Tenth class Physical Science Model paper

(Max.Marks:50) [Time:2.45 Hrs.]

Instructions:

i. Answer all questions in a separate answer booklet.
ii. The question paper contains 4 sections and 33 questions
iii. There is a internal choice in section IV
iv. Write answers neatly and legibly.

SECTION-I

Note: i. Answer all the questions in one word or sentence.
ii. Each question carries ½ mark

12 × ½ = 6m

1. Write the lens maker's formula.
2. Mention the role of pupil in a human eye.
3. Nitrogen (z = 7) is the element of group v of the periodic table. Which of the following is the atomic number of the next element in the group.
A) 9 B) 14 C) 15 D) 17
4. Give example for double bonded molecule
5. What is the resistance of an electric arc lamp uses 20 Amp when connected to a 220 V line.
6. Choose the suitable answer of section B with section A.

Section-A ***Section-B***

1) Refractive index A) $\frac{n_2}{n_1} = \frac{\sin i}{\sin r}$ 2) Shell's Law

B) C/V

C) $n_2 \sin i = n_1 \sin r$

7. List two sources of magnetic fields
8. Refractive index of glass relative to water is 9/8. What is refractive index water relative to glass.
9. Why does ice floats on water?
10.

Sample solution	Blue litmus	Phenolphthalein solution
A	Red	Colorless
B	No change	Pink

From the above information what are A, B?
11. Arrange Ag, Mg, K in activity series.
12. What is the bond angle of methane?

SECTION-II

Note:i. Answer all questions
ii. Each question carry one mark

8× 1 = 8m

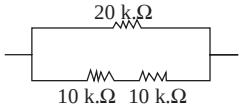
13. Convert 353 k into centigrade scale
14. Why does a ray of light bent when it travels from one medium to another.
15. Name the part of the human eye that helps in changing the focal length of the eye lens.
16. On which side of the periodic table do you find (i) Metals (ii) Non-metals
17. Represent the H_2O molecule using Lewis notation
18. Name the product other than water formed on burning of ethanol in air.
19. Why do two magnetic field lines never intersect each other?
20. Write the names of any two ores of Iron

SECTION-III

Note:i. Answer all questions
ii. Each question carries 2 marks

8 × 1 = 16 m

21. What is a double bond, triple bond? Give examples
22. Can a virtual image be photographed by a camera?
23. What is spectrum? How many types of spectrums are there?
24. Fresh milk has pH of 6. Explain why the pH changes as its turns into curd.
25. Why does the sky sometimes appear white?
26. What is the equivalent resistance of the following combination of resistors?



27. On which factor does the refractive index of medium depend?
28. Explain with the help of a chemical equation, how an addition reaction is used in vegetable ghee industry.

SECTION-IV

Note:i. Answer all questions
ii. Each question carries 4 marks
iii. There is a internal choice for each question?

5 × 4 = 20 m

29. (a) Write the differences between evaporation and boiling? ***(or)***
(b) Explain Faraday's Law of induction with the help of activity.
30. (a) Give four important uses of washing soda and baking soda ***(or)***
(b) Explain the signifi can ce of three quantum numbers in producing the portions of an electron in an atom.
31. (a) How do you prove experimentally that ∠r > ∠i. When light travel from denser medium to rarer medium? ***(or)***
(b) Conduct an activity and show that potential difference combination of resistors connected in series is equal to sum of the individual resistors.
32. (a) Complete the following table.

Period No.	Filling up orbitals (Sub shells)	Maximum no. of electrons filled in all the sub shells	Total no of elements in the period
1	1s	2	2
2	2s, 2p	-	8
3	-	8	8
4	4s, 3d, 4p	18	-
5	-	18	-
6	-	-	32

(or)

(b) Complete the following table.

Functional Group	Structural formula	Example	Suffix
Ketone	-	CH_3COCH_3	-
Carboxylic acid	R-COOH	-	Oic acid
Alcohol	-	CH_3CH_2OH	-Ol
Estor	-	$CH_3COOC_2H_5$	-
Ether	$R\text{-}O\text{-}R^1$		Alkoxy

33. (a) Draw a ray diagram for the following positions and explain the nature and position of image.
i) Object placed beyond the centre of curvature
ii) Object is placed between centre of curvature and focal point
(or)
(b) Draw a neat diagram of Reverberatory furnace and label it neatly.

ANSWERS

SECTION-I

1. $\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

2. To regulate the amount of light entering the eye.

3. C **4.** O_2 (or) C_2H_4

5. V = IR

$\therefore R = \frac{V}{I} = \frac{220}{20} = 11\Omega$

6. 1-B, 2-A

7. Magnet, making charges, electric current

8. Refractive index of glass relative to water = 9/8

$\therefore n_{gw} = \frac{ng}{nw} = \frac{9}{8}$

$\therefore$ Refractive index of water relative to glass

$n_{wg} = \frac{ng}{nw} = \frac{8}{9}$

9. When water freezes to from ice its density reduces. So ice floats on water.

10. A = Acid, B = Base

11. K > Mg > Ag

12. 109°.28[1]

SECTION-II

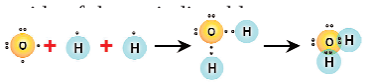
13. K = C + 273

C = k – 273 = 353 – 273 = 80°C

14. When light passes from one medium to another medium of different refractive index, the speed light changes. Hence the ray of light bends form it's path.

