SUMMATIVE ASSESSMENT - II SCIENCE
CLASS 10
CBSE Sample Papers for Class 10 Science with Solutions - Paper 1

Time: 3 Hrs **Max Marks: 90**

General Instructions:

A) The question paper comprises of two sections, A and B. You are to attempt both the sections.

B) All questions are compulsory.

C) There is no overall choice. However, internal choice has been provided in all the five questions of five marks category. Only one option in such questions is to be attempted.

D) All questions of section A and all questions of section B are to be attempted separately.

E) Questions number 1 to 3 in section A are one mark questions. These are to be answered in one word or in one sentence.

F) Questions numbers 4 to 7 in section A are two marks questions. These are to be answered in about 30 words each.

G) Questions numbers 8 to 19 in section A are three marks questions. These are to be answered in about 50 words each.

H) Questions numbers 20 to 24 in section A are five marks questions. These are to be answered in about 70 words each.

I) Questions number 25 to 42 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. Name a cyclic unsaturated hydrocarbon containing three double bonds.
   Benzene

2. Name the process that is a direct outcome of excessive burning of fossil fuels?
   Excessive burning of fossil fuels increases carbon dioxide in the atmosphere which results into Global warming.

3. Why are the small number of surviving tigers a cause of worry from the point of view of genetics?
   Decrease in population; decreases the chances of recombination and variation which impacts the gene pool. As a result, there is a loss of genes. Thus they become extinct.

4. You are given three lenses.
   i) a concave lens of focal length 25 cm.
   ii) a convex lens of focal length ¼ m and
   iii) a convex lens of focal length 100 cm.
   What combination from the above three lenses will form a lens of zero power?
   Combination of concave lens of focal length of 25 cm and a convex lens of focal length ¼ m

5. Answer the following
   a) Define Scum.
      Scum is the precipitate of calcium and magnesium salts of organic fatty acids.
   b) Give the names of the functional groups –CHO and –COOH.
      CHO - Aldehyde and COOH - carboxylic acid

6. The use of pesticide DDT is discouraged since this chemical has been found in the Human body and is harmful. How does this chemical enter our body? What is this process called?
   DDT enters human body through food chain. This process is called bio-magnification.

7. What are kulhs ?
   The water flowing in the streams is diverted into the man-made channels, which will be carried to numerous villages down the hillside. This local system of channel irrigation is called kulhs. Kulhs evolved in parts of Himachal Pradesh.

8. A person is known to use a lens of power
   - -5.5 D for his distant vision
   - +1.5 D for his near vision

   Calculate the focal length of the lens used for correcting his
   a) Distant vision
      For distant vision
      f = -1/ 5.5 = - 100/ 5.5 = -18.2 cm
   b) Near vision problems.
      For near vision
      F = 1/1.5 = 2/ 3m = 200/ 3 cm = 66.7 cm

9. Absolute refractive Index of some materials is tabulated below:

Material	Rock salt	Kerosene	Water	Diamond
Refractive index	1.54	1.44	1.33	2.42

i) In which of these does light travel fastest and why?

Light travels fastest in water because it has the least refractive index amongst the given materials.

ii) Arrange these materials in ascending order of their optical densities.

Water, Kerosene, Rock salt, diamond

10. Find the position, nature and size of the image formed by a convex lens of focal length 12 cm of an object 5 cm high placed at a distance 20 cm from it.

f = 12 cm

h = 5 cm

u= - 20 cm

Using lens formula, $\frac{}{} = \frac{}{v} - \frac{}{u}$

$\frac{}{12} = \frac{}{v} - \frac{}{-20}$

$\frac{}{v} = \frac{}{12} - \frac{}{20} = \frac{20-12}{240} = \frac{8}{240}$

v= 30 cm

m = $\frac{v}{u} = \frac{30}{-20}$ = - 1.5

m is negative so the image is real and inverted

$\frac{Height\ of\ image}{height\ of\ object} = \frac{v}{u}$ = -1.5

Height of image = - 7.5 cm

11. Write Chemical equations of the reactions of ethanoic acid with a) Sodium b) Sodium carbonate c) Ethanol in the presence of conc. H_2SO_4

