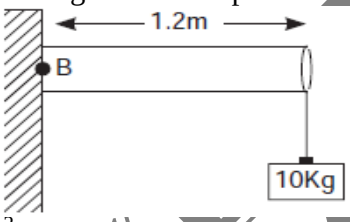
JAYAM MATRIC HR.SEC. SCHOOL –SANKARAPURAM

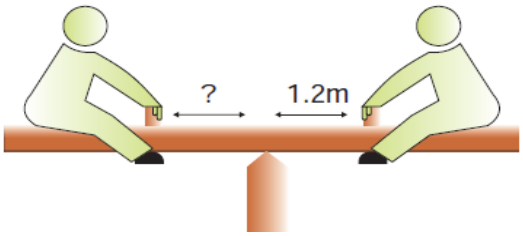
CLASS: X SCIENCE-1 (BOOK PROBLEMS)

1. Take 10g of common salt and dissolve it in 40g of water. Find the concentration of solution in terms of weight percent.
2. 2g of potassium sulphate was dissolved in 12.5 ml of water. On cooling, the first crystals appeared at 60°C. What is the solubility of potassium sulphate in water at 60°C?
3.50g of saturated solution of NaCl at 30°C is evaporated to dryness and 13.2g of dry NaCl was obtained. Find the solubility of NaCl at 30°C in water.
4. An empty evaporating dish weighs 20.0g. After adding saturated solution of $NaNO_3$, the dish weighs 66.0g. When evaporated to dryness, the dish with crystals weighs 41.5g. Find the solubility of $NaNO_3$ at 20°C.
5. Find the concentration of solution in terms of weight percent if 20g of common salt is dissolved in 50g of water.
6. Find the atomicity of chlorine, if its atomic mass is 35.5 and its molecular mass is 71.
7. Find the atomicity of ozone if its atomic mass is 16 and its molecular mass is 48.
8. Find the gram molecular mass of water (H2O)
9. Find the gram molecular mass of carbon dioxide (CO2)
10. Calculate the number of moles in
i) 81g of aluminium ii) 4.6g sodium iii) 5.1g of ammonia iv) 90g of water v) 2g of NaOH
11. Calculate the mass of 0.5 mole of iron.
12. Find the mass of 2.5 moles of oxygen atoms.
13. Calculate the number of molecules in 11g of CO_2
14. Calculate the number of molecules in 360g of glucose.
15. Calculate the mass of 18.069×10^{23} molecules of SO_2
16. Calculate the mass of glucose in 2×10^{24} molecules.
17. Calculate the mass of 12.046×10^{23} molecules in CaO.
18. Calculate the number of moles for a substance containing 3.0115×10^{23} molecules in it.
19. Calculate the number of moles in 12.046×10^{22} atoms of copper.
20. Calculate the number of moles in 24.092×10^{22} molecules of water.
21. Molecular mass of Nitrogen is 28. Its atomic mass is 14. Find the atomicity of Nitrogen.
22. Gram molecular mass of Oxygen is 32 g. Density of Oxygen is 1.429 g/litre. Find the gram molar volume of Oxygen.
23. Calculate the gram molecular mass of water from the values of gram atomic mass of Hydrogen and of Oxygen. **(**Gram atomic mass of Hydrogen = 1 g Gram atomic mass of Oxygen = 16 g**)**
24. One mole of any substance contains 6.023×10^{23} particles. If 3.0115×10^{23} particles are present in CO_2, find the number of moles.
25. Calculate the number of moles in:
i) 12.046×10^{23} atoms of Copper ii) 27.95g of Iron iii) 1.51×10^{23} molecules of CO_2
26. Find the gram molecular mass of the following from the data given:
i) H_2O ii) CO_2 iii) NaOH iv) NO_2 v) H_2SO_4
27.Calculate the number of water molecules present in one drop of water which weighs 0.18 g.
28.How many grams are there in:
i) 5 moles of water ii) 2 moles of Ammonia iii) 2 moles of Glucose
29. How many grams are there in the following?
i) 1 mole of chlorine molecule, Cl_2 ii) 2 moles of sulphur molecules, S_8
iii) 4 moles of ozone molecules, O_3 iv) 2 moles of nitrogen molecules, N_2
30. Find how many moles of atoms are there in:
i) 2 g of Nitrogen . ii) 23 g of sodium iii) 40 g of calcium. iv) 1.4 g of lithium v) 32 g of sulphur
31. The hydrogen ion concentration of a solution is 0.001M. What is the pH of the solution?
32. The hydrogen ion concentration of a solution is 1.0×10^{-9} M. What is the pH of the solution? Find out whether the given solution is acidic, basic or neutral.
33. The hydroxide ion concentration of a solution is 0.001M. What is the pH of the solution?
34. The hydroxide ion concentration of a solution is 1.0×10^{-9} M. What is the pH of the solution?

