



CLASS X  
SCIENCE (THEORY)  
SUMMATIVE ASSESSMENT TERM II  
SAMPLE PAPER II

TIME: 3 Hours

M.M: 80

Instructions:

- 1) The question paper comprises of two sections, A and B. You are to attempt both the sections.
- 2) All questions are compulsory.
- 3) There is no overall choice. However, internal choices in all the three questions of five marks category. Only one option in such question to be attempted.
- 4) Questions of section A and section B are to attempted separately.
- 5) Question numbers 1 to 4 in section A are one mark questions. These are to be answered in one word or one sentence.
- 6) Question numbers 5 to 13 are two mark questions, to be answered in about 50 words each.
- 7) Question numbers 14 to 22 are three mark questions, to be answered in about 30 words each.
- 8) Question numbers 23 to 25 are five mark questions, to be answered in about 70 words each.
- 9) Question 26 to 41 in section B are multiple choice questions based on practical skills. Each question is a one mark question. You are to select one most appropriate response out of the four provided to you.

SECTION A

- 1) Which bonding is mostly shown by carbon in its compounds? (1)
- 2) Name the triatomic gas which absorbs ultra violet rays. (1)
- 3) Rearrange the following according to their ascending trophic levels in a food chain:  
Hawk, snake, grass, rabbit (1)
- 4) What happens to light when it passes through a prism? (1)
- 5) What is the importance of a watershed management system? (2)
- 6) Why does white light undergo dispersion? (2)
- 7) a) Which poisonous gas is released by burning of fossil fuels?



- b) Why are coal and petroleum considered to be non-renewable sources of energy? (2)
- 8) With the help of a ray diagram show that concave lens is a diverging lens? (2)
- 9) Represent using a ray diagram, how the defect of hypermetropia can be corrected. (2)
- 10) (a) Why chemical properties of elements in same group are similar?  
(b) Is it possible to have an element having atomic number 1.5 placed between hydrogen and helium? (2)
- 11) a) Name the male and female gamete.  
b) Where does fertilization take place in females? (2)
- 12) (a) What is vegetative propagation?  
(b) List one advantage of vegetative propagation. (2)
- 13) Lithium, sodium and potassium are all elements that react with water to liberate hydrogen gas. Is there any similarity in the atoms of these elements? Explain. (2)
- 14) (a) Why are testes placed outside the abdominal cavity in scrotum?  
(b) What is the aim of the mechanical barrier method of contraception? Give an example of this contraceptive. (3)
- 15) Dentists use concave mirrors to view the teeth inside the mouth. Why? Represent using a ray diagram. Why not a convex mirror? (3)
- 16) An object 2 cm high is placed at a distance of 16 cm from mirror that produces a real image 3 cm high.  
(a) Find the position of the image (b) What is the focal length of the mirror? (3)
- 17)
- (a)
- i) In a cross between a white flowered plant and pink flowered plant, the F<sub>1</sub> generation was found to be pink. On the basis of this information, which are the dominant and the recessive traits?
- ii) What is the ratio of the plants in F<sub>2</sub> generation?



- (b) Mendel said that the characteristics (traits) of organisms are carried from one generation to the next by internal factors which occur in pairs. What is the modern name for these factors? (3)
- 18) The far point of a myopic person is double the near point of a normal person. What will be the nature of and power of lens required to correct the defect? (3)
- 19) (a) Why physical properties and chemical properties of an element are periodic function of their atomic numbers?  
(b) How does Modern Periodic Law justifies one position for isotopes? (3)
- 20) (a) Write the molecular formula of cyclohexane and benzene? How are they different?  
(b) Name a catalyst used in hydrogenation of oils. (3)
- 21) (a) Why Mendel chose pea plant for his experiments? Mention any two reasons.  
(b) Will experiences of a person during his life time be passed to next generation? (3)
- 22) (a) Mention any two advantages of variations in individuals.  
(b)  
i) A human being has XY pair of sex chromosome. Is it a male or a female?  
ii) Give an example where environmental factors play a major role in sex determination. (3)
- 23) (a) Why in a molecule of nitrogen two atoms are joined by a triple bond?  
(b) Give three points to distinguish between saturated and unsaturated hydrocarbons.
- OR
- (a) State any three characteristics of a homologous series.  
(b) What is the valency of carbon? How it satisfies its valency in a molecule of methane? (5)
- 24) (a) How is image distance, object distance and focal length of a lens are related to each other?  
Why focal length of convex lens is considered positive and that of concave lens is considered negative? (3)  
(b) An object is placed at a distance of 20 cm from a convex lens of radius of curvature of 20 cm. Find the nature, position and size of the image. (2)

OR



Image of an object formed by convex lens is of same size as object of 8 cm.