a) $2CH_3COOH + 2Na$ ---------→ $2CH_3COONa$ (sodium ethanoate) + H_2

b) $2CH_3COOH + Na_2CO_3$ --------→ $2CH_3COONa + CO_2 + H_2O$

c) $CH_3COOH + C_2H_5OH$ ----------→ $CH_3COOC_2H_5$ (ethyl ethanoate) + H_2O

12. Compare and contrast the arrangement of elements in Mendeleev's Periodic Table and Modern Periodic Table.

Mendeleev's periodic table	Modern periodic table
Elements are arranged in order of increasing atomic mass.	Elements are arranged in the order of increasing atomic number.
There are only eight vertical columns called groups.	There are eighteen vertical columns called groups.
The inert gases were not known at the time of Mendeleev.	The inert gases are placed at the end of periods in group 18.
No proper places assigned to isotopes.	Isotopes of elements are assigned the same place as their representative elements, as they have same atomic number.

13. How did Chipko Andolan ultimately benefit the local population? Give three benefits
    a) The local benefitted from forest produces
    b) The wildlife and nature were conserved
    c) The quality of air and soil was preserved

14. Assume brown eye color is recessive to black eye color. If a brown eyed man A has a blue eyed mother then find
    a) What are the possible genotypes of his father?
       BB – as black eye is dominant.
    b) What is the genotype of the man A and his mother?
       Genotype of man A is Bb and he will be carrier of recessive gene.
       Genotype of mother is bb as brown eye is recessive.

15. What is speciation? What factors could lead to speciation? How is it useful?
    The process of formation of new species is called speciation. The factors that led to speciation are
    - Geographical isolation
    - Action of environmental factors on the isolated population
    - Reproduction isolation for a long time
    - Genetic drift and natural selection

    It aids evolution of new species.

16. Who explained the mechanism of origin of new species for the first time? How does new species arise according to his theory? What was his second observation?
    Charles Darwin.
    New species arise by the slow accumulation of advantageous variations over a period of time.
    His second observation says that over population results in competition for food and shelter, ultimately leading to a str uggle for existence among the me mbers of a species.

17. Answer the following
    a) Why are the off springs of asexual reproduction called clones?
       The off springs of asexual reproduction are called clones as they are genetically similar to their parent.
    b) Explain spore formation.
       Spore Formation – Spores are asexual reproductive bodies enclosed in a thick- walled structure called sporangium, under favourable conditions spores are released by breaking sporangium. The spores germinate and develop into new individuals.
    c) Name an organism that reproduces by this method
       Rhizopus, Mucor

18. Answer the following:
    a) Why is variation possible in progeny of sexually reproductive individuals?
       Sexual reproduction results in new combinations of genes that are brought together during gamete formation. This reshuffling of genes in the gametes increases the chances of

variation in the progeny, which does not take place in asexual reproduction. Therefore variations are possible in progeny of sexually reproductive individuals.

b) What is a zygote?
The cell formed after the fusion of the male and female gametes is called zygote.

19. Answer the following:
a) What are STD's?
Sexually transmitted diseases.
b) Name causative organisms of Gonorrhoea and Herpes.
Gonorrhoea – bacteria, Herpes- Virus.
c) How are STD's prevented?
Preventive methods are
1. Using condom
2. Using disposable needles and syringes
3. Not sharing shaving blades or razors
4. Not having multiple sex partners
5. Testing and screening the blood for HIV before transfusing it

20. Give reasons for the following.
a) A certain person has minimum distance of distinct vision of 150 cm . He wishes to read at a distance of 25 cm. What focal length glass should he use? What is the nature of eye defect?
Given: u = -25 cm v = -150 cm
$\frac{}{} = \frac{}{v} - \frac{}{u} = \frac{}{-150} - \frac{}{-25} = \frac{-1+6}{150} = \frac{5}{150}$
F = 30 cm, since f is positive, hence lens used is convex lens.
The eye defect person is suffering from is hypermetropia.
b) What is presbyopia? State the causes of this defect? How is presbyopia of a person corrected?
Presbyopia is the defect of human eye in which a person is unable to see the nearby as well as far off objects clearly.
Causes:
(1) Decrease in the power of accommodation of the eye due to ageing
(2) Weakening of the ciliary muscles
It can be corrected by using a bifocal lens (upper half concave and the lower half convex)

OR

The rainbow is a natural spectrum appearing in the sky after a rain shower. Is it correct to say that
a) a rainbow is always formed in a direction opposite to sun?
Yes
b) it cannot be seen on a sunny day.
No, we can observe a rainbow on a sunny day when we look at the sky through a waterfall or fountain with the sun behind us.
c) Arrange the sequence in correct sequential order as it has to occur for a rainbow:
Refraction, Internal Reflection, Refraction, Dispersion
Refraction, dispersion, internal reflection, Refraction

d) Name the phenomenon responsible for the observed twinkling of stars. Will this twinkling be observed by an observer on the moon?

