Paper: **Science X Summative Assessment Term II Sample Paper - 1**

Total marks of the paper: 90   Total time of the paper   3 hrs

1]   Name the type of spherical mirror which   [Marks:1]
     (a) has +ve focal length.
     (b) always forms a virtual image.

2]   "Save the Tiger" campaign is being over emphasized these days by our Government.   [Marks:1]
     What may be the possible reason?

3]   Give any two ways in which biodegradable substances would affect the environment.   [Marks:2]

4]   What are sexually transmitted diseases? Name four such diseases. Which one of   [Marks:2]
     them damages the immune system of human body?
     (i) HIV-AIDS (ii)   Warts
     (iii) Syphilis   (iv)   Gonorrhea

5]   Both carbon and silicon belong to group 14 of the periodic table. But the tendency to   [Marks:2]
     exhibit catenation in carbon is much more than in silicon. Explain.

6]   List any two causes of our failure to sustain availability of underground water.   [Marks:2]

7]   (a) Refractive indices of media A, B, C and D are given below :   [Marks:3]

Medium	Refractive Index
A	1.33
B	1.44
C	1.52
D	1.65

     In which of these four is the speed of light maximum? Support your answer with
     reason. Find the refractive index of medium D with respect to medium A.
     (b) Mention two effects of atmospheric refraction of light.

8]   (a) Two thin lenses of power +3.5 D and -2.5 D are placed in contact with each   [Marks:3]
     other. Find the power and focal length of the lens combination.
     (b) A convex mirror used as a rear- view mirror in a car has a radius of curvature of
     3 m. If an approaching bus is located at a distance of 5 m from this mirror, how far
     its image appears in the mirror?

9]   (a) State the range of vision of a normal human eye.   [Marks:3]
     (b) A person has normal vision, but he cannot distinguish between red-green
     colours. Why? Inspite pf this disorder, why the person has normal vision?

10] Sania and Shreya are best friends and study in grade 4, recently, Sania has been   [Marks:3]
     facing difficulty in reading the black-board text from the last desk. Shreya is little
     uncomfortable and wonders why sania avoids sitting on the last desk. On
     observation she found that sania often carries junk food in her lunch. Shreya has
     started sharing her lunch – full of green vegetables and fruits with her. Sania is
     now better and has also started taking a 'balanced diet'.
     (i) Name the eye defect Sania is suffering from?
     (ii) What are the two possible causes of her eye defect?
     (iii) What values is shown by Shreya and Sania?

11] What were the two achievements of Mendeleev's periodic table? What was the basis   [Marks:3]
     of classification of elements in it?

12] Define isomerism? Illustrate with one example.   [Marks:3]

13] (a) Why are Group I elements of periodic table called as alkali metals?   [Marks:3]
     (b) Nitrogen (Atomic number 7) and phosphorus (Atomic number 15) belong to the
     same group of the periodic table. Write electronic configuration of these two
     elements. Which of these two is more electronegative? Why?

14] What is biological magnification? Will the levels of this magnification be different at   [Marks:3]
     different levels of the ecosystem? Where will the magnification maximum?

15] What is regeneration of an organism? Describe with a neat diagram about   [Marks:3]

regeneration in ' Planaria'.

16] What are analogous organs? Explain with examples. [Marks:3]

17] Mrs. Kumar is pregnant for the last three months and she goes for regular check-up to her doctor. During her last visit, the doctor asked Mrs. Kumar to get an ultrasound done. Both Mr. and Mrs. Kumar went to a radiologist and got the ultrasound done. Once the ultrasound is over, Mr. Kumar asked the doctor whether the baby in the womb is a boy or a girl. [Marks:3]
(a) What should the doctor reply to the couple?
(b) Is it ethical to determine the sex of a child?
(c) What should government do to discourage sex determination?

18] How many 'X' chromosomes are present in body cells of humans in a: [Marks:3]
(i) Male
(ii) Female?
(iii) Describe the role of sex chromosomes in deciding the sex of the child.

