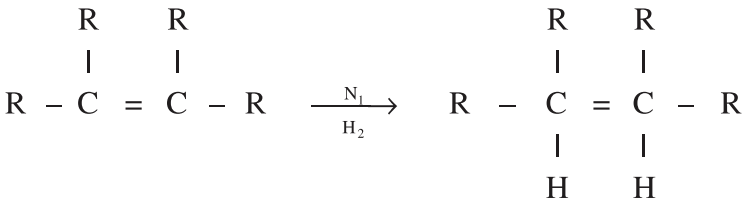
OR

(a) (i) B/C_3H_8 , has single bond between carbon atoms. ½+½

(ii) A/C_3H_6 , has a double bond between carbon atoms. ½+½

(iii) A - unsaturated hydrocarbons undergo addition reactions. ½+½

(b)



1

Hydrogenation/addition reaction 1 5

25.

	Sexual reproduction	Asexual reproduction
(i)	two parents involved	Only one parent involved.
(ii)	gametes are formed	no gametes are formed
(iii)	fertilisation occurs	no fertilisation occurs.
(iv)	involves division in which chromosomes number is reduced to half.	no such division.
(v)	variations are produced/ offsprings are not identical to the parent.	no variations produced/offsprings are alike.

5x1 5

OR

(a) Transference of pollen grains from stamen to stigma of a flower is called pollination. 1

Types:

Self pollination - Transfer of pollen grains from the anther of a flower to the stigma of the same flower/transfer of pollen grains within the same flower. 1

Cross pollination- Transfer of pollen grains from the anther of one flower to the stigma of another
(belonging to other plant of the same species) 1

(b)

	Pollination	**Fertilisation**
(i)	No fusion takes place	The male gamete (of the pollen tube) fuses with the female gamete (within the ovule)
(ii)	It requires agents like wind, water, animals	No such agents required

½x4 5

SECTION - B

26. (C) 16x1 16
27. (D)
28. (D)
29. (C)
30. (C)
31. (A)
32. (C)
33. (C)
34 (D)
35. (D)
36. (C)
37. (D)
38. (C)
39. (B)
40. (A)
41. (C)