- (a) What is the position of object & the image in such a case?  
 (b) Represent using a ray diagram.

(c) Given a series of lens of known focal lengths:

+ 5cm, + 10cm, - 5cm, - 10cm, - 20cm, - 25cm.

- (i) Pick any four lens and arrange them in the order of increasing bending power.  
 (ii) Identify any two lens of same bending power.  
 (iii) Will convex and a concave lens of same focal length (same numerical value) have similar extent of bending power? What will be the difference in nature of bending in such a case? (5)

25) (a)

- i) What happens to the thickened uterine lining if no fertilisation occurs?  
 ii) What is the process called?  
 iii) What is the duration of this process?

(b) Why does menstruation occur once a month?

(c) The blood of the mother never mixes with that of the foetus yet it nourishes the foetus, how? (5)

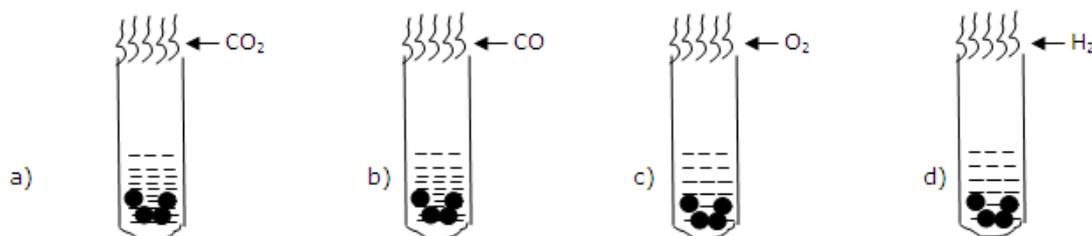
Or

(a)

- i) Why spore formation is beneficial for fungi?  
 ii) How multiple fission is advantageous for plasmodium?  
 iii) What type of division occurs in asexual reproduction?  
 (b) Diagrammatically explain the process of fertilization taking place in a flowering plant. (5)

SECTION B

26) Acetic acid reacts with zinc in all the test tubes. A pop sound is heard when a burning match stick is brought near the test tubes. Which test tube will produce this pop sound?





27) Raisins selected for the experiment should

- a) Have intact stalks
- b) Be swollen raisins
- c) Be without stalks
- d) None of these

28) 5gm of raisins were placed in distilled water for 24 hours. The weight of soaked raisins was found to be 7 gm. The correct percentage of water observed by raisins is

- a) 20%
- b) 25%
- c) 40%
- d) 45%

29) On the basis of sequence of reactions given below, identify the most reactive and least reactive element.



- a) B, A
- b) B, C
- c) C, B
- d) A, B

30) The correct procedure to show that zinc is more reactive than copper is

- a) Prepare copper sulphate solution and dip zinc strip in it.
- b) Mix solid zinc sulphate and copper.
- c) Heat zinc & copper strips
- d) Add dilute nitric acid on both the strips.

31) A student added sodium bicarbonate solution to dilute ethanoic acid. He observed that -

- a) A gas evolves
- b) A solid settles at the bottom
- c) The colour of the mixture becomes blue
- d) The colour of the mixture becomes light yellow

32) A student dipped a pH paper in an unknown liquid. Orange colour was obtained. The unknown solution can be -