19] (a) Name the defect of vision in which the eye loses its power of accommodation due to old age. [Marks:5]
(b) The near point of a person suffering from hypermetropia is at 50 cm from his eye. What is the power of the lens needed to correct this defect? (near point of normal eye is 25 cm)
(c)With the help of ray diagrams, show the formation of image by
(i) a hypermetropic eye and (ii) correction of hypermetropia by using an appropriate lens.

20] (a) What type of spectacles should be worn by a person having the defect of myopia as well as hypermetropia? [Marks:5]
(b) The far point of a myopic person is 50 cm. What is the nature and power of lens required to correct the defect?
(c) With the help of ray diagrams, show the formation of image by (i) a myopic eye and (ii) correction of myopia by using an appropriate lens.

21] (a) Find the size, nature and position of image formed when an object of size 1 cm is placed at a distance of 15 cm from a concave mirror of focal length 10 cm. [Marks:5]
(b) In what way is the word AMBULANCE printed in front of the hospital vans? Why is it printed this way?

22] (a) A point object is placed at a distance of 12 cm from a convex lens on its principal axis. Its image is formed on the other side of the lens at a distance of 18 cm from the lens. Find the focal length of the lens. Is the image magnified? Justify your answer. [Marks:5]
(b) Why does a diamond sparkle?

23] (a) State the Modern Periodic Law. How have the element been arranged in the modern periodic table? Why is it considered that the position of hydrogen in the periodic table is anomalous? [Marks:5]
(b) An element X (2, 8, 2) combines separately with NO_3^- and $(PO_4)^{3-}$ radicals. Write the formulae of the compounds so formed. To which group of the periodic table does the element 'X' belong? Will it form covalent or ionic compounds with these radicals? How?

24] The atomic radii of the element of second period are given below: [Marks:5]

Second period element	B	Be	O	N	Li	F	C
Atomic Radii (pm)	88	111	66	74	152	64	77

(i) Arrange these elements in decreasing order of their atomic radii.
(ii) Are the elements now arranged in the pattern of a period in the periodic table?
(iii) Name the element which has the (i) largest and (ii) smallest atomic number.
(iv) From the above data, infer how the atomic size or atomic radius of the elements

changes as we go from left to right in a period.

(v) Name one metal, one non-metal and a metalloid out of these elements.

(vi) Why does atomic radius decreases as we move from left to right in a period?

|		
25]	How the process of fertilization takes place in plants? Draw labeled diagram to explain the process.	[Marks:5]
26]	What is meant by tissue culture? How this technique is performed? In which area this technique is finding its application.	[Marks:5]
27]	What is meant by menstruation and menstrual cycle? Explain the sexual cycle in females.	[Marks:5]
28]	Sketch a neat diagram of female reproductive system in human beings and label on it.(i) Fallopian tube (ii) ovary (iii) uterus (iv) cervix (b) Mention a change seen in a girl at the time of puberty (c) How do mechanical barrier devices prevent pregnancy?	[Marks:5]
29]	While performing the experiment of refraction through a glass slab, the path of a ray of light passing through a glass slab is traced by four students as shown in the figures below. Which of them is correct ?	[Marks:1]
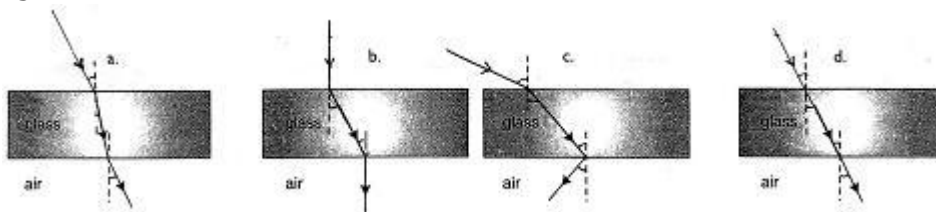
A. d   C. b

