



VIVEK TUTORIALS

X (English)

(Special test)

Science And Technology - I-(1 to 10 All)

DATE: 25-02-19

TIME: 1 Hr

MARKS: 100

SEAT NO:

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Q.1 Fill in the blank and rewrite the completed statements

12

1 In anodizing technique, is used as anode.

- a. Sulphuric acid b. Carbon c. Aluminium d. Aluminium oxide

Ans In anodizing technique, Aluminium is used as anode.

2 When a chemical change takes place some are taking place in the concerned matter.

Ans When a chemical change takes place some chemical reaction are taking place in the concerned matter.

3 A macromolecule formed by regular repetition of a small unit is called

Ans A macromolecule formed by regular repetition of a small unit is called polymer.

4 Aluminium is extracted from its common ore called

Ans Aluminium is extracted from its common ore called Bauxite.

5 To an astronaut in space, the sky appears

Ans To an astronaut in space, the sky appears black.

6 are the allotropic forms of carbon.

- a. Diamond and Gold
b. Gold and Silver
c. Diamond and Graphite
d. Lead and Diamond

Ans Diamond and Graphite are the allotropic forms of carbon.

7 Fuse wire is made of an alloy of

Ans Fuse wire is made of an alloy of lead and tin.

8 was the first satellite made by India.

Ans Aryabhata was the first satellite made by India.

9 Redox Reaction = Reduction +

Ans Redox Reaction = Reduction + oxidation.

10 A point inside or outside any object where all its total mass is assumed to be concentrated is called of an object.

Ans A point inside or outside any object where all its total mass is assumed to be concentrated is called centre of mass of an object.

11 Metal oxides are in nature.

Ans Metal oxides are basic in nature.

12 If the objects of equal masses are given equal heat, their final temperature will be different. This is due to difference in their

Ans If the objects of equal masses are given equal heat, their final temperature will be different. This is due to difference in their specific heat capacity.

Q.2 Find the odd one out

12

1 Planets, Stars, Satellite, Rainbow

Ans Rainbow - others are celestial bodies.

2 Fuse, bad conductor, rubber shoes, generator

Ans Generator - is the odd one out as it used to generate current while rests are the safety measures in using electricity.

3 Gold, Silver, Copper, Magnesium.

Ans Magnesium is the odd one out as it reacts with hot water while rests do not react with water at all.

4 Phase wire, Fuse wire, Neutral wire, Earth wire

Ans Phase wire is the odd one out because the rest are the three types of cables used in the electric supply.

5 Grams, Newton, centimeters, dyne.

Ans Newton. It is an S.I. unit while others are C.G.S units.

6 Methane, Ethane, Butane, Propane

Ans Butane - It is the only alkane that shows isomerism while others do not exhibit isomerism.

7 Bromine, Chlorine, Oxygen, Fluorine

Ans Bromine is the odd one out as it a non-metal in the liquid state while others are non-metals in gaseous state.

8 Reflection , Dispersion, Refraction, Refractive index.

Ans Refractive index - Refractive index is value while the rest are natural phenomenon of light.

9 Chlorine, Carbon, Bromine, Iodine

Ans Carbon - All others are halogen except carbon

10 Speed, velocity, displacement, acceleration.

Ans Speed. It is a scalar quantity (non-directional) while others are vector quantities (directional).

11 Twinkling of stars, Advanced sun rise, delayed sum set, Blue sky.

Ans Blue sky - as it is due to scattering of light while others are due to atmospheric refraction.

12 Dispersion , mirage, Refraction, refractive index

Ans refractive index

Q.3 Find co-related terms

12

1 : Froth floatation:: Cassiterite ore: Magnetic separation.

Ans Sulphide ore : Froth floatation:: Cassiterite ore: Magnetic separation.