- a) Acetic acid
- b) Ethanoic acid
- c) Sodium carbonate
- d) Both a and b



- 33) During the budding, division of cell in yeast shows
- Meiosis cell division
  - Mitosis cell division
  - Both mitosis and meiosis cell division
  - No cell division occurs
- 34) A student sowed two pieces of potato (A) with eye, (B) without eye  
In which case plant will grow.
- A
  - B
  - Both
  - None
- 35) A hypertonic solution as compared to hypotonic solution will have
- Less solute concentration.
  - Same solute concentration.
  - More solute concentration
  - Equal solute concentration
- 36) Which of the following organisms shows budding:
- Spirogyra
  - Hydra
  - Amoeba
  - Paramecium
- 37) Radius of curvature of a lens is 40 cm. Object is placed at a distance twice of focal length. Where will the image be formed?
- At infinity
  - Between  $f$  and  $2f$
  - At  $f$
  - At  $2f$
- 38) Why a highly diminished image of sun is obtained by a convex lens?
- A real image is formed
  - Object is very far
  - Because it converges parallel beam of light coming from infinity to focus.
- 39) All the distances measured in the direction of incident light are
- Positive
  - Negative
  - Depends upon the position of the object
  - Depends upon the position of the image.



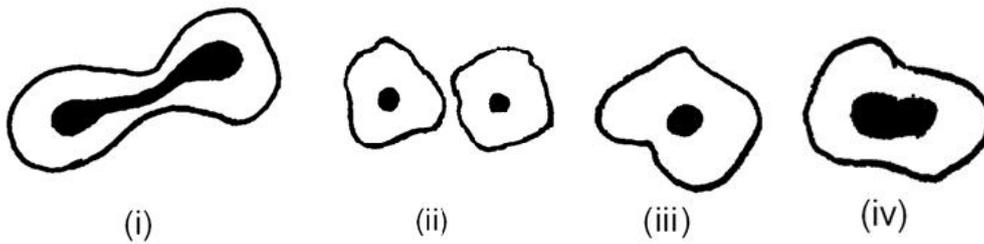
40) A student obtained an erect image of an object placed in front of a concave mirror of focal length 15 cm, the position of object should be.

- a) Equal to 15 cm
- b) More than 5 cm
- c) Less than 15 cm
- d) Equal to 30 cm

41) The following figure illustrates binary fission in Amoeba in an incorrect sequence.

The correct sequence is

- a) i, iii, iv, ii
- b) iii, ii, iv, i
- c) iv, iii, ii, i
- d) iii, iv, ii, i



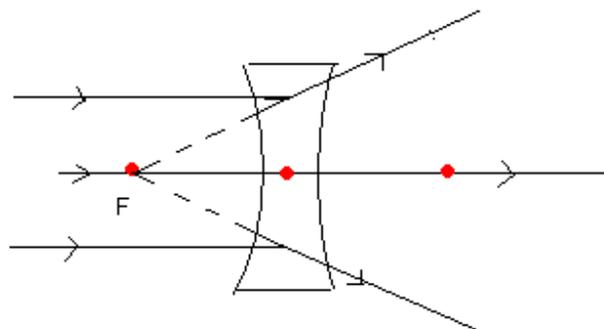


SOLUTIONS TO SAMPLE PAPER II

- 1) Covalent bonding 1
- 2) Ozone. 1
- 3) Grass → Rabbit → Snake → Hawk 1
- 4) When light passes through a prism it undergoes deviation & dispersion. 1
- 5) The importance of watershed management system is-
- i. It results in conservation of both water and soil.
  - ii. It is helpful in increasing the biomass production.
  - iii. It controls excess of droughts and floods.
  - iv. It maintains ecological balance in nature.
- Any two; 1x2=2
- 6) White light is composed to 7 spectral colours, which are of different wavelengths. They travel with different speeds when passed through a medium like glass. 1  
As a result of difference in speeds of constituent colours of light while passing through a medium, the white light splits into the respective spectral colours. This splitting of colours of white light is known as dispersion of white light. 1
- 7) a) Carbon monoxide 1
- b) Coal and petroleum are considered non-renewable sources of energy as they are not being formed continuously in nature and are, not replenished. Continuous use will result in their depletion one day. 1

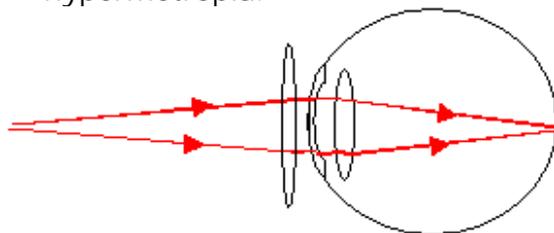


8) Diagram of concave lens showing that it is a diverging lens.



