PHYSICS

BOOKS - NAVBODH PHYSICS (HINGLISH)

QUESTION BANK 2021

Rotational Dynamics Mcqs 1 Mark Each

1. A diver in a swimming pool bends his head before diving, because it

A. Increases his linear velocity

B. Decreases his angular velocity

C. Increases his moment of inertia

D. Decreases his moment of inertia

Answer: D

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2. The angular momentum of a system of particles is conserved

A. When no external force acts upon the system

B. When no external torque acts upon the system

C. When no external impulse acts upon the system

D. When axis of rotation remains the same

Answer: B

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3. A stone is tied to one end of a string. On holding the other end, the string is whirled in a horizontal plane with progressively increasing speed. It breaks at some speed because

A. Gravitational forces of the earth is greater than the tension in string

B. The required centripetal force is greater than the tension sustained by the string

C. The required centripetal force is lesser than the tension in the string

D. The centripetal force is greater than the weight of the stone

Answer: B

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4. The moment of inertia of a circular loop of radius R, at a distance of $R/2$ around a rotating axis parallel to horizontal diameter of loop is

A. $1/2MR^2$

B. $3/4MR^2$

C. MR^2

D. $2MR^2$

Answer: B

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5. A 500 kg car takes a round turn of radius 50 m with a velocity of 36 km/hr . The centripetal force is

A. 250N

B. 750N

C. 1000N

D. 1200N

Answer: C

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6. A cystlist riding a bicycle a bicycle at a speed of $14\sqrt{3}$ m/s takes a turn around a circular a circular road of radius $20\sqrt{3}$ m without skidding . What is his inclination to the vertical ?

A. 30°

B. 45°

C. 60°

D. 90°

Answer: C

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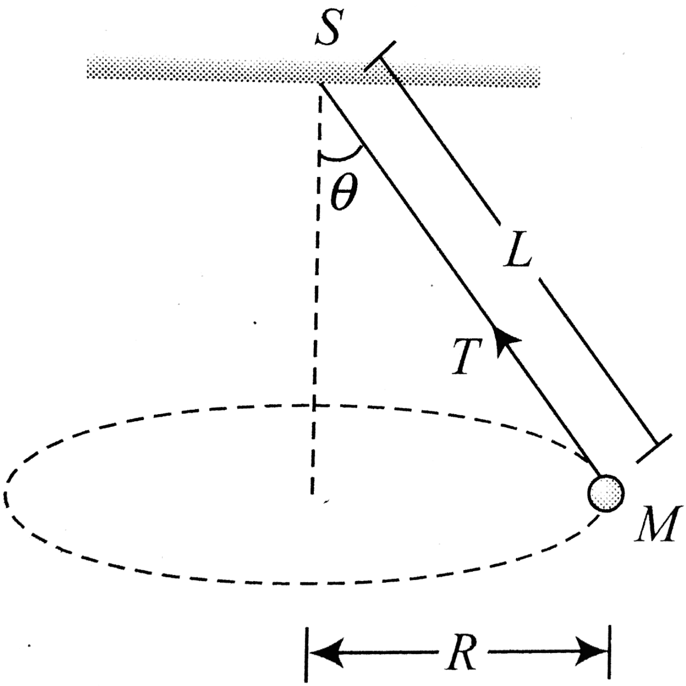
7. A string of length L is fixed at one end and carries a mass M at the other end. The string makes $2/\pi$ revolution per second around the vertical axis through the fixed end as shown in the figure, then tension in the string is.



A. 2 ml

B. 4 ml

C. 8 ml

D. 16 ml

Answer: D

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Rotational Dynamics Very Short Answer Vsa 1 Mark Each

1. Radius of gyration of disc rotating about an axis perpendicular to its plane passing through through its centre is (If R is the radius of disc)

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2. Does the angle of banking depend on mass of the vehicle ?

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3. What happens when a spinning ice skater draws in her outstretched arms?

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4. State the principle of conservation of angular momentum.