2 Chandrayaan : moon : : Mars

Ans Chandrayaan : moon : Mangalyaan : Mars

3 $\frac{1}{f(m)}$: Power of lens :: $\frac{\text{Images distance (V)}}{\text{Object distance(u)}}$:

Ans $\frac{1}{f(m)}$: Power of lens :: $\frac{\text{Images distance (V)}}{\text{Object distance(u)}}$: magnification

4 Concave lens : Nearsightedness :: Convex lens :

Ans Concave lens : Nearsightedness :: Convex lens : Far sightedness.

5 A chemical reaction is represented by writing a

Ans A chemical reaction is represented by writing a chemical equation.

6 Chloro : Cl :: Bromo :

Ans Chloro : Cl :: Bromo : Br

7 Nearsightedness : elongated eye ball :: Far sightedness :

Ans Nearsightedness : elongated eye ball :: Far sightedness : Flattened eye ball

8 Melting point of ice : 0°C:: Boiling point of water:

Ans Melting point of ice : 0°C:: Boiling point of water: 100°C

9 Dobereiner's : Law of triad : : John Newland :

Ans Dobereiner's : Law of triad : : John Newland : Law of octaves

10 Ethane : Alkane :: Propyne :

Ans Ethane : Alkane :: Propyne : Alkyne

11 One product : combination : : one reactant :

Ans One product : combination : : one reactant : Decomposition .

12 Alkene : C_nH_{2n} :: Alkyne :

Ans Alkene : C_nH_{2n} :: Alkyne : C_nH_{2n-2}

Q.4 Find out the difference between the following

6

1 Absolute humidity and relative humidity.

Ans	<table><tr><th>Absolute humidity</th><th>Relative humidity</th></tr><tr><td>The mass of vapor present in a unit volume of air is called absolute humidity.</td><td>The ratio of actual mass of vapor content in the air for a given volume and temperature to that required to make the air saturated with vapor at that temperature is called the relative humidity.</td></tr></table>	Absolute humidity	Relative humidity	The mass of vapor present in a unit volume of air is called absolute humidity.	The ratio of actual mass of vapor content in the air for a given volume and temperature to that required to make the air saturated with vapor at that temperature is called the relative humidity.
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2 Melting point and Boiling point.

Ans	<table><tr><th>Melting point</th><th>Boiling point</th></tr><tr><td>The constant temperature at which the solid converts</td><td>The constant temperature at which the liquid</td></tr></table>	Melting point	Boiling point	The constant temperature at which the solid converts	The constant temperature at which the liquid
Melting point	Boiling point				
The constant temperature at which the solid converts	The constant temperature at which the liquid				

into liquid is called the melting point.

transforms into gaseous state is called the boiling point.

3 AC generator and DC generator

Ans	<table><tr><th>AC generator</th><th>DC generator</th></tr><tr><td>AC generator converts mechanical energy into electrical energy in the form of alternating current</td><td>DC generator converts mechanical energy into electrical energy in the form of direct current.</td></tr></table>	AC generator	DC generator	AC generator converts mechanical energy into electrical energy in the form of alternating current	DC generator converts mechanical energy into electrical energy in the form of direct current.
AC generator	DC generator				
AC generator converts mechanical energy into electrical energy in the form of alternating current	DC generator converts mechanical energy into electrical energy in the form of direct current.				

4 Metals and Non-metals

Ans	<table><tr><th>Metals</th><th>Non-metals</th></tr><tr><td>Metals are generally good conductors of heat and electricity</td><td>Non-metals are bad conductors of heat and electricity except Graphite which is a good conductor of electricity.</td></tr></table>	Metals	Non-metals	Metals are generally good conductors of heat and electricity	Non-metals are bad conductors of heat and electricity except Graphite which is a good conductor of electricity.
Metals	Non-metals				
Metals are generally good conductors of heat and electricity	Non-metals are bad conductors of heat and electricity except Graphite which is a good conductor of electricity.				