(1+1 mark for correct drawing of the rays & their directions)

9) Diagram below shows how convex lens corrects the defect of hypermetropia.



(1 mark for

correct lens in place + 1 mark for correct ray diagram)

10) (a) Chemical properties of elements in same group are similar because they have same number of valence electrons. 1

(b) It is not possible to have an element with atomic number 1.5 because atomic number is the number of protons in an atom which is always a simple whole number ( it can be either 1 or 2 but not 1.5). 1

11) a) Sperm is the male and ovum is the female gamete.  $\frac{1}{2}$  ,  $\frac{1}{2}$

b) Fallopian tube 1

12)

(a) It is a method of reproduction in certain plants, where in parts of the plant like the root, stem and leaves develop into new plants under appropriate conditions. 1

(b) Advantages of vegetative propagation:

i) It helps in producing similar kinds of plants.

ii) It helps in producing such plants which do not produce viable seeds, or produce very few seeds. Any one; 1

13) Yes, there is a similarity in the atoms of lithium, sodium and potassium elements. 1

All these elements have a similar electronic configuration having one



electron each in their valence shells. The electronic configurations of lithium, sodium and potassium are given below:

- Lithium : 2,1
  - Sodium: 2,8,1
  - Potassium: 2,8,8,1
- 1

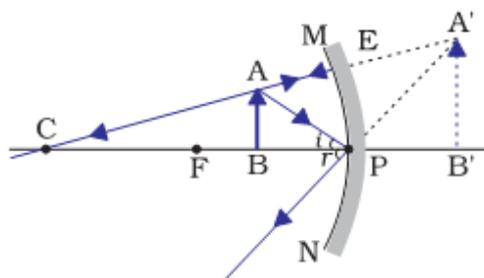
14)

(a) The testes are located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature than the normal body temperature. 1

(b) The aim of the mechanical barrier of contraception is to prevent the sperms from reaching the egg. 1

Example of this contraceptive is condoms worn on the penis. 1

15) If the object is placed closed to the concave mirror it forms virtual and enlarged image of the object so dentist uses concave mirror to see enlarged image of teeth. 1



1

Convex mirror will result in virtual image which is erect but diminished than the actual size. Diminished image of the teeth will not help dentist identify the tooth problem. 1

16) (a) Position of image, height of object and image are 2 cm and 3 cm respectively, so

$$m = h_1/h_2 \quad \text{1/2}$$

In this height of image will be taken negative as it is a real image. So

$$m = -3/2 = -1.5, \text{ but also } m = -v/u$$

Therefore,  $-1.5 = -v/(u)$

$$v = -1.5 \times 16 = -24 \text{ cm (as } u = -16 \text{ cm)} \quad \text{1}$$



(b) Focal length  
 $u = -16 \text{ cm}$ ,  $v = -24 \text{ cm}$ , focal length,  $f = ?$   
 $1/v + 1/u = 1/f$  1/2  
 $-1/24 + (-1/36) = 1/f$   
 $-5/48 = 1/f$   
 $f = -9.6 \text{ cm}$ . 1

17)

(a)  
 i) The pink colour of flowers is the dominant trait whereas the recessive trait is white colour.  $\frac{1}{2}$ ,  $\frac{1}{2}$

ii) 3:1 (pink:white) 1

(b) Gene. 1

18) This defect of eye is called myopia. It is corrected by using concave lens. The far point of the myopic person is 50 cm. (as near point of normal person is 25 cm)

Object distance,  $u = \text{infinity}$   
 Image distance,  $v = -50 \text{ cm}$   
 Focal length = ? 1

$$1/(-50) - 1/\text{infinity} = 1/f$$

$$-1/50 - 0 = 1/f$$

$$f = -50 \text{ cm}$$

Thus the focal length of the required concave lens is 50 cm or 0.5 m

1

$$\text{Power} = 1/f$$

$$P = - (1/0.5 \text{ m})$$

$$P = -2 \text{ D}$$

Power of the concave lens required is -2 D 1

19) (a) Physical and chemical properties of elements are determined by their atomic numbers which is equal to the number of electrons. 1