15. Ciliary muscles

16. Metals are placed on the left side, while non-metals are placed on the rigl



17.

18. The product other than water formed on burning of ethanol is carbondioxide.

19. Because if they did it would mean that at the point of intersection the compass needle would point towards two directions which is impossible.

20. Two of iron are:

Hematite: Fe_2O_3, Magnetite: Fe_3O_4

SECTION-III

21. Double bond: If two electron pairs are being shared by two combining atoms then the bond formed is double bond Ex: O_2

Triple bond: If three electron pairs are being shared between two atoms then the bond formed is triple bond. Ex: N_2

22. (i) Yes, a virtual image can be photographed by a camera.

(ii) A plane mirror forms a virtual image we can able to take photograph of that image in plane mirror.

(iii) In the same way human eyes forms a virtual image, which can able to take a photograph.

23. Spectrum: A collection of dispersed light giving its wavelength composition is called spectrum.

Spectrums are two types:

(i) Emission spectrum

(ii) Absorption spectrum

24. p^H decreases as milk changes to curd. Lacto bascillus bacteria turns milk to curd by releasing lactic acid that means curd contain lactic acid. So its p^H decreases than 6 as curd is acidic in nature.

25. (i) In a hot day due to rise in the tempe rature. Water vapor enters into atmos phere which leads to abundant presence of water molecules in atmosphere.

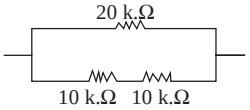
(ii) These water molecules scatter the colors of other frequencies (other than blue)

(iii) All such colors of other frequencies reaches your eye and white color is appeared.

26. Two 10kΩ resisters are connected in series

$\therefore$ Equivalent resistance

Req = $R_1 + R_2$ = 10kΩ + 10kΩ = 20kΩ



This 20KΩ equivalent resistance is connected to 20kΩ resistor in parallel

$\therefore$ Equivalent resistance:

$\frac{1}{\text{Req}} = \frac{1}{R_1} + \frac{1}{R_2}$

$\frac{1}{Req} = \frac{1}{20} + \frac{1}{20} = \frac{2}{20} = \frac{1}{10}$

$\therefore$ Req = 10. KΩ

$\therefore$ Equivalent resistance of the circuit = 10 kΩ

27. The refractive index of a medium depends on

i) Nature of the medium

ii) Nature of the surroundings medium

iii) Wave length of the light used

iv) Temperature.

28. The reaction in which a reagent adds completely on a substance without the removal of small molecules are called addition reaction.

Addition of hydrogen in the presence of nickel catalyst to vegetable oil gives ghee. vegetable oil is unsaturated compound where as ghee is saturated compound.

$$\text{Vegetable oil} \xrightarrow[H_2\ 200^\circ c]{\text{Ni catalyst}} \text{Ghee}$$

29. (a)

Evaporation	Boiling
1. The escape of mole cules form the free surface of a liquid called evaporation.	1. Boiling is rapid change form a liquid to gaseous state at boiling point
2. The temperature of liquid is reduced during evaporation.	2. The temperature of liquid remains constant
3. Evaporation causes cooling.	3. Boiling does not cause cooling
4. Evaporation is a su-rface phenomenon.	4. Boiling involves on complete volume of the liquid i.e. boiling is bulk phenomenon
5. Evaporation takes place at all temp-	5. Boiling takes place at boiling point

SECTION-IV

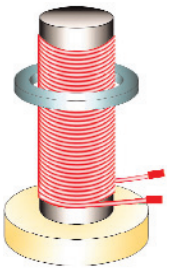
29. (b) Materials required: Wooden base, soft iron cylinder copper wire, metal ring, AC source, DC source, switch

Experiment:

1. Take wooden base fix a soft iron cylinder on the wooden base vertically.
2. Wind copper wire around the soft iron.
3. Now take a metal ring which is slightly greater in radius than the radius of soft iron cylinder and insert it through the soft iron cylinder on the wooden base.
4. Connect the ends of the coil to the AC source and switch on the

current.

5. You may notice that metal ring is levitated on the coil
6. Switch off the current, the ring will jump into the air very dramatically.
7. Remove AC supply applies to DC Current.
8. The metal ring levitates because the net force on it is zero



9. The levitation of metal ring is possible only when the metal ring should behave like a magnet and should change its polarities in the same intervals but in a sense opposite to that of the solenoid.
10. When such is on with DC supply there should be a change in flux lined ring
11. Whenever there is a continuous change of magnetic flux linked with closed coil the current is generated in the coil. It is a Faraday's Law.