Atmospheric refraction is responsible for twinkling of stars. The observer on the moon will not observe twinkling of stars as moon has no atmosphere.

e) Why does rising sun looks reddish?

Sunlight passes through the atmosphere before it reaches us. Sunlight is composed of seven colors — Violet, Indigo, Blue, Green, Yellow, Orange and Red. In the mornings and evenings, when the sun is near the horizon, the rays have to travel about fifty time's longer path in the atmosphere to reach us than it does in the noon. The dust, smoke and water vapor present in the atmosphere scatter away these colors differently. Violet, indigo and blue are scattered most and red and orange are scattered least. That is why these two colors reach our eyes. As a result, the rising and setting sun appears red.

21. Answer the following:

a) Light is incident at an angle of (i) 60^0 (ii) 45^0, on the same face of a given rectangular slab. If the angles of refraction are r_1 and r_2 in the two cases. Obtain the relation between these two angles.

$n = \frac{\text{in } i}{\text{in } r} = \frac{\text{in } 60}{\text{in } r1}$ .....1)

$n = \frac{\text{in } 45}{\text{in } r2}$ .....2)

Using (1) and (2), we get

$\sin r_2 = \frac{\text{in } 45}{\text{in } 60} \sin r_1 = \frac{1}{\sqrt{2}} \times \frac{2}{\sqrt{3}} \sin r_1 = \frac{\sqrt{2}}{\sqrt{3}} \sin r_1$

(i) State the mirror formula for determining the focal length of spherical mirrors.

(ii) Write the meanings of the symbols used.

(iii) An object is placed at a distance of 25 cm from a concave mirror of focal length 15 cm. Calculate the distance of the image from the mirror.

Mirror formula, $\frac{1}{} = \frac{1}{v} + \frac{1}{u}$

Where f is the focal length of the mirror

u is the object distance

v is the Image distance

u = - 25 cm

f = - 15 cm

v = ?

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

$\frac{1}{v} = \frac{1}{} - \frac{1}{u} = \frac{1}{-15} - \frac{1}{-25} = \frac{-5+3}{75} = \frac{-2}{75}$

$v = \frac{-75}{2}$ = **- 37.5 cm**

b) Define one dioptre.

Power of a lens is one dioptre if focal length of a lens is **1 m**

OR

a) Draw a ray diagram to show the use of a concave mirror for the formation of images, when the object is placed at the following places
   i) Object is placed at infinity
   ii) Object is placed at centre of curvature
   iii) Object is placed between centre of curvature and focus
   iv) Object is placed beyond centre of curvature

b) For the same angle of incidence the angle of refraction in three different media A, B and C are 30°, 45° and 60° respectively. In which medium will the velocity of light be minimum?
Refractive index in medium A, μ_A= sin i/sin 30
Refractive index in medium μ_B=sin i/sin 45
Refractive index in medium μ_c=sin i/sin 60
Since sin 60 > sin 45 > sin 30
$\mu_A > \mu_B > \mu_C$, therefore μ_A= max
Also we know, μ=c/v, $\mu \propto 1/v$
v_A= min
Hence velocity of light in medium A will be minimum.

22. Answer the following
a) What is Vinegar?
A dilute solution of Ethanoic acid in water is called vinegar. It contains about 5 to 8 percent of ethanoic acid.
b) What substance should be oxidized to prepare acetic acid?
Ethanol on oxidation with alkaline $KMnO_4$ gives acetic acid.
c) How does carbon attain a stable electronic configuration?
Carbon attains a stable electronic configuration by sharing its four electrons with other atoms.

d) Complete the following reaction.
C2H5OH + Na ----------→
$2C_2H_2OH + 2Na$ ----------→ $2C_2H_5ONa + H_2$

OR

a) What change will you observe when soap is tested with litmus paper (both red and blue).
Since soaps are basic in nature it turns red litmus paper blue and when blue litmus paper is dipped in soap solution it remains as blue.