B. c   D. a

30] A school laboratory has one large window. To find the focal length of a convex lens   [Marks:1]
using one of the walls as the screen, the experiment may be performed

    A.   on the right side wall adjacent to the window

    B.   on the left side wall adjacent to the window

    C.   on the same wall as the window

    D.   near the wall opposite to the window

31] Teacher advises the student, that he should take the angle of incidence not more   [Marks:1]
than 60°. This is because for higher angle of incidence, the emergent ray

  A. none of these   C.   moves along the same path

  B. tends to move along the normal   D.   tends to graze along the slab

32] In an experiment to determine the focal length of a convex lens, a student obtained   [Marks:1]
a sharp inverted image of a distant tree on the screen behind the lens. She then
removed the screen and looked through the lens in the direction of the object. She
will see

    A.   no image as the screen has been removed

    B.   a blurred image on the wall of the laboratory

    C.   an erect image of the tree on the lens

    D.   an inverted image of the tree at the focus of the lens.

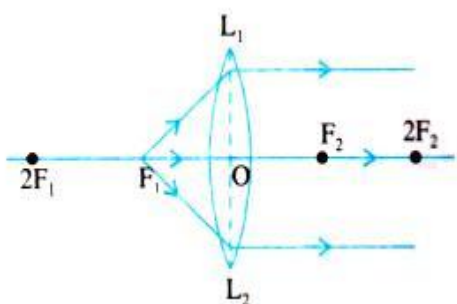33] Identify the correct ray diagram drawn by a student.   [Marks:1]

A.
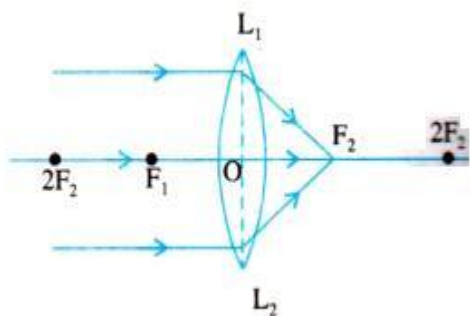
B.

.
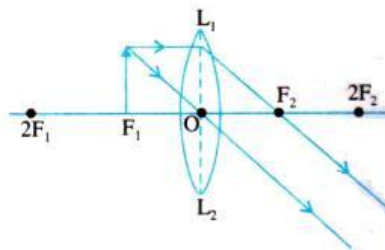
C.

D.   All are correct

34]   During the experiment "to trace the path of ray of light passing through the glass   [Marks:1]
prism", a student observed that in a particular case when $\angle i = \angle e$, the refracted ray
in prism will be

A. perpendicular to the base of the prism C. normal to the first refracting face

B. normal to the second refracting face   D. parallel to the base of the prism

35]   A student dips a blue paper in each of the following solutions. The solution which   [Marks:1]
turns blue litmus red is

A. Na_2CO_3 C. CH_3CH_2OH

B. $NaHCO_3$ D. CH_3COOH

36]   On adding sodium hydrogen carbonate to acetic acid, we immediately   [Marks:1]

A.   hear hissing sound   C.   notice formation of bubbles

B.   observe brown fumes   D.   observe strong effervescence

37]   If pH paper is dipped into acetic acid solution, it will become: [Marks:1]

A. Violet   C.   Blue

B. Green   D.   Orangish red

38]   Which of the following has lowest pH?   [Marks:1]

A. Na_2CO_3 C. CH_3COONa

B.   NaOH   D. CH_3COOH

39]   When acetic acid reacts with ethyl alcohol, we add conc. H_2SO_4. It acts as â€¦â€¦..   [Marks:1]
and the process is called â€¦â€¦â€¦â€¦â€¦â€¦

