

Q1) Derive Expression for time period of simple pendulum, centripetal force by units & dimensions

Time period of pendulum depends on:-

length of pendulum $= l$

mass of bob $= M$

Acc. due to gravity $= g$

$$T \propto M^a l^b g^c$$

$$T = K M^a l^b g^c$$

---(i)

Taking dimensions on b/s.

$$[T] = K [M]^a [L]^b [LT^{-2}]^c$$

$$[T] = K [M]^a [L]^{b+c} [T]^{-2c}$$

Since dimensions on b/s need to be equal

$$\therefore a = 0$$

$$b+c = 0$$

$$-2c = 1$$

$$a = 0$$

$$b = -c = 1/2$$

$$c = -1/2$$

Putting these in Eq (i)

$$T = K M^0 L^{1/2} g^{-1/2}$$

$$T = K \sqrt{\frac{L}{g}}$$

If $k = 2\pi$

$$\text{then } T = 2\pi \sqrt{\frac{L}{g}}$$

Centripetal force of pendulum can be expressed as

$$F = \frac{mv^2}{r}$$

$$= [F] = \frac{M [L/T]^2}{L}$$

$$\Rightarrow [F] = \frac{ML}{T^2}$$

STATIONARY WAVES IN STRINGS & LAWS OF STATIONARY WAVES IN STRINGS?

A stationary wave occurs when two identical waves travelling in opposite directions along the string interfere with each other resulting in a stand still wave pattern.

Laws of Stationary Waves in Strings

1) Law of Lengths:- Frequency of stationary wave on a string is inversely proportional to length of string.

2) Law of Tension:- Frequency is directly proportional to square root of tension in string.

3) Law of Linear Density:- Frequency is inversely proportional to square root of linear density of string.

Page No. _____

Q STATE & EXPLAIN FIRST LAW OF THERMODYNAMICS WITH MATHEMATICAL EQUATION

First law of Thermodynamics states that energy can be converted from one form to another with the interaction of heat, work and internal energy but it can not be created nor destroyed under any circumstances. Mathematically this is represented as-

$$\Delta U = q + w$$

where, ΔU is total change in internal energy of a system

q is heat exchanged

w is work done by system

Q DIFFERENCE BETWEEN STATE FUNCTION & PATH FUNCTION

State functions are properties of a system that depend only on its current state & are independent of path by which system reaches the state. e.g. Temperature or volume of a system.

Path functions are properties of a system that

STATE & EXPLAIN HESS'S LAW & HOW IT FOLLOWS FIRST LAW (OR) EXPLAIN HESS'S LAW OF HEAT SUMMATION

Hess's law, also known as law of constant heat summation, states that the total enthalpy change for a chemical reaction is same regardless of whether the reaction occurs in one step or multiple step.

Hess's law follows 1st law of Thermodynamics as both laws express concept of energy conservation. First law states that total energy of isolated system remains constant while Hess's law applies this principle to enthalpy changes in chemical reactions.

STATE & EXPLAIN Le CHATLIER PRINCIPLE & ITS APPLICATIONS

VARIOUS FACTORS INFLUENCING EQUILIBRUM

HOW EARTH'S PRINCIPLE BIOLOGICAL SYSTEMS BEING DEPLETED?

Earth has four principal biological systems. These are fisheries, forests, grasslands & croplands. They form the basis of world's economic system. These biological systems are being depleted by excessive use. Forests are being destroyed to obtain firewood for cooking. Grasslands are turning into ~~barren~~ deserts and they have lost their productivity. The destruction of forests have caused extinction of many species. We need to change our outlook and stop overusing natural resources.

Role of Green Movement in bringing change in Human Perception?

Green Movement has played a significant role in bringing change by raising public awareness about environmental issues like pollution, deforestation and climate change, thereby influencing policy decisions, promoting awareness and encouraging individuals to adopt eco-friendly behaviour shifting human perception towards greater environmental responsibility.

- (۱) نونفل نے حاتم کو بکڑ کر لے لیا اور اس نے لے لیا انعام رکھا تھا؟
- (۲) حاتم کیا سوچ کر نونفل سے جنگ کرنے کے بجائے جنگل میں چھپ گیا؟
- (۳) نونفل کون تھا اور اس کی حاتم کے ساتھ کیا رشتہ تھی؟
- (۴) حاتم اپنے قتلے کو چھوڑ کر کیوں غار میں چھپ گیا؟
- (۵) نونفل نے حاتم کو بکڑنے کا چھوٹا دعویٰ کرتے فالوں کو کیا سزا دی؟
- (۶) حاتم کی قتلے کا سرزار تھا اور نونفل کو کس وجہ سے حاتم سے دشمنی تھی؟
- (۷) دوسری بڑھیا کو گھر سے کیوں نکال دیا گیا؟
- (۸) پہلی بڑھیا کو گھر سے کیوں نکال دیا گیا؟
- (۹) دوسری بڑھیا سرکوں پر کیوں بھیک مانگنے لگی؟
- (۱۰) ایک کہانی میں پہلی بڑھیا کے ساتھ کیا سلوک کرتی تھی؟
- (۱۱) سلک روٹ سے کیا مراد ہے۔ مشاعرے پریشم کی لمبائی کتنی تھی؟
- (۱۲) سلک روٹ کی تین اہم شاخیں کن علاقوں سے گزرتی تھی؟
- (۱۳) لارڈ کرزن نے اپنا جلتا ہوا سگریٹ کیوں پھینک دیا؟
- (۱۴) محلے کی ہولی میں کس مشہور شاعر کا ذکر ہے؟
- (۱۵) ڈرامہ محلے کی ہولی کسی کی تخلیق ہے۔ اس ڈرامے میں کام کرنے والوں کے کرداروں کے نام لکھئے؟
- (۱۶) ڈرامہ محلے کی ہولی کے لائق کے کردار پر نوٹ لکھئے۔
- (۱۷) ڈرامہ محلے کی ہولی کا بنیادی پیغام کیا ہے؟
- (۱۸) ایک یادگار وصیت میں پنڈت پٹو نے اپنی راکھ کا کچھ حصہ سارے بھارت میں کیوں بکھیرنا چاہتا تھا؟
- (۱۹) لنگا لیس بھارت کے مذہم تہذیب کی نشانی ہے؟