5 Photochemical and Electrochemical Reaction.

Ans	<table><tr><th>Photochemical Reaction</th><th>Electrochemical Reaction</th></tr><tr><td>i. A chemical reaction which proceeds with the absorption of light energy is called photo chemical reaction.</td><td>i. A chemical reaction which proceeds with absorption of electrical energy is called an electrochemical reaction.</td></tr><tr><td>ii. $\text{H}_2 + \text{Cl}_2 \xrightarrow{\text{Sunlight}} 2\text{HCl}$</td><td>ii. $2\text{H}_2\text{O} \xrightarrow[\text{Current}]{\text{Electric}} 2\text{H}_2 + \text{O}_2$</td></tr></table>	Photochemical Reaction	Electrochemical Reaction	i. A chemical reaction which proceeds with the absorption of light energy is called photo chemical reaction.	i. A chemical reaction which proceeds with absorption of electrical energy is called an electrochemical reaction.	ii. $\text{H}_2 + \text{Cl}_2 \xrightarrow{\text{Sunlight}} 2\text{HCl}$	ii. $2\text{H}_2\text{O} \xrightarrow[\text{Current}]{\text{Electric}} 2\text{H}_2 + \text{O}_2$
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6 Bar magnet and Solenoid

Ans	<table><tr><th>Bar Magnet</th><th>Solenoid</th></tr><tr><td>Bar magnets are permanent magnets</td><td>Solenoids are temporary magnets.</td></tr></table>	Bar Magnet	Solenoid	Bar magnets are permanent magnets	Solenoids are temporary magnets.
Bar Magnet	Solenoid				
Bar magnets are permanent magnets	Solenoids are temporary magnets.				

Q.5 State True or False

1 When left over edible oil is heated its small terms foul and develops rancidity

Ans When left over edible oil is heated its small terms foul and develops rancidity - True

2 Catalyst only increases the rate of chemical reaction.

Ans False

3 The C^{4+} cation that would ultimately form by donating electrons is unstable in spite of its noble gas configuration

Ans The C^{4+} cation that would ultimately form by donating electrons is unstable in spite of its noble gas configuration.
- True

4 Non-metals have a tendency to form positive ions.

Ans False - Metals have a tendency to form positive ions.

5 Velocity of light is same in all media.

Ans Velocity of light is same in all media. - False.
The speed of light is different in different mediums.

6 PET is poly ethylene terephthalate.

Ans PET is poly ethylene terephthalate. - True

7 Potassium metal is stored under kerosene.

Ans True

8 No medium can have refractive index less than 1.

Ans No medium can have refractive index less than 1 - True.

No medium can have refractive index less than 1.

9 All the non metals lie on the right side of zig zag line drawn in p block.

Ans All the non metals lie on the right side of zig zag line drawn in p block. - True

10 Gallium exists in liquid state.

Ans True

11 Specific heat is denoted by the letter 'c'

Ans Specific heat is denoted by the letter 'c'. - True

12 Specific heat capacity is different for different substances.

Ans Specific heat capacity is different for different substances. - True

Q.6 Name the following

12

1 Two non-metals which are lustrous.

Ans Iodine and Diamond

2 An alloy of copper and zinc.

Ans Brass

3 Name a gas which is poisonous.

Ans Nitrogen dioxide (NO_2)

4 The gas liberated when copper carbonate is heated

Ans carbon dioxide (CO_2)

5 The rule that gives the direction of induced current in the circuit.

Ans Fleming's right hand rule

6 The device used for grinding an ore.

Ans ball mill/grinding mill

7 Which Phenomenon enable the focusing of light by lens and mirrors ?

Ans Refraction and Reflection are the phenomenon which enables the focusing of light by lens and mirror.

8 Name the two isomeric forms of C_4H_{10} .

Ans N - Butane and 2 - Methyl propane.

9 The commercial unit of electric power.

Ans Kilowatt

10 Alloy of sodium and mercury.

Ans Sodium amalgam

11 Name the two types of hydrocarbons.

Ans Saturated and unsaturated.