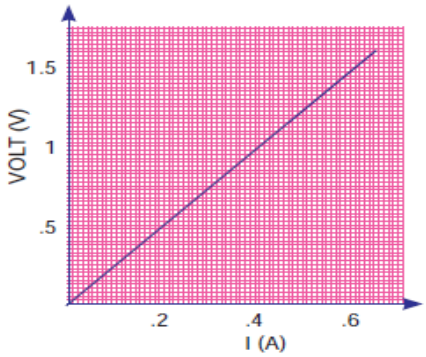
35. The hydroxide ion concentration of a solution is 1.0 x 10^{-8}M. What is the pH of the solution?
36. The hydrogen ion concentration of a solution is 1 X 10^{-8} M
i) What is the PH of the solution? ii) What is the POH of the solution?
iii) Is the given solution, acidic or basic?.
37. A constant force acts on an object of mass 10 kg for a duration of 4 s. It increases the object's velocity from 2 $ms^{-1}$to 8 ms^{-1}. Find the magnitude of the applied force.
38. Which would require a greater force for accelerating a 2 kg of mass at 4 ms^{-2}or a 3 kg mass at 2 ms^{-2}?
39. A bullet of mass 15 g is horizontally fired with a velocity 100 $ms^{-1}$from a pistol of mass 2 kg. What is the recoil velocity of the pistol?
40. The mass of an object is 5 kg. What is its weight on the earth?
41.A bullet of mass 20 g moving with a speed of 75 ms^{-1}hits a fixed wooden plank and comes to rest after penetrating a distance of 5 cm. What is the average resistive force exerted by the wooden plank on the bullet?
42. A shopping cart has a mass of 65 kg. In order to accelerate the cart by 0.3ms^{-2}what force would you exert on it?
43.A 10 Kg mass is suspended from a beam 1.2 m long. The beam is fixed to a wall. Find the magnitude and direction (clockwise or anti-clockwise) of the resulting moment at point B.



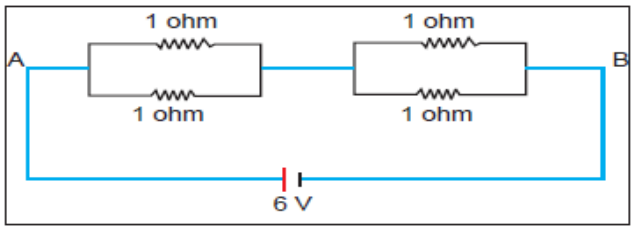
44. Renu is standing in a dining line 6.38 x 10^3 km from the centre of the earth. The mass of the earth is 6 x 10^{24} kg.
i) Find the acceleration due to gravity.
ii) Will the value change after she finishes her lunch?
45. If an angel visits an asteroid called B 612 which has a radius of 20 m and mass of 104 kg, what will be the acceleration due to gravity in B 612 ?
46. An object of mass 1 kg is dropped from a height of 20 m. It hits the ground and rebounds with the same speed. Find the change in momentum.(Take g=10 m/s2)
47. What will be the acceleration due to gravity on the surface of the moon, if its radius is 1/4th the radius of the earth and its mass is 1/80 times the mass of the earth.
48. A boy weighing 20 kg is sitting at one end of a see-saw at a distance of 1.2 m from the centre. Where should a man weighing 60 kg sit on the see-saw, so that it stands balanced?