By using the number of electrons, we can find out the number of valence electrons and hence the physical and chemical properties. 1

(b) According to Modern Periodic Law, elements are arranged in the Modern Periodic Table in the increasing order of their atomic numbers. Isotopes have the same atomic number and different atomic mass. So, though they have different atomic masses still they are given the same position in the Modern Periodic Table. 1

20) (a) Molecular formula :

➤ Cyclohexane :  $\text{C}_6\text{H}_{12}$  1/2

➤ Benzene :  $\text{C}_6\text{H}_6$  1/2



Though both contain six carbon atoms but cyclohexane is a saturated hydrocarbon and benzene is an unsaturated hydrocarbon. 1

(b) Nickel 1

21) (a) Mendel chose the pea plant because:

- i. Pea plant completes its life cycle in a very short interval of time. 1
- ii. Pea plant has several distinct and contrasting characters that can be easily studied. 1

(b) No, experiences of a person will not be transferred to next generation because it is an acquired trait.

22) (a) Advantages of variations are:

- i. Variations in individuals often increase the chances of their survival. ½
- ii. Variations are also helpful in bringing about the evolution of species. ½

(b)

i) The person is a male as human males have XY chromosome. 1

ii) In lizards environmental factor helps in sex determination.

High temperature induces maleness while low temperature brings about femaleness in the offspring's. 1

23) (a) Nitrogen has valency 3. So, it needs 3 electrons to complete its outermost shell. 1

It requires a lot of energy to gain three electrons or lose five electrons. Hence, two atoms of nitrogen share three electrons to form a triple bond. Therefore, in each molecule of nitrogen two atoms are joined by a triple bond. 1



(b)

Saturated hydrocarbons	Unsaturated hydrocarbons
<ul style="list-style-type: none"> <li>➤ In these hydrocarbons carbon atoms are linked by single bond only.</li> <li>➤ They burn in air with a clean, non sooty flame.</li> <li>➤ They undergo substitution reactions.</li> </ul>	<ul style="list-style-type: none"> <li>➤ In these hydrocarbons double and/or triple carbon carbon bonds are also present.</li> <li>➤ They burn with a yellow flame producing large amount of smoke.</li> <li>➤ They undergo addition reactions.</li> </ul>

(3 x 1 = 3 marks)

OR

(a) Three characteristics of a homologous series are:

- Any two adjacent members of a homologous series differ by a CH<sub>2</sub> group. 1
- The difference in molecular masses of any two adjacent homologues is 14 u. 1
- All the compounds of a homologous series show similar chemical properties. 1

(b) Valency of carbon is four. 1

In a molecule of methane, carbon shares one electron each with four hydrogen atoms forming four single covalent bonds with four hydrogen atoms. Thus, it satisfies its valency by sharing four electrons with hydrogen atoms. 1

24)(a) Image distance (v), object distance (u) and focal length (f) of a lens are related to each other by the following formula

$$1/v - 1/u = 1/f$$

This is called lens formula. 1

Focus of a convex lens lies on the right side of the lens, hence according to sign convention, the distances measured to the right are taken as positive. So focal length for convex lens is taken as positive. 1

Similarly the focus of concave lens lies on the left side of the lens hence according to sign convention, the distances measured to the left are taken as negative. So its focal length is taken negative. 1



(b) Object distance = -20cm

Image distance = ?

Focal length =  $r/2 = +10$  cm

$$1/v - (1/u) = 1/f$$

$$1/v - 1/u = 1/f$$

$$1/v = 1/f + 1/u$$

$$1/v = 1/10 - 1/20$$

$$1/v = 1/20$$

$$v = 20 \text{ cm}$$

1

The image is formed at a distance of 20cm. It is real and inverted.

Size of image can be found out by

Magnification =  $v/u$

$$m = 20/-20$$

$$m = -1$$

1

This implies that the image is of same size as that of object and is real and Inverted.

