CBSE X Date :	**MT EDUCARE LTD.** SUBJECT : **SCIENCE** **QUEST - II (Semi Prelim II)** **MODEL ANSWER PAPER**	**Set - A** Marks : 80 Time : 3 hrs.

SECTION - A

1. To preserve forest, maintain balance in the eco-system, prevent floods, droughts. **1**

2. Artificial methods of vegetative propagation include stem cuttings, grafting, layering and tissue culture. **1**

3. The addition of hydrogen to unsaturated hydrocarbon in the presence of catalyst is called hydrogenation. **1**
   Industrial application : Vegetable oils have long unsaturated carbon chains . These on hydrogenation in the presence of nickel catalyst form saturated carbon chains which are animal fats or ghee. Thus ghee on industrial scale is made by hydrogenation of naturally available vegetable oils. **1**

4. When one half of a convex lens is covered with a black paper the lens will produce a complete image of the object but the intensity of the image is reduced because rays from the top portion of the lens only are refracted and forms the image. **2**

5. $u = -25$ cm, $v = -100$ cm

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

$$= \frac{1}{-100} - \frac{1}{-25}$$

$$= \frac{-1}{100} + \frac{1}{25}$$

$$= \frac{3}{100}\,\text{cm}$$

$$\frac{1}{f} = \frac{3}{1}\,\text{m}$$

$\therefore \quad f = \frac{1}{3}$ m

$P = \frac{1}{f} = \frac{3}{1}$

$\therefore \quad P = +3D$ **3**

6. (a) The mirror is concave mirror. **1**

(b) The image is real inverted and of same size as that of the object. **1**

(c) Here, object is placed at centre of curvature, so the object distance is equal to the image distance. Since, screen is placed at distance of 50cm from the mirror, therefore,
object distance = image distance = 50cm
= Radius of curvature

$\therefore \quad f = \frac{R}{2}$

$= \frac{50}{2} = 25$ cm

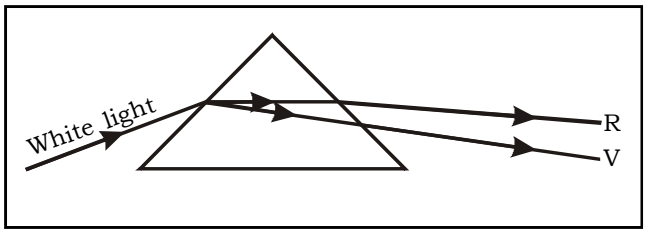
$\therefore$ Focal length of mirror is 25 cm. **1**

OR

6. (a) (i) It is the ability of the eye lens to adjust its focal length, according to the distance of object from it is called power of accommodath. **1**

(ii) In aged people, the flexibility of the eye muscles decrease and the power of accommodation reduces. **1**

(b) Correct the diagram is as shown : **1**



7. (a) The three common refractive defects of vision are : **1**

(i) Myopia(or near-sightedness) - It is corrected by using concave lens of appropriate power.

(ii) Hypermetropia (or far-sightedness) - It is corrected by using convex lens of appropriate power.

(iii) Presbyopia - It is corrected by using bifocal lens of appropriate power in which the upper part consists of a concave lens (to correct myopia) and lower part consists of convex lens (to correct hypermetropia). **1**

(b) $f = \frac{1}{P} = \frac{1}{4D} = \frac{1}{4}\text{m} = 25\text{ cm}$

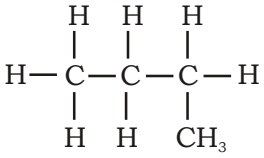
$v = 40\text{ m}, \frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$\frac{1}{u} = \frac{1}{v} - \frac{1}{f} = \frac{-3}{200}$

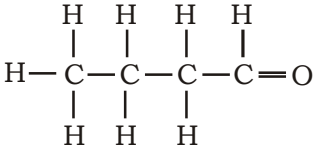
$u = \frac{-200}{3}\text{ cm}$

So candle should be placed $\frac{200}{3}$ cm from the lens. **1**

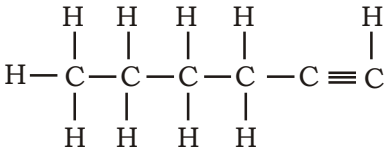
8. (i) Methyl propane **1**



(ii) Butanal **1**



(iii) Hexyne **1**



9. Electronic configuration of X and Y are 2, 7 and 2, 8, 7.
(i) X is placed in period 2 and Y in period 3. **1**
(ii) Y has larger atomic radius. **1**
(iii) They are chemically similar because both have 7 electrons in outermost shell. **1**

10. **3**

Binary fission	Multiple fission
1. In binary fission, the parent organism splits into two daughter nuclei, followed by division of cytoplasm, thus resulting into two identical individuals (daughter cells)	1. Multiple fission is the simultaneous division of the parent body into many daughter individuals.
2. It occurs during favourable conditions.	2. It occurs when an organism faces unfavourable environmental conditions.
3. Nucleus divides only once during this form of reproduction.	3. Nucleus divides repeatedly to form large number of nuclei.
4. Protective covering is not formed around an organism.	4. Protective covering, a cyst is formed around the organism during multiple fission.
5. Example:Amoeba, Paramecium.	5. Example : Plasmodium.