49. The following graph was plotted between V and I values. What would be the values of V / I ratios when the potential difference is 0.5 V and 1 V?



50. Observe the circuit given and find the resistance across AB.



51. How many electrons flow through an electric bulb every second, if the current that passes through the bulb is 1.6 A.

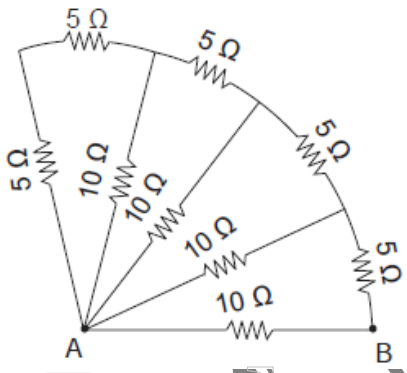
52. Vani's hair dryer has a resistance of 50 Ω when it is first turned on.

i) How much current does the hair dryer draw from the 230 V – line in Vani's house?

ii) What happens to the resistance of the hair dryer when it runs for a long time?

(Hint: As the temperature increases the resistance of the metallic conductor increases.)

53. In the given network, find the equivalent resistance between A and B.

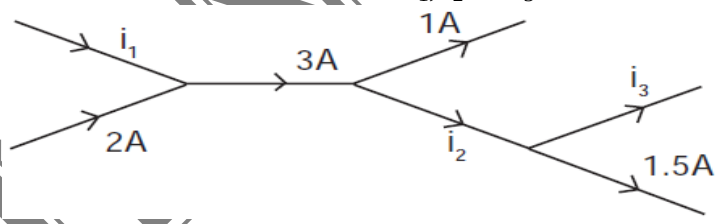


54. Old – fashioned serial lights were connected in a series across a 240V house hold line.

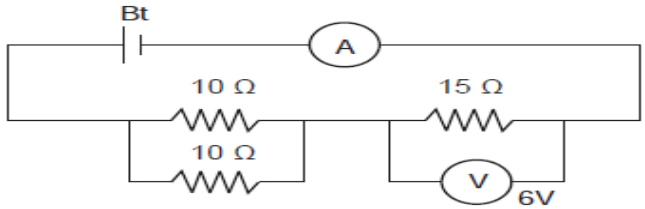
i) If a string of these lights consists of 12 bulbs, what is the potential difference across each bulb?

ii) If the bulbs were connected in parallel, what would be the potential difference across each bulb?

55. The figure is a part of a closed circuit. Find the currents i_1, i_2 and i_3.



56. If the reading of the Ideal voltmeter (V) in the given circuit is 6V, then find the reading of the Ammeter (A).



57. A wire of resistance 8 Ω is bent into a circle. Find the resistance across the diameter.

58. A wire is bent into a circle. The effective resistance across the diameter is 8 Ω. Find the resistance of the wire.

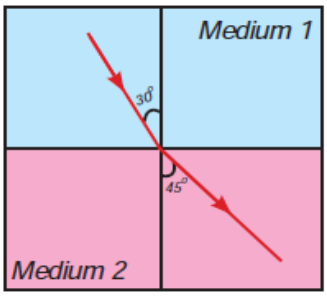
59. Two bulbs of 40 W and 60 W are connected in series to an external potential difference. Which bulb will glow brighter? Why?

60. Two bulbs of 70 W and 50 W are connected in parallel to an external potential difference. Which bulb will glow brighter? Why?