A.   Acid, esterification   C.   Reducing agent, esterification

B.   Oxidizing agent, saponification   D.   Dehydrating agent, esterification

40]   The gas evolved in the experiment shown here is: [Marks:1]
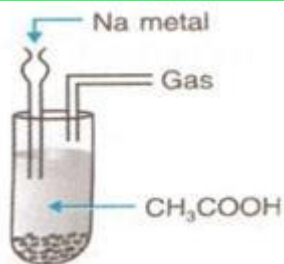
A. O_2 C. CO_2

B. CO D. H_2

41] The diagram, showing daughter amoeba formed after binary fission, is : [Marks:1]

A. II C. IV

B. I D. III

42] The budding in yeast is illustrated by the diagram : [Marks:1]

A. C B. B C. A D. D

43] The process represented in the diagram below is the : [Marks:1]

A. Budding in amoeba C. Gamete formation in amoeba

B. Spore formation in amoeba D. Binary fission in amoeba

44] A student soaked 10 g of raisins in 50 mL of distilled water in two beakers A and B each. She maintained beaker A at $25^{o}C$ and beaked B at 50° C. After an hour, the percentage of water absorbed will be. [Marks:1]

A. The same in both A and B C. Exactly twice as much in B as in A.

B. More in A than in B D. More in B than in A

45] Binary fission in amoeba is illustrated by the diagrams [Marks:1]

A. A, B, C, D B. B and C

C. B and D D. A and C

46] What is the inference drawn from the experiment to determine the percentage of water absorbed by raisins? [Marks:1]

A. Distilled water enters raisins because of exosmosis

B. Water moves out of raisins due to endosmosis

C. Water moves out of raisins due to exosmosis

D. Distilled water enters raisins because of endosmosis

Paper: **Science X Summative Assessment Term II Sample Paper – 1[Solution]**
Total marks of the paper: 90   Total time of the paper   3 hrs

Solution Sample paper-01

1]   (i) convex mirror
      (ii) convex mirror

2]   To maintain ecological balance in nature and to preserve the gene pool.

3]   (i) They may produce foul smell during decomposition process.
      (ii) They may produce some harmful gases such as ammonia, methane, carbon dioxide,
      etc., which can further cause global warming.

4]   The infectious diseases that spread from infected to a health person by sexual contact are
      called Sexually Transmitted Diseases (STDs). HIV-AIDS damages the immune system of
      human body.

5]   The size of carbon atom is small as compared to that of silicon. Therefore, C-C bond is
      smaller and stronger than Si-Si bond. As a result, any number of carbon atoms can be
      linked to each other resulting in a large number of carbon compounds.

6]   Two causes which led to the failure of sustaining the availability of underground water are:
      (i) Population: With the increase in population the demand of water is also increasing which
      is depleting the underground water.
      (ii) Industrialization: As the industries need more water to manufacture its goods; this led
      to decrease in the level of underground water.

7]
    (a) Speed of light in a medium $\propto \dfrac{1}{\text{refractive index of the medium}}$
    As refractive index of medium A is the least, so speed of light in A is maximum.
    The refractive index of medium D with respect of A $= 1.33/1.65 = 0.80$
    (b) Twinkling of stars, advanced sunrise and sunset.

8]   (a) $P_1 = +3.5\ D$, $P_2 = -2.5\ D$

        Power of combination, $P = P_1 + P_2$
                  $= 3.5 - 2.5 = 1\,D$

        Focal lenght, $f = \dfrac{1}{P} = \dfrac{1}{1} = 1\,m$

        (b) $R = 3m$ $\dfrac{1}{f} = \dfrac{1}{v} + \dfrac{1}{u}$ $\dfrac{1}{v} = \dfrac{1}{5} + \dfrac{2}{3} = \dfrac{10+3}{15}$

           $f = \dfrac{3}{2} = 1.5\ m$ $\dfrac{1}{\frac{3}{2}} = \dfrac{1}{v} + \dfrac{1}{-5}$ $v = \dfrac{15}{13} = 1.15\ m$

           $u = -5m$

9]   (a) Range of vision - from infinity to about 25 cm.
      (b) A person who is blind to red-green colours may be deficient in cone shaped cells having
      red and green pigment in the retina of his eyes. It is a genetic disorder and not a refractive
      defect of vision. That is why the person has normal vision.