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5. Two bodies have their moments of inertia I and $2I$ respectively about their axis of rotation. If their kinetic energies of rotation are equal, their angular momenta will be in the ratio.

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6. A hollow sphere has radius 6.4 m. Minimum velocity required by a motor cyclist at bottom to complete the circle will be.

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7. A bend in a level road has a radius of 100 m Find the maximum speed which a car turning this bend may have without skidding if coefficient of friction between the tyres and the road is 0 .8 S .

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Rotational Dynamics Short Answer I Sa 1 2 Marks Each

1. A flywheel is revolving with a constant angular velocity. A chip of its rim breaks and flies away. How is its angular velocity affected ?

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2. The moment of inertia of a uniform circular disc about a tangent in its own plane is $\frac{5}{4}MR^2$, where M is mass and R is the radius of the disc. Find its moment of inertia about an axis through its centre and perpendicular to its plane.

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3. Derive an expression for maximum safety speed with which a vehicle should move along a curved horizontal road. State the significance of it

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4. The moment of inertia of the body about an axis is 1.2 kg m^2. Initially the body is at rest. In order to produce a rotational kinetic energy of 1500J, an angualr acceleration of 25 $ra\frac{d}{s^2}$ must be applied about the axis for the duration of

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5. A bucket containing water is tied to one end of a rope 5 m long and it is rotated in a vertical circle about the other end. Find the number of rotations per minute in order that the water in the bucket may not spill. (Ans: n=13.37 rpm)

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6. A body weighing 0.5 kg tied to a string is projected with a velocity of $10ms^{-1}$. The body starts whirling in a vertical circle. If the radius of circle is 0.8 m, find the tension in the string when the body is (i) at the lop of the circle and (ii) at the bottom of the circle.

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Rotational Dynamics Short Answer Ii Sa 2 3 Marks Each

1. Derive an expression for the kinetic energy of a body rotating with constant angular velocity. State how it depends on the moment of inertia, and frequency and period of rotation.

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2. Obtain an expressing for torque acting on a body rotating with uniform angular acceleration.

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3. The difference in tensions in the string at lowest and highest points in the path of the particle of mass 'm' performing vertical circular motion is :

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4. Angular Momentum of a Body Rotating About Fixed Axis of Rotation

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5. A railway track goes around a curve having a radius of curvature of 1 km. The distance between the rails is 1 m. Find the elevation of the outer rail above the inner rail so that there is no side pressure against the rails when a train goes round the curve at $36km / hr$

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6. A flywheel of mass 8 kg and radius 10 cm rotating with a uniform angular speed of 5 rad

/ sec about its axis of rotation, is subjected to an accelerating torque of 0.01 Nm for 10 seconds. Calculate the change in its angular momentum and change in its kinetic energy.

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7. Two wheels, each of moment of intertia 4 kg. m^2, rotate side by side at the rate of 120 rpm and 240 rpm in opposite directions. If both the wheels are coupled by a light shaft so that they now rotate with a com on angular speed, find this new rate of rotation.

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Rotational Dynamics Long Answer La 4 Marks Each

1. Theorem of parallel axes

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2. Draw a neat labelled diagram of conical pendulum. State the expression for its periodic time in terms of length.

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3. The maximum speed with which a vehicle can be safely driven along curved road of radius r, banked at angle θ is

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4. Show that the angle of banking is independent of mass of vehicle.

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Mechanical Properties Of Fluids Mcqs 1 Mark Each

1. Insect moves over surface of water because of a

A. Elasticity

B. Surface tension

C. Friction

D. Viscosity

Answer: B

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2. The water droplets in free fall are spherical due to

A. gravity

B. intermolecular attraction

C. Surface tension

D. Viscosity

Answer: C

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3. The value of surface tension of a liquid at critical temperature

A. Infinity

B. Zero

C. Same as any other temperature

D. Can not be determined

Answer: B

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4. Unit of coefficient of viscosity is