b) Write the combustion reaction of ethanol.
Ethanol burns readily in air with a blue flame to form carbon dioxide and water vapour.
$C_2H_5OH + 3O_2$ ----------→$2CO_2 + 3H_2O$

c) Why is CNG considered as environmental friendly fuel?
CNG (Compressed Natural gas) mainly contains methane. On burning it gives CO_2 and H2O and does not produce toxic gases like nitrogen oxides.
$CH_4 + 2O_2$ --------→ $CO_2 + 2H_2O$

d) Why are carbon and its compounds used as fuels for most applications?
Carbon compounds are used as fuels because they undergo combustion in the presence of air by liberating large amount of heat.

23. Answer the following:

a) How does the metallic character change along the period?
As we go left to right in a period, the metallic character decreases because of the addition of electron in the same energy shell each time. So attraction between the nucleus and the electrons in the outermost shell increases. Therefore tendency to lose electrons decreases and metallic characteristics decreases.

b) Define ionization energy.
The amount of energy required to remove the most loosely held electron from an isolated gaseous atom is called ionization energy.

c) A mixture of oxygen and ethyne is burnt for welding. Explain why a mixture of ethyne and air is not used.
When ethyne is burnt in air it gives a sooty flame due to incomplete combustion with limited supply of air. When ethyne is burnt with oxygen it gives clean flame at a 3000^0Cas a result of complete combustion. The oxy-acetylene flame is used for welding cannot attain high temperature without mixing with oxygen.

OR

a) An element of group 14 has the atomic number 14. Examine whether the element will exhibit metallic or non-metallic properties.
Since the element is in group 14, it has 4 valence electrons and it lies in the middle of the 3rd period. It does not have the tendency to lose electrons. Hence it does not exhibit metallic properties.

b) Explain salting out of soap.

The precipitation of soap from the soap suspension in sodium hydroxide by the addition of sodium chloride is known as salting out of soap.

c) Complete the following reactions.

i) Ethanol + Hydrogen iodide ------→

Ethanol + Hydrogen iodide ------→Iodoethane

$C_2H_5OH + HI$ ---------→ $C_2H_5I + H_2O$

ii) Ethanol + Thionyl chloride -----→

Ethanol + Thionyl chloride -----→ chloroethane

$C_2H_5OH + SOCl_2$ ----------→ $C_2H_5Cl + HCl + SO_2$

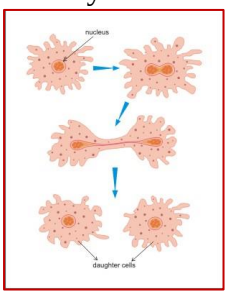
iii) Methanol + sodium -------→

Methanol + sodium -------→ sodium methoxide

$2CH_3OH + Na$ ------→ $2CH_3ONa + H_2$

24. Answer the following

a) Identify the method of asexual reproduction, in the given diagram.



Binary reproduction

b) Explain it.

Binary fission is the division of one cell into two similar cells. This type of division takes place under favourable condition, without the formation of spindles. The single DNA molecule first replicates then attaches each copy to a different part of the cell membrane. When the cell begins to pull apart, the replicate and original chromosomes are separated. Hence the cells formed are genetically identical.

c) Mention other methods of asexual reproduction.

Multiple fission, budding, fragmentation, spore formation etc.

OR

a) What is vegetative reproduction?

Organism produces new individuals by a vegetative part of the plant.

e.g. **potato**, onion, ginger, mint

b) What is tissue culture?

A collection of techniques used to maintain or grow plant cells, tissues or organs under sterile conditions on a nutrient culture medium of known composition

c) How is vegetative reproduction different from tissue culture?

Vegetative reproduction is natural method of reproduction that occurs in plant body while tissue culture artificial method of reproduction held in laboratories.

SECTION – B

25. Which of the following substance is used to denature ethanol?
    a) Methanol
    b) Pyridine
    c) Copper sulphate
    d) All of these.