61.. A 3 cm tall bulb is placed at a distance of 20 cm from a diverging lens having a focal length of 10.5 cm. Determine the distance of the image.

62. A needle placed at 30 cm from the lens forms an image on a screen placed 60cm on the other side of the lens. Identify the type of lens and determine the focal length.

63. A ray from medium 1 is refracted below while passing to medium 2. Find the refractive index of the second medium with respect to medium 1.



64. A real image, 1/5th the size of the object, is formed at a distance of 18 cm from a mirror. What is the nature of the mirror? Calculate its focal length.
65. A person cannot clearly see objects farther than 12 m from the eye. Name the defect in vision he is suffering from and the lens that should be used to correct this defect.
66. Explain the use of concave mirror as solar concentrators with the help of a ray diagram.
67. Light enters from air to kerosene having refractive index of 1.47. What is the speed of light in kerosene, if the speed of light in air is $3x10^8$ m/s?
68. Murugan trims his beard while looking into a concave mirror whose focal length is18 cm. He looks into it from a distance of 12 cm.
i) How far is Murugan's image from the mirror?
ii) Does it matter whether or not Murugan's face is closer or farther than the focal length? Explain.
69. Light travels at 1.90×10^8 m/s in a crystal, what is the crystal's index of refraction?
70. Ranjini makes arrangements for a candle-light dinner and tops it with a dessert of gelatin filled blue berries. If a blueberry that appears at an angle of 450 to the normal in air is really located at 300 to the normal in gelatin, what is the index of refraction of the gelatin?
71. If the far point of a myopic person is 75 cm, what should be the focal length of the lens used to rectify this defect?
72. Reena and Vani find a discarded plastic lens lying on the beach. The girls discuss what they learnt in Physics and argue whether the lens is a converging or diverging one. When they look through the lens, they notice that the objects are inverted.
i) If an object 25 cm in front of the lens forms an image 20 cm behind the lens, what is the focal length of the lens?
ii) Is it a converging or diverging lens?

73. Light which is incident on a flat surface makes an angle of 15° with the surface.
i) What is the angle of incidence?
ii) What is the angle of reflection?
iii) Find the angle of deviation.

74. A current of 0.75 A is drawn by the filament of an electric bulb for 10 minutes. Find the amount of electric charge that flows through the circuit.
75. How much work is done in moving a charge of 5C across two points having a potential difference 10V?
76. The potential difference between the terminals of an electric heater is 60 V when it draws a current of 5 A from the source. What current will the heater draw if the potential difference is increased to 120 V?
77. Three resistances having the values 5 Ω, 10 Ω, 30 Ω are connected parallel to each other. Calculate the equivalent resistance.
78. A potential difference 20 V is applied across a 4 Ω resistor. Find the amount of heat produced in one second.
79. An electric bulb is connected to a 220 V generator. The current is 0.50 A. What is the power of the bulb?
80. Calculate the energy produced when 1 kg of substance is fully converted into energy.
81. A convex mirror used as rear-view mirror in an automobile has a radius of curvature of 3 m. If a bus is located 5 m from this mirror, find the position and nature of the image.

82. A concave lens has focal length of 15 cm. At what distance should the object from the lens be placed so that it forms an image10 cm from the lens?
83. An object is placed at a distance of 30 cm from a concave lens of focal length 15cm. An erect and virtual image is formed at a distance of 10 cm from the lens. Calculate the magnification.
84. The focal length of a concave lens is 2m. Calculate the power of the lens.