10]   (i) Myopia or short sightedness
      (ii) Tow possible causes-
      (a) excessive curvature of the eye lens
      (b) elongation of the eyeball.
      (iii) Friendship, concern for each other, value and balanced die

11]   The two achievements of Mendeleev's periodic table were:

(i) Mendeleev adjusted few elements with a slightly greater atomic mass before the elements with slightly lower atomic mass, so that the elements with similar properties could be grouped together.

(ii) Mendeleev left some gaps in his periodic table. He predicted the existence of some elements that had not been discovered at that time. His predictions were quite true as elements like scandium were discovered later.

In Mendeleev's periodic table, the elements were arranged on the basis of their fundamental property, the atomic mass and also on the similarity of chemical properties.

12] Compounds having the same molecular formula but different structures are called structural isomers and the phenomenon is called structural isomerism.

eg: 4 carbon atoms in C_4H_{10} can be arranged in 2 different ways. ∴ C_4H_{10} has two isomers. These are n-butane and iso-butane
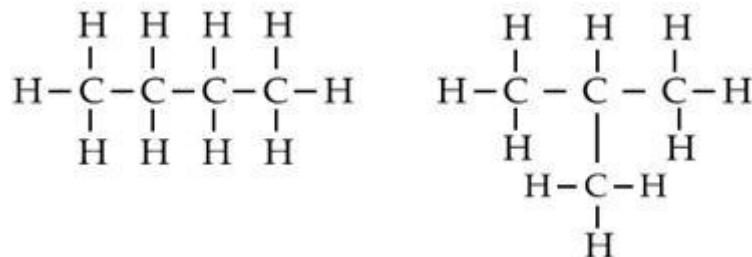
13] (a) Group I elements form alkalis when they react with water hence they are called alkali metals.

(b) N - 2, 5
P - 2, 8, 5

Nitrogen is more electronegative than phosphorus because of smaller size and high nuclear charge.

14] The accumulation of harmful chemicals in the body of living organisms at different trophic levels in a food chain is called biological magnification.

Yes, the concentration of these harmful chemicals will be different at different levels of the ecosystem.

It will be maximum at the last trophic level which is mostly the top carnivores (quaternary consumers).

15] Regeneration is the ability of an organism to grow into a complete individual if its body is into any number of pieces. If can be seen in Hydra and Planaria.
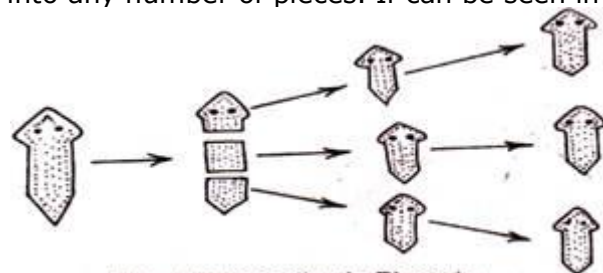

Fig. Regeneration in Planaria.

Regeneration is carried out by specialized cells which proliferate and further make large number of cells. From this mass of cells, different cells undergo changes to become various cell types and tissues. These changes take place in an organized sequence referred to as development.

16] The organs which are similar in function or appearance but differ in structure and development are called analogous organs.

Fig. Wings of a bird and an insect showing analogous features.

The wings of a bird and an insect are developmentally and structurally different from each other. Skeleton, flesh and feathers support bird's wings. The insects have a fold of membrane as wing, which is associated with few muscles. Wings of birds and insects are structurally different but perform the same function of flying. They are therefore, termed as analogous organs.

17] (a) The doctor should not tell the sex of the foetus.
(b) No, it is not ethical to determine the sex of a child.
(c) The government should ban the process of sex determination and should punish or fine whosoever does so.