OR

10. **Bacterial infection :** Gonorrhoea **1**
Viral infection : Warts and HIV-AIDS **1**
Prevention : Use of condoms by male. **1**

11. The age of fossils can be estimated by two methods :
(a) **Relative method :**
When we dig into the earth we find fossils at different depths. The fossils which are closer to the surface of the earth are more recent, whereas the fossils found in the deepest layers of earth are the oldest ones.
(b) **Carbon Dating method :**
All the living objects contain some carbon-14 atoms which are radioactive. When a living objects dies and forms fossil, its C-14 radioactivity goes on decreasing gradually. In this method, the age of fossil is found by comparing the C-14 radioactivity left in fossils with C-14 radioactivity present in living objects today. **3**

12. (a) $u = -60$ cm,

$$f = \frac{R}{2} = \frac{3}{2} = 1.5 \text{ m}$$

$$m = +\frac{1}{2}$$

$$m = -\frac{v}{u} = \frac{1}{2}$$

$$\frac{1}{2} = \frac{v}{60}$$

$$v = 30 \text{ cm}$$

using mirror formula,

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

$$f = 60 \text{ cm}$$

Now $m = \frac{1}{3}$

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

$\therefore \quad \frac{1}{3} = \frac{-v}{u}$

$\therefore \quad v = \frac{-u}{3}$

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

$\therefore \quad \frac{-3}{u} + \frac{1}{u} = \frac{1}{f}$

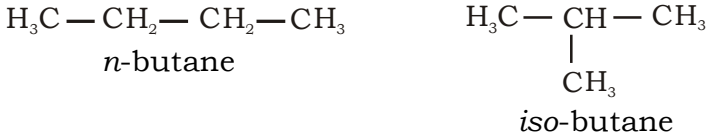
$\therefore \quad \frac{-3+1}{u} = \frac{1}{60}$

$\therefore \quad -2 \times 60 = 4$

$\therefore \quad u = -120 \text{ cm}$ **2**

(b) When a small electric lamp is placed at the focus of a convex lens a parallel beam of light is produced by the lens. **1**

13. The compounds that contain the same molecular formula but different structures are called structural isomers. For example, butane with the molecular formula, C_4H_{10} may exist in the following two isomeric forms :



n-butane

iso-butane **3**

OR

13. **3**

Mendeleev's Periodic Table	Modern Periodic Table
1. Elements are arranged in the order of increasing atomic masses.	1. Elements are arranged in the order of increasing atomic numbers.
2. There are nine vertical columns called groups.	2. There are eighteen vertical columns called groups.
3. Transition elements are arbitrarily placed together in group VIII.	3. Transition elements fit in the middle of long periods.

14. By following 3 R's :

(a) **Reduce:** Reduce or minimize the use of resources, by saving electricity by switching off unnecessary lights and fans etc. and by walking whenever possible.

(b) **Recycle:** Collect and recycle products like plastic, paper, glass and metal.

(c) **Reuse:** It is better than recycle. Instead of throwing used envelopes. We can reverse it and use it again. The plastic and glass containers, bottles can be reused. **3**

15. **Monohybrid cross :** It is a cross in which only one character is considered at a time, eg., in a cross between tall and dwarf plant, the size of stem is considered. Mendel made a cross between pure tall (TT) and a pure dwarf (tt) pea plant.

. . . . . F_1 generation. On selfing, these plants produced tall and dwarf plants in the ratio of 3 : 1. The genotypic ratio of 1 : 2 : 1 and phenotypic ratio of 3 : 1 is termed monohybrid ratio. **3**

16. (a) The pupil : It is the perforation in the iris through which light enters our eyes. The relaxation and contraction of the muscular fibres of the iris regulate the opening and closing of the pupil. Hence, it is the pupil that controls the amount of light entering our eyes.

(b) The retina is the light -sensing part of the eye which converts the incident light into electrical signals and sends them to the brain.