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JAYAM MATRIC HR.SEC. SCHOOL –SANKARAPURAM

CLASS: X SCIENCE-1 CHEMISTRY (2 MARKS)

1. Distinguish between the saturated and unsaturated solution at a temperature of 25 C using the data given below (Note: Solubility of NaCl is 36g)
2. Differentiate the true solution and colloidal solution.
3. You have prepared a saturated solution of sugar at room temperature. Is it possible to dissolve some more grams of sugar to this solution? Justify your answer.
4. Find the concentration of solution in terms of weight percent if 20gm of comman salt is dissolved in 50 gm of water.
5 .i) Which gas is dissolved in soft drinks? ii) What will you do to increase the solubility of this gas?
6. Give the dispersed phase and dispersion medium in each of the following.
a) Cheese b) Soda water c) Smoke
7. Define Brownian movement
8. Common salt dissolves in water easily. Give reason.
9. When sunlight passes through the window of the classroom, the path of the light visible. What is this effect called? Give reason.
10. What is Tyndall Effect?
11. Molecular mass of Nitrogen is 28. Its atomic mass is 14. Find the atomicity of Nitrogen.
12. 'Cl' represents Chlorine atom' Cl_2 represents Chlorine molecule. List out any two difference between atoms and molecules.
13. From the given examples, form the pair of isotopes and pair of isobars.
[$_{18}Ar^{40}$, $_{17}Cl^{35}$, $_{20}Ca^{40}$, $_{17}Cl^{37}$]
14. Calculate the gram molecular mass of water from the values of gram atomic mass of Hydrogen And of Oxygen. (Gram atomic mass of Hydrogen=1g; Gram atomic mass of Oxygen = 16g)
15. **Fill in;**
i) Monoatomic ii) Diatomic iii) Triatomic iv) Polyatomic
16. Analyse the table and fill in the blanks.

	Substance	Mass	No.of. moles
a)	Al	81 g	-
b)	Fe	-	.5

17. Analyse the table and fill in the blanks.

Gas	Atomic mass	Molecular mass	Atomicity
Ozone	16	48	-
Nitrogen	14	-	2

18. What type of chemical reaction takes place when i) limestone is heated? ii) a magnesium ribbon is burnt in air?
19. The p^H values of certain familiar substances are given below:

Substances	**P^H value**
Blood	7.4
Baking soda	8.2
Vinegar	2.5
Household Ammonia	12

Analyse the data in the table and answer the following questions.
a) Which substances are acidic in nature? b) Which substances are basic in nature?
20. Why does the colour of copper sulphate change when an iron nail is kept in it? Justify your answer.
21. The hydroxide ion concentration of a solution is 1.0×10^{-8}M. What is the pH of the solution?
22. A Process employed for the concentration of sulphide ore is……(Froth flotation/ Gravity separation)

23.Iron reacts with conc. HCl and conc. H_2SO_4, but it does not react with con. HNO_3 . Justify your answer with proper reasons.
24. To design the body of an aircraft, aluminium alloys are used. Give reasons.
25.X is silvery white metal. X reacts with with oxygen to form Y. The same compound is obtained from the metal on reaction with steam with the liberation of hydrogen gas. Identify X and Y.
26.Any metal mixed with mercury is called an amalgam. The amalgam used for the dental filing is…. [Ag-Sn amalgam, Cu- Sn amalgam]
27.Write down the possible isomers and give their IUPAC names using the formula C_4H_{10}
28.Diamond is the hardest allotrope of carbon. Give reason for its hardness.
29.An organic compound (A) is widely used as a preservative in pickle and has a molecular formula $C_2H_4O_2$. This compound reacts with ethanol to form a sweat smelling compound (B).
i) Identify the compounds A and B
ii) Name the process and Write corresponding chemical equation.
30. Read the redox reactin given below and answer the questions.

$$Cuo + H_2 \rightarrow Cu + H_2O$$

a. Conversion of Cuo into Cu is called…….
b. Conversion of H_2 into H_2O is Called……..
31. Can copper displace zinc or lead from their salt solutions? Give reasons.
32. a) The P^H value of human blood is…….
b) King of chemicals……..
33. The P^H values of certain familiar substances are given below.