12 A metal which does not react with water but reacts with steam.

Ans Aluminium

Q.7 Solve Numerical problems/ Write Equation

24

1 Who will spend more electrical energy? 500 W TV set in 30mins or 600 W heater in 20 mins?

Ans Given: Power of TV set = 500W = 0.5KW

Power of heater = 600W = 0.6KW

Time taken by TV set (t) = 30 min = 0.5 hours

Time taken by the heater (t₂) = 20 min = 0.33 hours

To find: Electrical energy = ?

Formula: Electrical energy = Power x Time

Solution:

1. Electrical energy for TV set = P x t

= 0.5 x 0.5

= 0.25 KWh

2. Electrical energy for heater = P x t

= 0.6 x 0.33

= 0.198KWh

The TV set will spend more electrical energy.

2 Chlorine dissolves in water.

OR

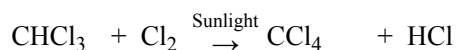
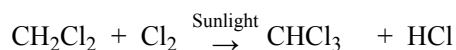
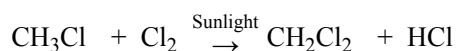
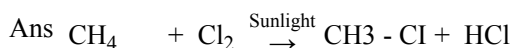
Reaction of non-metal with water

Ans Chlorine gas dissolves in water forming hypochlorous acid.

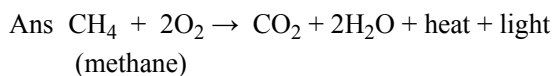


Chlorine gas Water Hypochlorous acid Hydrochloric acid

3 Chlorination of methane.



4 Ignition of methane in presence of oxygen.



5 An electric tungsten bulb is connected into a home circuit. The home electric supply runs at 220V potential

difference. When switched on, a current of 0.45A flows through the bulb. What must be power of the bulb? If it is kept on for 10hours, how many units of electricity will be consumed?

Ans Given: Potential difference = 220V, Current = 0.45A

To find: $P=?$, electrical energy consumed=?

Formula = $P=V \times I$, Electrical energy consumed= $P \times t$

Solution: Power= $V \times I$

$$= 220 \times 0.45$$

$$\text{Power} = 99\text{W}$$

The power of the bulb is 99W and is used for the duration of 10 hours. Then the electrical energy consumed is given by $P \times t$

Electrical energy consumed = Power x time

$$= P \times t$$

$$= 99 \times 10$$

$$= 990 \text{ Watt-hour}$$

$$= 0.99 \text{ KWatt-hour}$$

$$(990/1000=0.99)$$

But 1 kWh = 1 unit

So 0.99KWh= 0.99 units

0.99 units of electricity will be consumed by the tungsten bulb.

- 6 A cell is connected to a 9 ohm resistance, because of which heat of 400 J is produced per second due to current flowing through it. Obtain the potential difference applied across the resistance.

Ans Given: $H= 400\text{J}$, $R= 9 \text{ ohms}$, $t = 1 \text{ sec}$

To find: P.D = ?

Formula: $H = P \times t$, $P= V^2/R$

Solution = $H = P \times t$

$$P = H/t = 400/1 = 400 \text{ watts}$$

$$P = V^2/R$$

$$400 = V^2/9$$

$$400 \times 9 = V^2$$

$$\sqrt{400 \times 9} = V$$

$$20 \times 3 = V$$

$$60\text{V} = V$$

The potential difference applied across the resistance is 60V

- 7 An electrical iron of 1100 W is operated for 2 hrs daily. What will be the electrical consumption expenses for that in the month of April? (The electric company charges Rs.5 per unit of energy)

Ans Given: $P = 1100\text{W} = 1.1\text{KW}$

$$t = 2\text{hrs}$$

Number of days in April = 30 days = $30 \times 2 = 60\text{hrs}$

To Find: Cost of electrical consumption = ?

Formula: Electrical energy = Power x time

Solution: Electrical energy = Power x time

$$= 1.1 \times 60$$

$$= 66 \text{ KWh}$$

But 1 kWh = 1 unit

So, 66KWh= 66 units

If the cost of 1 unit is Rs.5

Then for 66 units = 66×5

= Rs.330

The expense for electrical consumption will be Rs. 330 for the month of April.