18] (i) In the body cells of human males one X and one Y chromosome is present. 50 percent male gametes (sperms) carry X-chromosome and the remaining 50 percent carry Y-chromosome.
(ii) The body cells of human female carry two X-chromosomes. Females produce gametes (ova) with similar type of chromosomes, all carry one X-chromosome.
(iii) Sex chromosomes in males are XY type while in female they are XX type. When a sperm carrying X- chromosome fertilizes an egg, the zygote develops into a female (XX condition). When sperm carrying Y chromosome fertilizes an egg, the zygote develops into a male (XY condition).

19] (a) Presbyopia
(b) $v = -50$ cm
$u = -25$ cm
Using lens formula
$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$
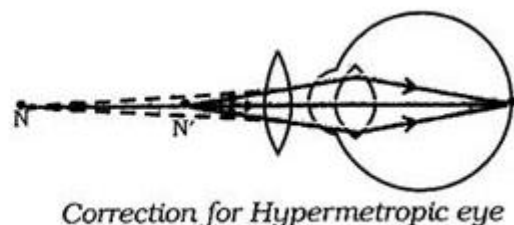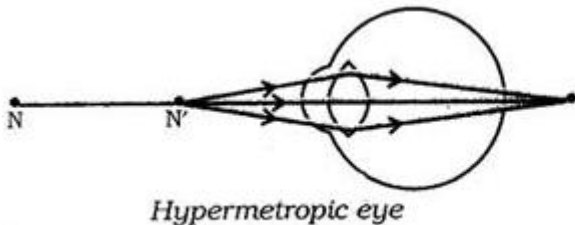$$= \frac{1}{-50} - \frac{1}{-25} = \frac{-1+2}{50} = \frac{1}{50}$$
$f = 50$ cm

Power of the lens, $p = \dfrac{1}{f\,(m)} = \dfrac{100}{f(cm)}$

$p = \dfrac{100}{50} = 2D$

(c)

Hypermetropic eye   Correction for Hypermetropic eye

20] (a) Spectacles having bifocal lens

(b) $u = \infty$

$v = -50$ cm

Using lens formula

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

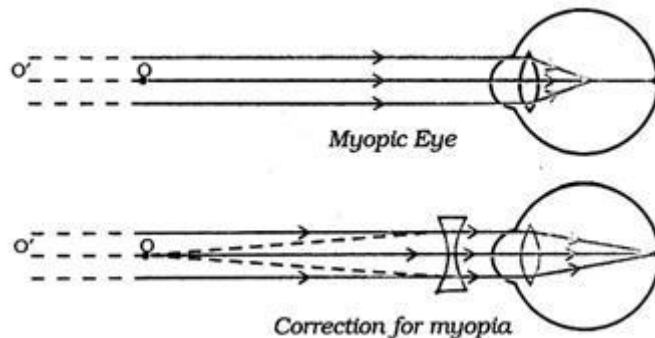$$\frac{1}{f} = \frac{1}{-50} - \frac{1}{\infty}$$

$f = -50$ cm

Power of lens, $P = \frac{1}{f} = \frac{100}{-50} = -2D$

Nature of lens – concave

(c)

Myopic Eye

Correction for myopia

21] (a) $u = -15$ cm

$f = -10$ cm

$v = ?$

$h' = ?$

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

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

$$\frac{1}{v} = \frac{1}{-10} - \frac{1}{-15} = -\frac{1}{30}$$

$v = -30$ cm

Image is formed at a distance 30 cm on the side of the object. Negative sign indicates that object and image are on the same side.

The image is in front of the mirror, its real and inverted.

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

$$h' = 1 \times -\frac{-30}{-15} = -2 \text{ cm}$$

Size of image is 2cm. It is magnified.

