Std X

Science

Part I

1 d) Bifocal lens

2 c) 6.023 x 10^23

3 d) sulphur in carbon dioxide

4 c) 54000J

5 b)combustion of ethanol

Part II

13) A gear is a circular wheel with teeth around its rim. It helps to change the speed of rotation of wheel by changing the torque and helps to transmit power.

14)When

(I) source and listener both are at rest

(II)source and listener move in such a way distance between them remains same

(III) source and listener are moving in mutually perpendicular directions.

(IV)if the source is at the centre of the circle along which the listener is moving.

15)Coefficient of real expansion is defined as the ratio of the true rise in volume of the liquid per degree rise in temperature to its unit volume. The SI unit of coefficient of real expansion is /K or K^-1

16) Ethanol is oxidised to ethanoic acid with using alkaline $KMnO_4$ and acidic $K_2Cr_2O_7$

$$KMnO_4$$

$$CH_3CH_2OH \text{——} 2[O] \text{——->} CH_3COOH + H_2O$$

During this reaction the orange colour of Potassium dichromate changes to green colour.

22) focal length f=-0.3 m

Image distance v= -0.2 m

Object distance u = ?

1/ f= 1/v-1/u

1/ -0.3 =1/-0.2. -1/u

-1/u=-0.2+0.3/(0.3)(0.2)

-1/u= 0.1/0.06

u=-0.6m

Part III

23) Propulsion of rockets

It is based on law of conservation of linear momentum and Newton's III law of motion. Rockets are filled with a fuel in the propellant tank. When the rocket is fired, this fuel is burnt and a hot gas is ejected with a high speed from the nozzle of the rocket, producing a huge momentum

To balance this momentum, an equal and opposite reaction reaction is produced in the combustion chamber, which makes the rocket project forward

During motion the mass of rocket decreases and velocity of the rocket increases. Since there is no external force acting on it, the linear momentum of the system is conserved. As the mass of the rocket decreases with altitude, which results in increase in velocity. At one stage the velocity is sufficient enough to escape the gravitational pull of the Earth. This is called escape velocity.

24)Uses of simple microscope

a) by watch repairers and jewellers

b) to read small letters clearly

c)to observe parts of flowers , insects etc

d) to observe finger prints in the field of forensic science

25)These are sound waves with a frequency greater than 20 Hz.

Medical applications of echo

It is used in obstetric ultrasonography to create real time visual images of developing embryo or foetus in the mother's uterus. It is very safe, as it has no harmful radiations.

It is also used to find the functioning of heart through echocardiography

26) Methods to prevent corrosion

a) galvanization

b) anodizing

c) electroplating

d) cathode protection

e) alloying

27) Soaps and detergents

Soaps.

- Does not used with hard water
- Biodegradable

Detergents

- Used with hard water
- Non biodegradable

32)

Mass%= [mass of the solute/(mass of the solute+ mass of the solvent)]x100%

={25 g/(25+100)g}x 100%

={25/125}x100%

=(1/5)x100%

=20%

(ii) False correction is v/v

False correction is w/w

Part IV

33.Domestic electric circuits

- The first step is to bring power supply to the main box from the transformer
- Main box contains two components

1. Fuse box - to protect appliances
2. Meter - to record electrical energy consumed

Fuse protects the appliances from overloading due to excess current

3. The electricity is brought to the houses by two insulated wires

(I) red insulation is live wire

(II) black insulation is neutral wire

Live wire is connected to the main fuse

- The potential difference between the two wires is 220V
- After the main switch the wires are connected to separate circuits

—-one circuit is 5A rating where low power rating devices are connected like fan,bulb and tube light

—- another circuit of 15 A rating where high power rating devices such as air conditioner and refrigerator

- All the devices are connected parallel to each other

* all get equal voltage

*if one device is disconnected still other devices continue to work

*overall resistance is low

*allows different current to flow

- Another wire of green insulation called earth wire is connected to devices

which has a metal body, which carries all electric charges to the metal plate and neutralises it thereby prevents us from getting shock if there is a leakage of charge.

OR

Alpha rays

Helium nucleus

Positively charged

Highest ionising power

Least penetrating power

Deflected by both electric and magnetic fields

Travels1/10 to 1/20 times speed of light

Beta rays

Electrons

Negatively charged

Ionising power comparatively low

Penetrating power is more than alpha rays

deflected in both fields but opposite to alpha rays

Travels upto 0.9 times the speed of light

Gamma rays

Electromagnetic waves

Photons

No charge

Least ionising power

Highest penetrating power

Not deflected by both fields

Travels with the speed of light

34.Modern atomic theory

- An atom is no longer indivisible
- Atoms of the same element may have different atomic mass(isotopes)
- Atoms of different elements may have same the same atomic masses (isobars)
- Atoms of one element can be transmuted into atoms of other elements by artificial transmutation
- Atoms is the smallest particle that takes part in chemical reaction
- Mass of an atom can be converted into energyE= mc^2
- Atoms may not always combine in a simple whole number ratio

Any 5 points - 5 marks

Applications of Avogadro's hypothesis

- explains Gay Lussac's law

-helps to determine the atomicity of gases

- helps to derive molecular formula of gases

- determines relation between molecular mass and vapour density

- helps to determine gram molar volume of all gases

Any two - 2 marks

OR

Double displacement reactions with examples

- If the ions are interchanged when two compounds react, then the

reaction is called double displacement reaction or metathesis reaction

- In this reactions one of the products must be a precipitate or water
- It is of two types

Precipitation reaction

- When aqueous solutions of two compounds are mixed, they react

to form an insoluble compound called a precipitate and a soluble compound

Potassium and lead displace one another to form a yellow precipitate of lead

Iodide

$Pb(No3)2+2KI \rightarrow PbI2+2KNO3$

Neutralization reaction

- The reaction in which acid reacts with base

form a salt and water

$HCL+ NaOH \rightarrow NaCl+ H2O$

Single displacement reaction

It is a reaction between element and compound

When they react, one of the elements is displaced

by the other element to form new compound

$Zn + 2HCl \rightarrow ZnCl2 + H2$

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