Or

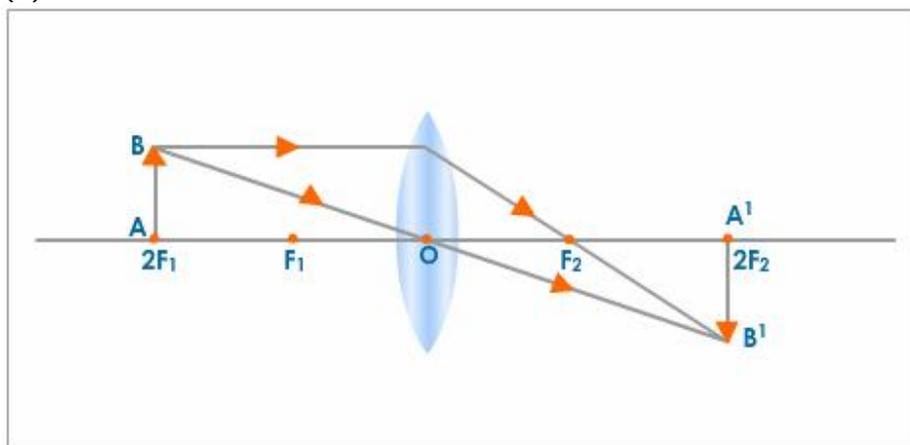
Size of object,  $h_1 = 8$  cm

Size of image,  $h_2 = 8$  cm

(a) As the image formed is of the same size as that of the object, it can be said that the object & image are located at 2F on the either side of the lens.

1/2

(b)



1

(c) (i) -25cm, -20cm, -10cm, -5cm.

Lens arranged in decreasing order of focal length would correspond to increasing bending power.

1/2

(ii) Lens with same numerical value of focal lengths, irrespective of signs, will show same bending powers. (+5cm, -5cm); (+10cm, -10 cm) 1



(iii) Yes, a convex and a concave lens of same numerical value of focal lengths will show similar bending power.

1

However a convex lens of focal length +10cm will exhibit converging power, whereas a concave lens of focal length -10cm will exhibit diverging power. Consequently, both these lens will show similar extent of bending power.

1

25 (a)

i) If no fertilisation occurs, the thickened uterine lining slowly breaks down and comes out through the vagina as blood and mucous.

1

ii) This process is known as menstruation.

½

iii) It usually lasts for about two to eight days.

½

b) Since the ovary releases one egg every month, the uterus also prepares itself every month to receive a fertilised egg. In the absence of fertilisation, the thickened uterine lining is shed as menstruation once every month.

1

c) A number of finger like projections called villi penetrate the tissues of the uterine wall in which they are embedded and make up the organ known as the placenta.

1

By means of this placenta, the developing foetus obtains nutrients and oxygen and also gets rid of carbon dioxide and other metabolic wastes.

1

Or

(a)

i) Spore formation is beneficial for fungi because spores are able to withstand adverse conditions like shortage of food and moisture, heat etc.

1

ii) Plasmodium lives in lining of stomach it reproduces by multiple fission. Thus a large number of organisms are produced by one organism.

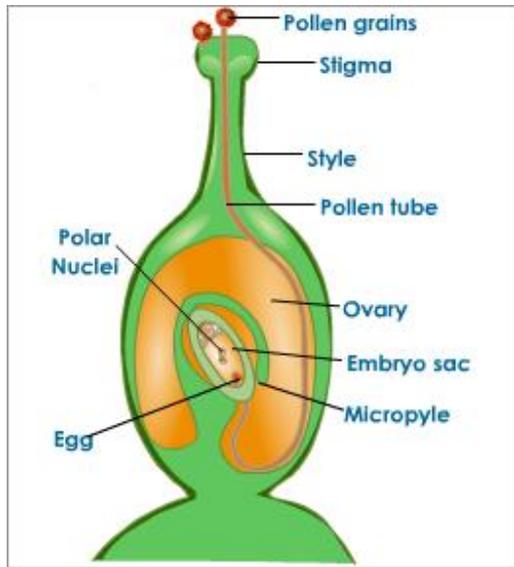
1

iii) Mitosis

1



(b)



(Any 4 labels;  $\frac{1}{2} \times 4 = 2$ )

SECTION- B

- 26) d
- 27) a
- 28) c
- 29) b
- 30) a
- 31) a
- 32) d
- 33) b
- 34) a
- 35) c
- 36) b
- 37) d
- 38) c
- 39) a
- 40) c
- 41) b