A. Ns/m

B. Ns^2/m

C. Ns^2 / m^2

D. Ns / m^2

Answer: D

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5. Two capillary tubes of radii 0.6 cm and 0.3 cm are dipped in the same liquid. The ratio of heights through which the liquid will rise in the tubes is

A. $2:1$

B. $1:2$

C. $4:1$

D. $1:4$

Answer: B

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6. The energy stored in a soap bubble of diameter 6 cm and T = 0.04 N/m is nearly

A. $0.9 \times 10^{-3} J$

B. $0.4 \times 10^{-3} J$

C. $0.7 \times 10^{-3} J$

D. $0.5 \times 10^{-3} J$

Answer: A

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7. Two stones with radii 1:2 fall from a great height through atmosphere. Their terminal velocities are in the ratio

A. $2:1$

B. $1:4$

C. $4:1$

D. $1:2$

Answer: B

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Mechanical Properties Of Fluids Very Short Answer Vsa 1 Mark Each

1. What is surface film?

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2. What is cohesion ?

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3. SHAPE OF LIQUID MENISCUS

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4. How will the weight of a body be affected, when it falls with its terminal velocity through a viscous medium?

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5. A squre metal plate of 10cm side moves parallel to another plate with a velocity of $10cms^{-1}$, both plates immersed in water. If the viscous force is 200 dyne and viscosity of water is 0.01 poise, what is their distance a part.

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6. The relative velocity of two parallel layers of water is 8 cm/sec. If the perpendicular distance between the layers is 0.1 cm, then velocity gradient will be

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7. Water rises to a height of 20 mm in a capillary tube. If the radius made $1/3^{\text{rd}}$ of its previous value, to what height will the water now rise in the tube?

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Mechanical Properties Of Fluids Short Answer I Sa 1 2 Marks Each

1. State properties of an ideal fluid.

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2. STREAMLINE AND TURBULENT FLOW

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3. Define surface tension and angle of contact.

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4. Calculate the rise of water inside a clean glass capillary tube of radius 0.1 mm, when

immersed in water of surface tension $7 \times 10^{-2} N / m$. The angle of contact between water and glass is zero, density of water is 1000 kg/m^3, $g = 9.8 m / s^2$

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5. A rain drop of radius 0.3 mm falls through air with a terminal velocity of 1 m/s. The viscosity of air is $18 \times 10^{-6} N - s / m^2$. Find the viscous force on the rain drop.

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6. Two soap bubbles have radii in the ratio $2:3$. Compare the excess of pressure inside these bubbles. Also compare the woeks done in blowing these bubbles.

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Mechanical Properties Of Fluids Short Answer Ii Sa 2 3 Marks Each

1. Explain the phenomenon of surface tension on the basis molecular theory.

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2. Obtain an expression for the rise of a liquid in a capillary tube.

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3. State Stoke's law and give two factors affecting angle of contact.

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4. Twenty seven droplets of water, each of radius 0.1 mm coalesce into a single drop. Find the change in surface energy. Surface tension of water is 0.072 N/m.

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5. A $U-$ tube is made up of capillaries of bores $1mm$ and $2mm$ respectively. The tube is held vertically and partically filled with a liquid of surface tension $49\text{dyne}/\text{cm}$ and zero contact angle. Calculate the density of the liquid of the difference in the levels of the meniscus is $1.25cm$.

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6. A rectangular wire frame of size 2 cm $\times$ 2 cm, is dipped in a soap solution and taken out.

A soap film is formed, it the size of the film is changed to 3 cm x 3 cm, Calculate the work done in the process. The surface tension of soap film is 3×10^{-2} N/m.

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Mechanical Properties Of Fluids Long Answer La 4 Marks Each

1. The relation between surface tension and surface energy is

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2. Derive Laplace's law for a spherical membrane.

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3. Derive an expression for terminal velocity of the sphere falling under gravity through a viscous medium.