8 Calculate focal length of lens having power + 2.5 D

Ans Given $P = +2.5\text{D}$, $f = ?$

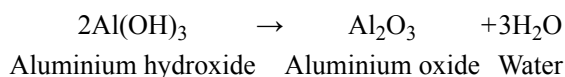
$$P = \frac{1}{f}$$

$$f = \frac{1}{P} = \frac{1}{2.5} = 0.4 \text{ m.}$$

The focal length is 0.4 m or 40 cm.

9 Dry aluminium hydroxide is ignited at 1000°C

Ans When dry aluminium hydroxide is ignited at 1000°C , alumina is obtained.



10 How much energy needs to be supplied to 150g of water at 100°C to convert it to steam at 100°C ? (Latent heat of vaporization = 540 cal/g)

Ans Given: mass of water = 150 g

$$L_{\text{vap}} = 540 \text{ cal/g}$$

To find: $Q = ?$

$$\text{Formula: } Q = m \times L$$

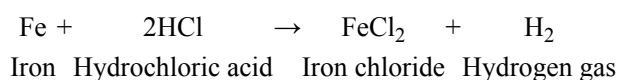
$$Q = 150 \times 540$$

$$= 81000 \text{ cal}$$

Ans: The heat energy needed is 81000 cal.

11 Iron reacts with dilute hydrochloric acid.

Ans Iron reacts with dilute hydrochloric acid to form iron chloride and hydrogen gas.



12 A ball falls off a table and reaches ground in is assuming $g = 10\text{m/s}^2$, calculate its speed on reaching the ground and the height of the table

Ans Given : Time taken = $t = 1\text{s}$

$$= g = 10 \text{ m/s}^2$$

It's a free fall motion

$$\therefore \text{height} = s = \frac{1}{2}gt^2$$

$$s = \frac{1}{2} \times 10 \times (1)^2$$

$$s = 5 \text{ m}$$

using third kinematical equation

$$v^2 = u^2 + 2as$$

$u = 0$ and $a = g$ in free fall

$$\therefore v^2 = 2gs$$

$$\therefore v^2 = 2 \times 10 \times 5$$

$$\therefore v^2 = 100$$

$$\therefore v = \sqrt{100}$$

$$\therefore v = 10 \text{ m/s}$$

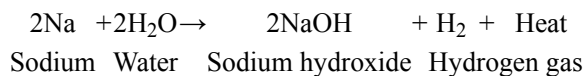
∴ Height of table = 5m
Speed of reaching to the ground = 10m/s

Q.8 Write equation

10

1 Reaction of Sodium with water.

Ans When sodium reacts with water, it evolves hydrogen gas which immediately catches fire producing a lot of heat.



2 Give equation for reaction of copper with concentrated Nitric acid.

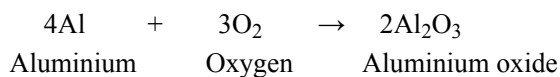
Ans Give equation for reaction of copper with concentrated Nitric acid. - $\text{Cu(s)} + 4\text{HNO}_3(\text{aq}) \rightarrow \text{Cu}(\text{NO}_3)_2(\text{aq}) + 2\text{NO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$

3 Give equation for the slow decomposition of hydrogen peroxide.

Ans $2\text{H}_2\text{O}_2(\text{l}) \rightarrow 2\text{H}_2\text{O}(\text{l}) + \text{O}_2\uparrow$

4 Aluminium is exposed to air.

Ans When aluminium is exposed to air, it develops a thin layer of aluminium oxide. This layer of oxide acts like a barrier to prevent further corrosion.



5 Give an equation where MnO_2 (manganese dioxide) is used as catalysts.

Ans $2\text{KClO}_3 \xrightarrow[\text{MnO}_2]{\Delta} 2\text{KCl} + 3\text{O}_2$