Precautions: Take care when the metal ring is leviated from the cylinder.

30. (a) ***Uses of washing soda.***

1. Sodium carbonate (washing soda) is used in glass, soap and paper industry.
2. It is used in the manufacture of borax
3. It can be used as cleaning agent for domestic purposes.
4. It is used for removing permanent hardness of water.

Uses of baking soda.

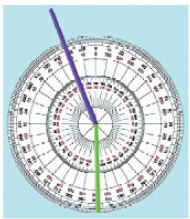
1. Baking soda causes bread or cake to rise making them soft and spongy.
2. It is also used in soda acid fire extinguisher
3. It acts as mild antiseptic

30. (b) Each electron in an atom is described by a set of three quantum numbers n, *l* and m*l*

1. ***Principle quantum number -(n):*** If an electron is in ns then n indicates the principle quantum number (n) explains the size and energy of the orbitals in which electron is predicted.
2. ***Orbital quantum number (l):*** If the electron is in ns then s indicates orbital quantum number (*l*) s defines the shape of the orbital occupied by the electron for *l* = 0 Name of the orbital is s. s orbital shape is spherical.
3. ***Magnetic orbital quantum number (ml):*** The electron with same values of principle quantum number n and orbital quantum number *l* may still define in their behavior. The orientation of orbital (*l*) with external magnetic field determines magnetic orbital quantum *ml* values -*l* to + *l* for s orbital m*l* = 0 for an electron in ns the three quantum numbers are n = n, *l* = 0, m*l* = 0

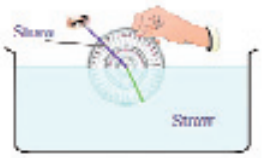
31. (a) ***Aim:*** To prove that angle of refraction (∠r) > Angle of incidence (∠i) when light travel from denser to rarer medium.

Apparatus required: metal disk, protractor two straws, water.



Procedure:

1. Take a metal disk use a protractor and mark angels along its edges as shown in figure.
2. Arrange two straws at the centre of the disk such that they can be rotated freely about the centre of the disk.
3. Adjust one of the straws to an angle say 10.
4. Immerse half of the disk vertically into water filled in a transparent vessel while dipping verify that the straw at 10 must be inside the water.



5. From the top of the vessel try to view the straw which is inside the water.
6. They adjust the second straw which is out of the water until both straws look like as they are in a single straight line.
7. Then take the disk out of the water and observe the two straws on it.
8. We will find that they are not in a single straight line.
9. Now measure the angle between the normal and second straw which given the angle of refraction.
10. Repeat the same for various angle and find the corresponding angle of refractions.

Angle of incidence ∠i	***Angle of refraction*** ∠r
10°	
20°	
30°	
40°	
50°	

11. From the experiment we observe that ∠r > ∠i in all cases
12. That means when light travels from water (denser) to air (rarer) the angle of refraction > the angle of incidence.

32. (a) 1) A and D belong to same period B and C belong to the same period.

2) A, B coming in the same group.

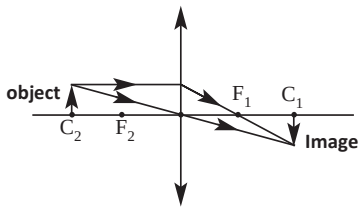
3) 'D' is the nobel gas.

4) 'C' belongs to 15th group and third period.

(b)

Functional group	Structural formula	Example	Suffix
Alcohol	R-OH	CH_3CH_2OH	-ol
Ether	R-O-R¹	CH_3OCH_3	alkoxy
Ester	R-COO-R	$CH_3COOC_2H_5$	oate
Amine	R-NH_2	CH_3-NH_2	Amine
Aldehyde	R-CHO	CH_3CHO	-al

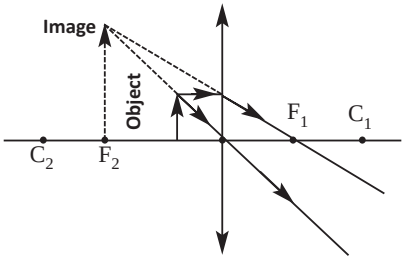
33. a) ***i) Object is placed at C_2***



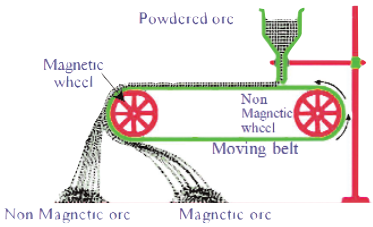
When the object is placed at C_2 we will get an image at C_1 which is real, inverted and of the same size as that of object.

ii) Object is placed between F_2 and optic centre p.

If we place an object between focus and optic centre, we will get an image which is virtual, erect and magnified.
The image is formed on the same side of the lens where the object is placed.



b) ***Magnetic separation***



Magnetic separation