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Kinetic Theory Of Gases And Radiation Mcqs 1 Mark Each

1. Average kinetic energy of molecules is

A. the pressure of the gas

B. the volume of the gas

C. the absolute temperature of the gas

D. the mass of the gas

Answer: C

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2. The number of degrees of freedom, for the vibrational motion of a polyatomic molecule depends on the

A. geometric structure of the molecule

B. mass of the molecule

C. energy of the molecule

D. absolute temperature of the molecule

Answer: A

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3. The power radiated by a perfect blackbody depends only on its

A. material

B. nature of surface

C. colour

D. temperature

Answer: D

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4. If the absolute temperature of a body is doubled, the power radiated will increase by a factor of

A. 2

B. 4

C. 8

D. 16

Answer: D

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5. Calculate the value of $\lambda_{\max}$ for radiation from a body having surface temperature 3000 K.

A. 9935 Å

B. 9656 Å

C. 9421 Å

D. 9178 Å

Answer: B

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6. The molar specific heat of a gas at constant volume is 12307.69 J $kg^{-1}K^{-1}$. If the ratio of the two specific heats is 1.65, calculate the difference between the two molar specific heats of gas.

A. 7999 J $kg^{-1}K^{-1}$

B. 7245 J $kg^{-1}K^{-1}$

C. 6890 J $kg^{-1}K^{-1}$

D. 4067 J $kg^{-1}K^{-1}$

Answer: A

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7. Calculate the energy radiated in one minute by a blackbody of surface area 200 cm^2 at 127 $^\circ C\left(\sigma = 5.7 \times 10^{-8} Jm^{-2}s^{-1}K^{-4}\right)$

A. 1367.04 J

B. 1698.04 J

C. 1751.04 J

D. 1856.04 J

Answer: C

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Kinetic Theory Of Gases And Radiation Very Short Answer Vsa 1 Mark Each

1. Under which condition laws of Boyle, Charles, and Gay-Lussac are valid?

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2. On what, the values of absorption coefficient, reflection coefficient and transmission coefficient depend, in addition to the material of the object on which the radiation is incident?

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3. Why the temperature of all bodies remains constant at room temperature?

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4. Above what temperature all bodies radiate electromagnetic radiation?

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5. If the density of nitrogen is 1.25 kg/m^3 at a pressure of 10^5 Pa, find the root mean square velocity of oxygen molecules.

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6. Find kinetic energy of 3 litre of a gas at S.T.P given standard pressure is $1.013 \times 10^5 N/m^2$.

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7. Determine the pressure of nitrogen at $0^\circ C$ if the density of nitrogen at N.T.P. is 1.25 kg/m^3 and R.M.S. speed of the molecules at N.T.P. is 489 m/s.

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Kinetic Theory Of Gases And Radiation Short Answer I Sa 1 2 Marks Each

1. The amount of energy radiated by a body depends upon

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2. Show that for monoatomic gas the ratio of the two specific heats is 5:3.

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3. Show that for diatomic gas the ratio of the two specific heats is 7:5.

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4. Show graphical representation of energy distribution spectrum of perfectly black body.

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5. Attempt any SIX :

Draw a neat and labelled diagram of Ferry's black body.

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6. Compare the rate of radiation of metal body at 727 $^\circ C$ and 227 $^\circ C$.

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7. 1000 calories of radiant heat is incident on a body. If the body absorbs 400 calories of heat, find the coefficient of emission of the body.

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8. A metal cube of length 4 cm radiates heat at the rate of 10 J/s. Find its emissive power at given temperature.

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Kinetic Theory Of Gases And Radiation Short Answer Ii Sa 2 3 Marks Each

1. The root mean square speed of gas molecules

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2. Kinetic theory of gases is a generalization offered by Maxwell. Boltzmann, Clausius, etc. to explain the behaviour of ideal gases. This theory assumes that ideal gas molecules neither attract nor repel each other. Average kinetic energy of gas molecules is directly proportional to the absolute temperature. A gas equation called kinetic gas equation was derived on the basis of kinetic theory

$$PV = \frac{1}{3}mv^2$$

The average kinetic energy per molecule of an ideal gas is equal to :

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3. If one mole of the polyatomic gas is having two vibrational modes and β is the ratio of molar specific heats for polyatomic gas $\left(\beta = \frac{C_p}{C_V}\right)$ then the value of β is :

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4. Explain the construction and working of Ferry's black body.