26. To determine the focal length of a convex lens by obtaining a sharp image of a distant object, the following steps is suggested which are not in proper sequence.
    1. Hold the lens between the object and the screen.
    2. Adjust the position of the lens to form a sharp image.
    3. Select a suitable distant object.
    4. Measure the distance between the lens and the screen.
    The correct sequence of steps to determine the focal length of lens is.
    a) 1, 2, 3, 4
    b) 3, 1, 4, 2
    c) 3, 4, 2, 1
    d) 3, 1, 2, 4

27. Which of the following compounds contains the carboxylic group?
    a) CH_3COOH
    b) CH_3OH
    c) CH_3CHO
    d) CH_3COCH_3

28. To find focal length of a convex lens in laboratory, Rahul fixed it on a stand and kept it on a mark of 21 cm on an optical bench. To get a clear image of a distant tree, he adjusted a screen and finally got clear image when screen was placed at 38.5 cm. Focal length of the lens is :
    a) 32.5 cm
    b) 17.5 cm
    c) 34.4 cm
    d) 47.8 cm

29. On heating ethyl alcohol with alumina at 350^0C we get
    a) Diethyl Ethers
    b) Acetaldehyde
    c) Ethane
    d) Ethene

30. Brisk effervescence produced when a pinch of sodium carbonate is added to CH3COOH is due to the formation of
    a) H_2 gas
    b) CO_2 gas
    c) CO gas
    d) CH_4 gas

31. Which of the following salt when dissolved in water produces hard water?
    a) Calcium sulphate
    b) Magnesium carbonate
    c) Calcium chloride
    d) Any of the above

32. In an experiment on tracing the path of a ray of light through a rectangular glass slab, four students A, B, C, D used the following values of angle of incidence and the distance between feet of the two pins (fixed on the incident ray).
    A) (30°, 45°, 60°) and 1cm
    B) (30°, 45°, 60°) and 6cm
    C) (20°, 55°, 80°) and 10cm
    D) (20°, 50°, 80°) and 15cm
    Out of these the best choice is that of student,
    a) A
    b) B
    c) C
    d) D

33. A student is to find the focal length of a (i) concave mirror, (ii) convex lens by using a distant object. He will observe that the screen is on the same side as the object
    a) in both cases
    b) in neither of the two cases
    c) in case(i) but not in case(ii)
    d) in case (ii) but not in case(i)

34. A student has to perform an experiment on tracing the path of a ray of light passing through a rectangular glass slab for different angles of incidence. Where should he place the Protractor for measuring the angle of incidence?
    a) On the edge of the glass slab.
    b) Along the normal drawn on the edge of the glass slab at the point of incidence.
    c) The positioning does not matter.
    d) Along the incident ray at the point of incidence

35. If the object is at 2F of a convex lens, and then the image is at:
    a) 2F
    b) F
    c) infinity
    d) Between F and 2F

36. A student performs an experiment to find the focal length of a convex lens. The image formed in this case would be :
    a) real and enlarged
    b) virtual and enlarged
    c) virtual and diminished
    d) real and diminished

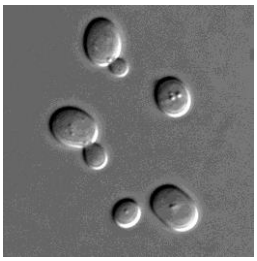
37. A student traces the path of a ray of light passing through a rectangular glass slab for three different angle of incidence (i), namely 30°, 45°, 60°. He produces the incident ray and measures the perpendicular distance 'l' between the produced incident ray and emergent ray. He will observe that the distance 'l'
    a) keeps on increasing with increase in angle of incidence.
    b) keeps on decreasing with increase in angle of incidence.
    c) remains the same for all three angles of incidence.
    d) is maximum for i=45° and is less than this value both for i = 30 and i = 60

38. A raisin placed in a concentrated salt solution, shrinks because
    a) Salt enters its cells
    b) Water comes out of its cells to establish an equilibrium
    c) The cytoplasm of its cells begins to decompose
    d) Salt comes out of its cells

39. The buds of yeast are:
    a) external
    b) internal
    c) external and internal
    d) None of these

40. Fragmentation means
    a) Splitting up of a cell into two daughter cells
    b) Growth of buds, that gets detached and develops into new individuals
    c) Body of an individual breaks up into two or more parts, that develops into fragments
    d) Spores are released, which germinate into new individuals

41. The image of the slide focused in the microscope shows



a) Amoeba undergoing binary fission
b) Yeast undergoing budding
c) Amoeba undergoing budding
d) Yeast undergoing binary fission

42. A partially permeable membrane of a cell facilitates the process of
a) diffusion
b) plasmolysis
c) osmosis
d) imbibition