PHYSICS

Date _____
Page _____

Q1) STATE & EXPLAIN COULUMB'S LAW & GIVE ITS VECTOR FORM & DEFINE UNIT OF CHARGE?

The force of interaction between any two point charges is directly proportional to the product of charges and inversely proportional to the square of distance between them, and acts along the line joining the two charges.

According to Coulumb's law,

$$F \propto q_1 \cdot q_2 \quad \text{and} \quad F \propto \frac{1}{r^2}$$

$$\text{or } F = \frac{k q_1 \cdot q_2}{r^2} \quad [k = \text{Electrostatic constant}]$$

$$[k = \frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2/\text{C}^2]$$

ϵ_0 Electrical permittivity

$$\text{Value of } \epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2/\text{Nm}^2$$

Vector Form of Coulumb's Law

Let the position vector of charges q_1 and q_2 be $\vec{r}_1$ and $\vec{r}_2$ respectively

$\vec{F}_{12}$ = Force on q_1 due to q_2

$\vec{F}_{21}$ = Force on q_2 due to q_1

CHEMISTRY

Date _____

Page _____

Q WHAT ARE COLLIGATIVE PROPERTIES

The properties which depend on the number of solute particles and not on their nature are called colligative properties.

IMPORTANT COLLIGATIVE PROPERTIES

1) Relative Lowering of Vapour Pressure & ITS EXPRESSION

When a non-volatile solute is added to a pure solvent, the vapour pressure of resulting solution is lower than that of pure solvent. The difference between the vapour pressure of pure solvent and that of solution is called lowering of vapour pressure (ΔP)

$$P_A = P_A^\circ X_A$$

} where P_A = Vapour pressure
 P_A° = Pure vapour pressure

where A is (Solvent)

B is solute

X_A = Mole Fraction

Now

Physics (Main Questions)

- 1) All numericals based on mirrors and lenses
- 2) All defects of vision (Myopia, Hypermetropia, Presbyopia, Astigmatism, Cataract) with their correction and cause.
- 3) Expression of resistances in series and parallel (Def. & derived)
- 4) Laws of reflection and refraction (with diagrams)
- 5) Heating Effect of Current, Joules law of Heating & Applications of heating effect of current.
- 6) Define:- Principal axis, Focus, Optical Centre, Centre of curvature, Radius of Curvature, Pole, focal length.
- 7) Ohm's law and Ohm's law circuit/apparatus diagram. How can Ohm's law be verified experimentally (in laboratory)
- 8) Uses of Concave and Convex mirrors
- 9) S.I Unit of Current, Voltage (P.D), Power, Energy.
- 10) Dispersion of white light through prism, Formation of rainbow
- 11) Refractive Index def. & (Ref. index of different substances) like water, rock salt, Kerosene, Alcohol, diamond etc.

Q1) An electric refrigerator rated 400W operated 8 hour/day. Find the cost of energy to operate it for 30 days at the rate of Rs 3 per kWh?

Sol Power = 400W

Time = 8 hour

Energy for one day = Power $\times$ Time [$\because$ Energy = $P \times T$]

$$= 400 \times 8h$$

$$= 0.4 \text{ KW} \times 8h$$

$$= 3.2 \text{ KWh}$$

$$[\because 1 \text{ KW} = 1000 \text{ W}]$$

$$[\because 400 \text{ W} = \frac{400}{1000} \text{ kW} = 0.4 \text{ kW}]$$

$$\text{Energy of 30 days} = 3.2 \text{ KWh} \times 30 = 96 \text{ KWh}$$

$$\text{Cost of energy} = 96 \times 3 = \text{Rs. } 288$$

Q2. A 500W lamp gives light for 10 hours on electric mains. If the cost of energy is Rs. 40 per unit. Find cost of electric consumption.

Sol Power = 500 W

Time = 10 hours

Energy = Power $\times$ Time

$$\text{Energy} = 500 \text{ W} \times 10$$

$$= 0.5 \text{ KW} \times 10$$

$$= 5 \text{ KWh}$$

$$[\because 1 \text{ KW} = 1000 \text{ W}, \therefore 500 \text{ W} = \frac{500}{1000} \text{ kW} = 0.5 \text{ kW}]$$

$$\text{Cost} = 5 \times 40 \text{ paise}$$

$$= \text{Rs. } 200 \text{ paise}$$

$$= \text{Rs. } 2.$$