(c) Image distance, v = – 2 m, u = –∞

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

$= \frac{1}{-2} - \frac{1}{\infty}$

$\frac{1}{f} = \frac{1}{-2}$

$\therefore \quad f = -2$ m

Power of Lens,

$P = \frac{1}{-2} = -0.5$ D **5**

17. (A) (i) A is acetic acid ($C_2H_4O_2$). **1**

(ii) $CH_3COOH + C_2H_5OH \xrightarrow[H_2SO_4]{\text{Conc.}} CH_3COOC_2H_5 + H_2O$

(B)

Ethyl acetate **1**

conc. sulphuric acid helps to remove water.

(iii) Esters are sweet smelling compounds and on treatment with sodium hydroxide give alcohol and salt. Thus A can be obtained on heating B with NaOH.

$CH_3COOC_2H_5 + NaOH \longrightarrow C_2H_5OH + NaOOCH_3$

$NaOOCH_3$ on treatement with dilute HCl gives acetic acid. **1**

(iv) This process is called saponification. **1**

(v) CO_2 gas is produced when acetic acid (A) reacts with washing soda (Na_2CO_3).

$2CH_3COOH + Na_2CO_3 \longrightarrow 2CH_3COONa + CO_2 + H_2O$ **1**

OR

17. (A) Modern Periodic Law : "The physical and chemical properties of elements are the periodic function of their atomic numbers." The Modern Periodic Table is called 'long form' of the periodic table. **2**

(B) (i) As the effective nuclear charge on the valence electrons in metals is comparatively less, they have tendency to form cations. **1**

(ii) Fluorine atom is smaller than chlorine atom, as it has less number of shells (2 shells) as compared to that in chlorine (3 shells). **1**

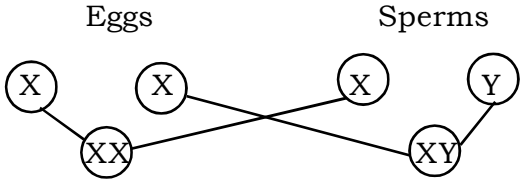
(iii) Non-metals have high nuclear attraction on the outermost shells and thus these have tendency to attract/gain electrons. **1**

18. (i) The local people obtain large quantities of firewood, timber and thatch from the forests.
(ii) Bamboo is used to make slats for huts and baskets for collecting and storing food materials.
(iii) Implements for agriculture, fishing and hunting are largely made of wood.
(iv) Forests are sites for fishing and hunting.
(v) Also they gather fruits, nuts and medicines from the forests. **5**

19. (i) Mirror A is plane mirror
Mirror B is convex mirror
Mirror C is concave mirror **2**
(ii) Mirror A reflects a parallel beam whereas mirror C reflects a converging beam. **1**
(iii) Mirror B reflects a parallel beam of light as a diverging beam. **1**
(iv) Mirror C which is a concave mirror. **1**

20. These elements belong to IIIrd period of the periodic table and can be systematically arranged as Na, Mg, Al, Si, P, S, Cl, Ar.
(i) Na **1**
(ii) Si **1**
(iii) Mg **1**
(iv) Na **1**
(v) Cl **1**

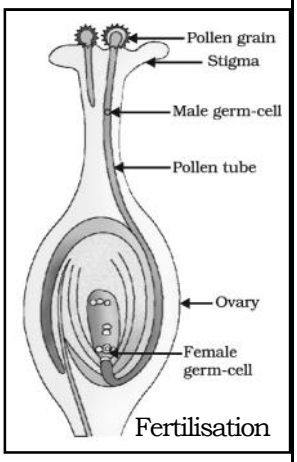
21. The process by which the sex of a person is determined is called sex determination.The chromosomes which determine the sex of a person are called sex chromosomes.These are of two types - X and Y chromosomes.
a) A man has one X and one Y chromosomes.
b) A women has two X chromosomes.
c) If a sperm carrying X chromosome fertilises an ovum which carries X chromosome, then the child will be a girl (XX).
d) If a sperm carrying Y chromosome fertilises an ovum which carries X chromosome, then the child will be a boy (XY).
e) The sperm cell determines the sex of the child because half of the sperms have X chromosomes and the other half have Y chromosome.



Zygote - Girl Zygote - Boy **5**

OR

21. (a) Fertilisation occurs when the male gamete present in pollen grain fuse with the female gamete present in ovule.
(b) When a pollen grain falls on the stigma of the carpel, it bursts, open and grows a pollen tube downwards through the style towards the female gamete in the ovary.
(c) A male gamete moves downwards the pollen tube. The pollen tube enters the ovule in the ovary. The tip of pollen tube bursts open and male gamete comes out of pollen tube.
(d) In ovary, the male gamete of pollen tube combines with the nucleus of female gamete to form a fertilised egg (zygote). **5**