Substance	P^H value
Coffee	5.0
Lemon Juice	2.4
Household Ammonia	12.0
Tomato juice	4.1

Analyse the data in the table and answer the following questions.
a) Which substances are acidic in nature? b) Which substances are basic in nature?
34. **Match the following:**

Sl.No	Source	Acid present
1.	Apple	Lactic acid
2.	Lemon	Tartartic acid
3.	Grape	Malic Acid
4.	Tomato	Citric Acid
5.	Curd	Oxalic Acid

35. The hydroxyl ion concentration of a solution is 1.0×10^{-4} M. Find the P^H of the solution.
36. **Fill in the blanks.**
i) On passing steam over red hot iron…… is formed with hydrogen. (Feo, Fe_2O_3, Fe_3O_4, $FeCO_3$)
ii) The components of Duralumin are …… (Al, Mg, Mn, Cu / Al, Mn, Zn, C)
37. Write any two uses of Aluminium.
38. Mention any two uses of Iron?
39. Modern periodic table consists of periods and groups. Mention the number of periods and groups of the same.
40.Why cannot aluminium metal be obtained by the reduction of aluminium oxide with coke?
41. State any two Advantages of Modern periodic table?
42. **Correct the mistakes , if any in the following statements.**
In a period the metallic character of the element increases while their non -metallic character decreases.
43. **Answer in one word.**
i) …… is used in advertisement bulbs.
ii) Inner transition elements present in 7th period……..

44. Define Esterification and write the chemical equation.

45. **Answer the following questions on One word.**

i) Modern periodic table is made up of periods and groups. How many periods and groups are there in the periodic table?

ii) Name any two strategic metals.

iii) Name the metal used in the process of Galvanisation.

46. **Match it.**

i) Weak acid	-	H_3PO_4
ii) Strong acid	-	CH_3COOH
iii) Dibasic acid	-	HCl
iv)Tribasic acid	-	H_2CO_3

47. **Odd one out.**

i) Aluminium, Carbon, Copper, Iron

ii) Chlorine, Bromine, Iodine, Oxygen

48. **Fill in the blanks.**

i)……. Have equal number of neutrons.

ii)…… have same mass number

49. **Spot the error.**

i) Alloy is a heterogeneous mixture of metal.

ii) Corrosion is a simple combination reaction

50. **Match it.**

i) Bleaching powder	-	$NaHCO_3$
ii) Washing soda	-	$CaSO_4.1/2H_2O$
iii) Plaster of Paris	-	$CaOCl_2$
iv) Baking soda	-	Na_2CO_3

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JAYAM MATRIC HR.SEC. SCHOOL –SANKARAPURAM

CLASS: X SCIENCE-1 PHYSICS (2 MARKS)

1. **Fill in the blanks.**
   i) If force = mass x acceleration, then momentum = _____.
   ii) If liquid hydrogen is for rocket, then ———— is for MRI.
2. Correct the mistakes, if any, in the following statements.
   i) One newton is the force that produces an acceleration of 1 ms^{-2} in an object of 1 gram mass.
   ii) Action and reaction always act on the same body.
3. The important use of cryogenics is cryogenic fuels. What do you mean by cryogenic fuels?
4. As a matter of convention, an anticlockwise moment is taken as _____ and a clockwise moment is taken as _____.
5. Which would require a greater force accelerating a 2 Kg of mass at 4ms^{-1} or a 3Kg mass at 2 ms^{-1}
6. Fill in the blanks.
i) The space stations…….and ……have been monolithic.
7. To every action there is equal and opposite reaction. Explain action and reaction with example.
8. State Newton's third Law of motion.
9. (A) Assertion: Liqiud nitrogen is the most commonly used element in cryogenics.
   (R) Reason: It is not legally purchasable around the world.
i) Both (A) and (R) are correct ii)(A) is wrong (R) is correct
iii) Both (A) and (R) are wrong iv)Both (A) and (R) are Wrong
10. Define the Law of Inertia.
11. Spot the error in the given Statements.
a) Two equal and opposite forces whose lines of action coincide are said to constitute a moment in mechanics.
b) One newton is the force that produces an acceleration of 1 ms^{-2} in an object of 1 gram mass
c) The physical quantity which is equal to the rate of change of momentum is impulse.
12.Fill in the blanks
   i) Potential difference : voltmeter; then current _____.
   ii) Hydro power plant : Conventional source of energy; then solar energy: _____.
13. In the list of sources of energy given below, find out the odd one.
   (wind energy, solar energy, hydro electric power)
14. Correct the mistakes, if any, in the following statements.
   i) A good source of energy would be one which would do a small amount of work per unit volume of mass.
   ii) Any source of energy we use to do work is consumed and can be used again.
15. Draw the schematic diagram of an electric circuit consisting of a battery of two cells of1.5V each, three resistance of 5 ohm, 10 ohm and 15 ohm respectively and a plug key all connected in series.
16. Fuse wire is made up of an alloy of _____ which has high resistance and_____.