(b)
The word AMBULANCE on the hospital vans is written in the form of its mirror image as ƎƆИA⅃UᗺMA because any vehicle, which is ahead of the ambulance van, can see the laterally inverted alphabets correctly from his rear view mirror and make way for it to pass through.

22] (a)

$u = -12$ cm, $v = 18$ cm, $f = ?$

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

$$\frac{1}{18} + \frac{1}{12} = \frac{1}{f}$$

$f = 7.2$ cm

(Image formed on the other side of the object means it is real. As $f=7.2$ cm and $u=-12$ cm, object is between f and 2f, so image is magnified and is formed beyond 2f)
or $m = v/u = 18/(-12) = -3/2$
As $3/2>1$, hence image is magnified.
(b) The refractive index of diamond is very high. The faces of diamond are cut in such a way that the light entering into the diamond suffers total internal reflection repeatedly.

23] (a) Modern Periodic Law states that the properties of elements are periodic functions of their atomic numbers.
In increasing order of atomic number, hydrogen can be placed in group 1 with alkali metals as well as with halogens in 17th group.
(b) Three compounds formed -
XSO_4, $X(NO_3)_2$, $X_3(PO_4)_2$
X belongs to 2nd group
X will form ionic compound because it is a metal and the radicals are of non-metals.

24] (a) Li   Be   B   C   N   O   F
       152   111   88   77   74   66 64
(b) Yes, the elements are now arranged in the pattern of a period of periodic table.
(c) Li has the smallest atomic number
F has the largest atomic number
(b) Atomic radius decreases on moving from left to right in a period of the periodic table.
(c) Metal: Li; Non-metal: C; Metalloid: B
(d) Atomic radius decreases because force of attraction for the outermost electrons increases because of increased nuclear charge.

25] Fertilization in plants: In plants, pollination is followed by fertilization. Once the pollen grains are deposited on the stigma, they form tubes called pollen tubes. The pollen tubes grow through the ovules and reach the ovary where ovules are located. The pollen tube normally enters the ovule through a small opening called micropyle. Inside the ovule, the pollen tube releases two male gametes into the embryo sac.
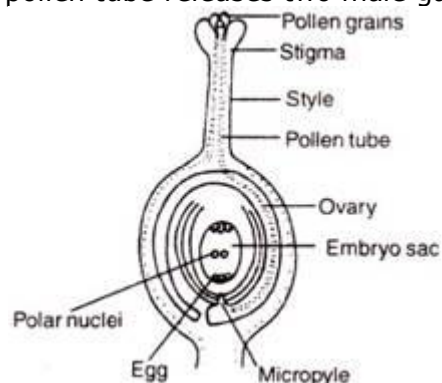
The embryo sac of the ovule contains the egg. One male gamete fuses with the egg. This fusion of male and female gamete is called syngamy and its product is the zygote. The other male gamete fuse with the called triple fusion, where three nuclei are involved in the fusion process, one male gamete and two polar nuclei. Thus, inside each embryo sac, two fusions, syngamy and triple fusion, take place. This mechanism of two fusions occurring in mechanism of two fusions occurring in an embryo sac is called double-fertilization. After fertilization, ovary develops into the fruit and ovules develop into the seeds.

26] The production of plants by cells or tissues or organs in a synthetic medium is called tissue

culture. This technique is also Know as micro propagation technique. The synthetic medium used in this technique contains all the nutrients and hormones which are required for the growth.

A cell or tissue is transferred into suitable synthetic medium under sterile conditions. The tissue often develops into a fast growing cellular mass called callus. The callus is transferred to another medium for growth and differentiation that forms plantlets. The plantlets can be transplanted into soil or pots where they can be grown to maturity. Tissue culture technique is being popularly used for production of ornamental plants like Orchids, Dahlia and Carnation.