Fertilisation

SECTION - B

22. **2**

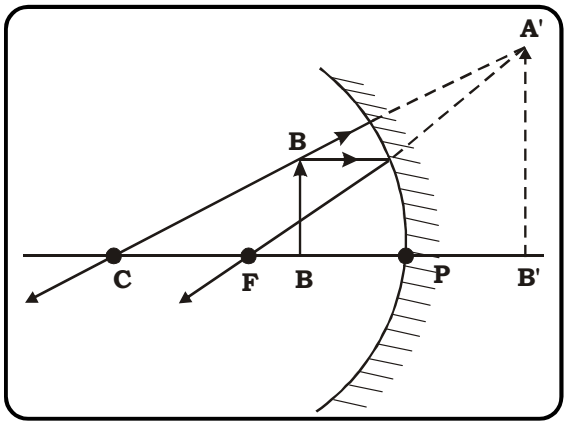
Soap	Detergent
1. When used with hard water a lot of it is wasted in removing Ca^{2+}/Mg^{2+} salts as curdy precipitate.	1. It forms good lather with hard water and thus can be safely used even with hard water.
2. It is completely oxidized to CO_2 by bacteria present in sewage and so it does not create any pollution problem in rivers.	2. Its excess use creates pollution problem in rivers since it is not fully bio-degradable.
3. It is obtained easily from edible oil.	3. It is obtained from costly petroleum products.

23. (i) When methanol is mixed with ethanol, the latter becomes undrinkable and is named as denatured alcohol. **1**
(ii) Acetylene mixed with oxygen burns giving large amount of heat which is used for welding purposes. **1**

24. Fewer individuals in a species impose extensive inbreeding among them. This limits the appearence of variations and puts the species at a disadvantage if there are changes in the environment. Since the individuals fail to cope up with the environmental changes, they may become extinct. **2**

25. (i) Roof top and underground rain water harvesting. **1**
(ii) Members show responsible behaviour, socially just interaction and team work. **1**

26. In order to obtain an erect image of an object with a concave mirror, the object should be at a distance less than its focal length. Here the focal length of concave mirror is 15 cm. So to obtain an erect image of the object by using this concave mirror, the object should be placed at any distance which is less than 15 cm from the mirror. The nature of image will be virtual and erect. The image will be larger than the object.



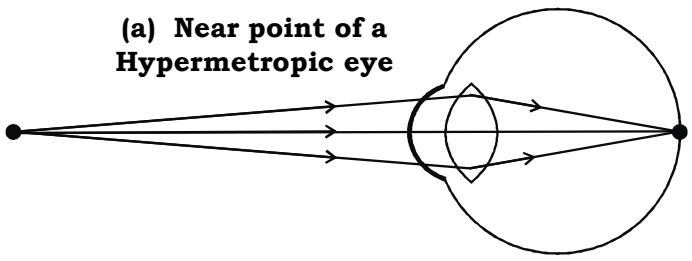
2

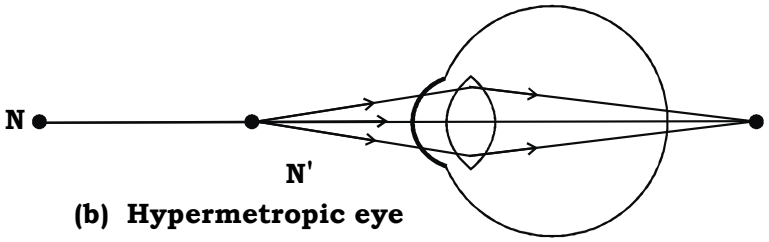
OR

26. (i) The image is formed behind the retina, defect of the eye is hypermetropia.
(ii) Causes of hypermetropia : **1**
(i) the focal length of the eyelens is larger.
(ii) the eyeball becomes too short, so that light rays from the nearby object, say at point N, cannot be brought to focus on the retina to give a distinct image.
(iii) Hypermetropia can be corrected by using convex lens of suitable focal length in spectacles. **1**

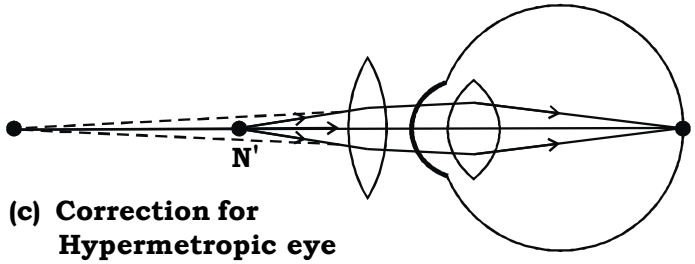
N

(a) Near point of a Hypermetropic eye





(b) Hypermetropic eye



(c) Correction for Hypermetropic eye

27. (i) Presbyopia.
(ii) He shall have to use a bifocal lens consisting of both kinds of lenses. Convex lens for long sightedness (hypermetropia) and concave lens for shortsightedness(myopia). **2**

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