17. Complete the table choosing the right terms within the brackets.
(Zinc, Copper, Carbon, Lead, Lead dioxide, Aluminum.)

+ ve electrode	Lead acid accumulator	
- ve electrode	Lechlanche cell	

18. Write about ocean thermal energy?
19. Two resistance 18 Ω and 6 Ω are connected to a 6V battery in series. Calculate (a) The total resistance of the circuit, (b) The current through the circuit.
20. Three resistances having the values 5Ω,10Ω, 30Ω are connected parallel to each other. Calculate the equivalent resistance.
21. An electric bulb is connected to a 220V generator. The current is 0.50A What is the power of the bulb?
22. Calculate the energy produced when 1Kg of substance is fully converted into energy.

23. Match the Following:

S.No	Scientists	Inventions
1.	Michael Faraday Otto Hahn	First battery
2.	George Simon Ohm	Radioactivity
3.	Volta	Dynamo Nuclear Fission
4.	Henry Becquerel	Ohm's law

24.γ- rays are harmful radiations emitted by natural radioactive substances.

a) Which are other radiations emitted from such substances?

b) What is the unit of nuclear radiations?

25. Good sources of energy should possess some special characteristics. List them.

26. **Fill in the blanks**

i) For a motor : a permanent magnet, then commercial motor : _____

ii) Focal length of a lens; metre, then for power of a lens_____

27. **Correct the mistakes, if any, in the following statements.**

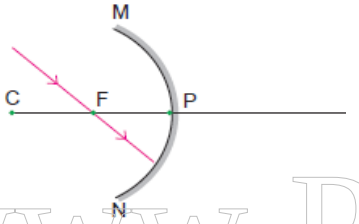
i) The magnetic field is a quantity that has magnitude only.

ii) Outside the bar magnet, the magnetic field lines emerge from the south pole andmerge at the north pole.

28. The ray diagram shown below is introduced to show how a concave mirror forms theimage of an object.

i) Identify the mistake and draw the correct ray diagram.

ii) Write the justifications for your corrections.



29. In traffic signals _____ colour light is used to stop vehicles because it has _____wave length. (Hint: scattering of light is inversely proportional to the fourth power of its wavelength)

30. Fill the table with the appropriate words given in bracket.

----------	the tooth's	enlarged image
----------	rear side of the vehicle	erect image

(Convex mirror, Plano convex, Concave mirror, Plane mirror, Convex lens, Concave lens)

31. Write down the names of the specified parts of the human eye.

i) Dark muscular diaphragm that controls the pupil.

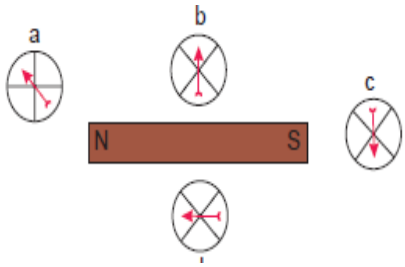
ii) The screen where the image is formed by the eye lens.