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5. Compare the rates of emission of heat by a blackbody maintained at $627^\circ C$ and at $127^\circ C$, if the blackbodies are surrounded by an enclosure at $27^\circ C$. What would be the ratio of their rates of loss of heat?

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6. Determine the molecular kinetic energy per mole of nitrogen molecules at $227^\circ C, R = 8.310 J \text{mole}^{-1} K^{-1}$,No =

6.03×10^{26} moleculesKmole^{-1}. Molecular weight of nitrogen = 28.

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7. Determine the molecular kinetic energy per gram of nitrogen molecules at $227^{\circ} C, R = 8.310 J\text{mole}^{-1} K^{-1}$,No = 6.03×10^{26} moleculesKmole^{-1}. Molecular weight of nitrogen = 28.

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8. Determine the molecular kinetic energy per molecule of nitrogen molecules at $227^{\circ} C, R = 8.310 J\text{mole}^{-1} K^{-1}$,No = 6.03×10^{26} moleculesKmole^{-1}. Molecular weight of nitrogen = 28.

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9. The velocity of three molecules, are $2kms^{-1}, 4kms^{-1}, 6kms^{-1}$. Find mean square velocity.

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10. The velocity of three molecules, are $2kms^{-1}, 4kms^{-1}, 6kms^{-1}$. Find root mean square velocity.

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Kinetic Theory Of Gases And Radiation Long Answer La 4 Marks Each

1. The spectrum of thermal radiation from a blackbody is

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2. The average pressure of an ideal gas is

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3. Derive Mayer's relation.

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Thermodynamics Mcqs 1 Mark Each

1. Which of the following is correct, when the energy is transferred to a system from its environment?

A. System gains energy

B. System loses energy

C. System releases energy

D. system does not exchange energy

Answer: A

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2. Which of the following system freely allows exchange of energy and matter with its environment?

A. Closed

B. Isolated

C. Open

D. partially closed

Answer: C

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3. Two systems at same temperature are said to be in

A. chemical equilibrium

B. thermal equilibrium

C. mechanical equilibrium

D. electrical equillibrium

Answer: B

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4. For work done to be reversible, the process should be

A. cyclic

B. isobaric

C. isochoric

D. adiabatic

Answer: D

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5. A gas in a closed container is heated with 10 J of energy. Causing the lid of the container to rise 2 m with 3 N of force. What is the total change in energy of the system?

A. 10 J

B. 4 J

C. $-4J$

D. $-10J$

Answer: B

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6. The second law of thermodynamics deals with transfer of

A. work done

B. energy

C. momentum

D. heat

Answer: D

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7. Heating a gas in a constant volume container is an example of which process?

A. isochoric

B. adiabatic

C. isobaric

D. cyclic

Answer: C

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Thermodynamics Very Short Answer Vsa 1 Mark Each

1. When two objects are said to be in thermal equilibrium?

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2. The science of measuring temperatures is called as?

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3. State Zeroth law of thermodynamics. How does it lead to the concept of temperature?

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4. What is energy associated with the random, disordered motion of the molecules of a system called as ?

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5. A group of objects that can form a unit which may have ability to exchange energy with its surrounding is called what?

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6. On what basis a thermodynamic system can be classified?

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7. THERMODYNAMIC PROCESS

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8. Define heat with its S.I Unit

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9. What is the internal energy of the system, when the amount of heat Q is added to the system and the system does not do any work during the process?

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10. When does a system lose energy to its surrounding and its internal energy decreases?

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11. State the first law of thermodynamics.

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12. A system releases 100 kJ of heat while 80 kJ of work is done on the system. Calculate the change in internal energy.

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Thermodynamics Short Answer I Sa 1 2 Marks Each

1. Draw p-V diagram of reversible process.

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2. Draw p-V diagram of irreversible process.