27] Ovaries exhibit cycle of events at definite intervals. The ovarian follicles grow into mature follicle. Usually, one mature follicle develops to surround one ovum. The maturing ovum is from one of the two ovaries. The ovum is then released from the respective ovary by the process called ovulation. When the ovarian follicle matures, the inner wall of uterus thickens to get prepared for receiving the developing zygote in case fertilization occurs. In case, fertilization does not take place the thickened inner wall of the uterus breaks down along with its blood vessels, and moves out of the vagina in the form of bleeding, called menstrual flow (menstruation). It lasts for about 4 - 7 days. The cycle of events taking place in the ovaries and uterus every twenty eight days and marked by the menstrual flow, is called menstrual cycle (sexual cycle in human female). In a normal healthy woman, ovulation takes place in the mid of the menstrual cycle around 14th day. Menstrual occurs every 28 to 38 days.

28] (a)
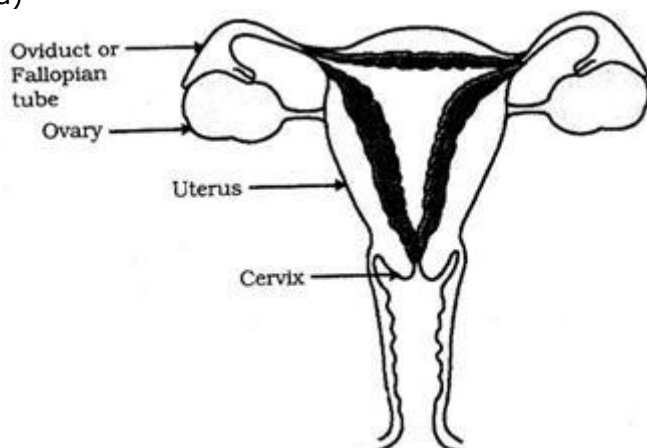
(b) Breast size begins to increase.
(c) Do not allow entry of sperms into the female genital tract at the time of copulation

29] If the ray is incident obliquely, the emergent ray is parallel to the incident ray but laterally displaced. If the ray is incident perpendicular to the slab, it will come out undisplaced.

30] The image obtained from the convex lens can be focused on or near the wall opposite to the window using it as the screen.

31] For higher angle of incidence, angle of emergence is also higher so emergent ray tends to move along the glass-air interface.

32] The screen is just a device to observe the (real) image formed by a convex lens. The image of a distant object continues to get formed at the focus of the convex lens even when no screen is being used to show its formation.

33] In option A a finite size object is kept at F_1.
In option B a point size object is kept at F_1.
In both the cases, final image is formed at infinity, so parallel beam of rays are obtained.
In option C parallel rays coming from the distant object meet at principal focus after refraction through the lens.

Hence, all the three ray diagrams are correct.

34] In the minimum deviation position, refracted ray in the prism is parallel to its base.

35] Acetic acid is acidic in nature and turns blue litmus red.

36] On adding sodium hydrogen carbonate to acetic acid, we immediately observe strong effervescence due to evolution of CO_2 gas.

37] Acetic acid will turn pH paper orangish red because it is acidic in nature.

38] Acetic acid has lowest pH among all because it is acidic in nature while the rest are basic in nature.

39] Conc. H_2SO_4 acts as dehydrating agent when acetic acid reacts with ethyl alcohol and this process is called Esterification.

40] Hydrogen gas is liberated in the experiment:
$$2Na + 2CH_3COOH \rightarrow 2CH_3COONa + H_2$$

41] In case IV, nucleus is not present. In case II, additional wall is shown which resembles a cyst. In cast I, nucleus is dividing.

42] Budding is yeast is illustrated in diagram D as it shows a Yeast cell with an attached outgrowth called bud.

43] In the following diagrams, two daughter Amoebas are produced from a parent Amoeba, thus, showing the process of binary fission in Amoeba.

44] Absorption is facilitated in warm water.

45] The process of binary fission is illustrated in diagrams A and C where the nucleus elongates and the parent cell shows constriction so that it can divide into two daughter cells.

46] Water moves into the raisins because of endosmosis.