32. You know that myopia is a common refractive defects of vision. A person with this defect can clearly see only objects that are near. Using concave lens of suitable power this defect is corrected.

i) Mention the other two types of defects.

ii) Explain how they can be corrected.

33. i) Which of the compass needle orientations in the following diagram correctly describes the magnet's field at that point?



34. A person cannot clearly see objects farther than 12 m from the eye. Name the defect in vision he is suffering from and the lens that should be used to correct this defect.

35. A convex mirror used for rear-view mirror in an automobile has a radius of curvature of 3m. If a bus is located 5m from this mirror, find the position and nature of the image.

36. The focal length of a concave lens is 2m. Calculate the power of the lens.

37. Match the following in the case of a convex lens.

	Position of the object	**Relative size of the image**
a)	Beyond C	i) Infinitely large
b)	At C	ii) Diminished
c)	Between F and C	iii) Same size
d)	At Focus F	iv) Enlarged

38. **Find out the odd one:**

a) Angle of incidence, Angle of Refraction, Angle of emergence, Right angle

b) Convex mirror, Concave lens, Plane mirror, Convex lens.

39. Define Fleming's left hand Rule.

40. The focal length of a concave lens is 4m. Calculate the Power of the lens.

41. To an astronaut sky appears dark instead of blue. Give the reasons.

42. **Match the following:**

i) Myopia	- Convex lens
ii) Hypermetropia	- Hyperbolic mirrors
iii) Presbyopia	- Concave lens
iv) Hubble space telescope	- Bi-Focal lens

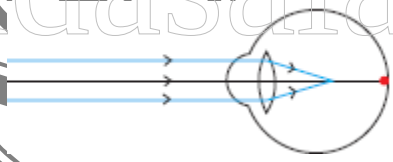
43. Place the magnetic needle the north pole of the bar magnet. How does the south pole and the north pole of the needle point?

44. We see rainbow in the sky sometimes after the rain.

a) What is a spectrum?

b) Write the sequence of colours in a spectrum.

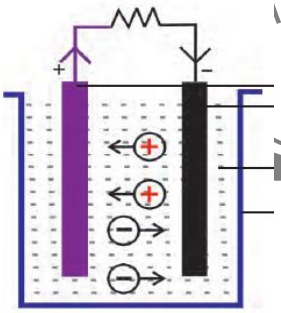
45. Observe the diagram and fill up the following.



a)……. Defect of eye.

b)……. Lens is used to correct the defect.

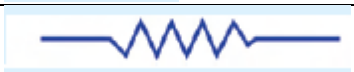
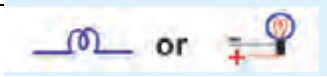
46. Draw the Voltaic cell diagram given below. Label the parts.



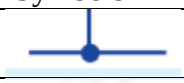
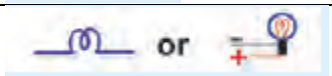
47. **Match the Following.**

S.No	Scientists	Inventions
1.	a) Michael Faraday b) Otto Hahn	First battery
2.	George Simon Ohm	Radioactivity
3.	Volta	Dynamo , Nuclear fission
4.	Henry Becquerel	Ohm's law

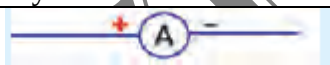
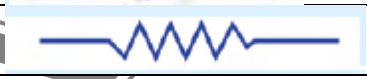
48. Match the Following.

1.		a.	Plug key
2.		b.	Electric Bulb
3.		c.	Resistance
4.		d.	Wire joint
5.		e.	An electric Cell

49. Match the Following.

S.No	Components	Symbols
1.	Plug key or Switch	
2.	A wire joint	
3.	Electric bulb	
4.	Electric cell	

50. Match the Following.

S.No	Components	Symbols
1.	A battery or a combination of cells	
2.	A resistor of resistance R	
3.	Ammeter	
4.	Voltmeter	

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