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3. Draw p-V diagram showing positive work with varying pressure.

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4. Draw p-V diagram showing negative work with varying pressure.

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5. Draw p-V diagram showing positive work at constant pressure.

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6. 3 mole of a gas at temperature 400 K expands isothermally from initial volume of 4 litre to final volume of 8 litre. Find the work done by the gas. $(R = 8.31 J mol^{-1} K^{-1})$

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7. An ideal gas of volume 2 L is adiabatically compressed to $(1/10)^{th}$ of its initial volume. Its initial pressure is 1.01×105 Pa, calculate the final pressure. (Given γ= 1.4)

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8. Explain the cyclic process.

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9. Differentiate between reversible and irreversible process.

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10. State the assumptions made for thermodynamic processes.

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Thermodynamics Short Answer Ii Sa 2 3 Marks Each

1. Define the terms thermodynamic system, surroundings, thermodynamic variable and equation of state.

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2. Explain given cases related to energy transfer between the system and surrounding –

energy transferred (Q) > 0

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3. Explain given cases related to energy transfer between the system and surrounding

–

energy transferred (Q) $<$ 0

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4. Explain given cases related to energy transfer between the system and surrounding

–

energy transferred (Q) = 0

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5. Explain the different ways through which internal energy of the system can be changed.

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6. Write a note on thermodynamic equilibrium.

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7. Explain graphically positive work with varying pressure.

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8. Explain graphically negative work with varying pressure.

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9. Explain graphically positive work at constant pressure.

Watch Video Solution

10. Write a note on free expansion.

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11. One gram of water $(1cm^3)$ becomes 1671 cm^3 of steam at a pressure of 1 atm. The latent heat of vaporization at this pressure is 2256 J/g. Calculate the external work and the increase in internal energy.

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12. Calculate the fall in temperature of helium initially at $15^{\circ} C$, when it is suddenly expanded to $8 \times$ its original volume $(\gamma = 5/3)$.

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13. A cylinder containing one gram molecule of the gas was compressed adiabaticaly untill its tempertaure rose from $27^\circ C$ to $97^\circ C$. Calculate the work done and heat produced in the gas $(\gamma = 1.5)$.

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Thermodynamics Long Answer La 4 Marks Each

1. State first law of thermodynamics and state the relation between the change in internal energy (ΔU), work done (W) and heat (Q).

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2. Explain work done during a thermodynamic process.

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3. Explain thermodynamics of isobaric process.

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4. Explain thermodynamics of isochoric process.

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5. Explain thermodynamics of adiabatic process.

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Oscillations Mcqs 1 Mark Each

1. If a particle is moving along a circular path with constant speed, then Its motion is

A. Periodic and simple harmonic

B. Non periodic

C. Periodic but not simple harmonic

D. Non periodic but simple harmonic

Answer: C

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2. A particle is performing simple harmonic motion with amplitude A and angular velocity ω . The ratio of maximum velocity to maximum acceleration is

A. ω

B. $1/\omega$

C. ω^2

D. A / ω

Answer: B

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3. What is the acceleration of a particle executing S.H.M. at its mean position.?

A. infinity

B. Varies

C. maximum

D. zero

Answer: D

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4. In a second's pendulum, mass of Bob is 50 g. If it is replaced by 100 g mass, then its period will be.

A. 1 s

B. 2 s

C. 3 s

D. 4 s

Answer: B

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5. The maximum speed of a particle executing SHM is 10 m/s and maximum acceleration is $31.4m/s^2$. Its periodic time is

A. 1 s

B. 2 s

C. 4 s

D. 6 s

Answer: B

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6. When the displacement of a simple harmonic oscillator is half of its amplitude, its potential energy is 3J. Its total energy is

A. 6 J

B. 12 J

C. 15 J

D. 20 J

Answer: B

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7. Two S.H.M.'s have zero phase difference and equal amplitudes A. The resultant amplitude on their composition will be

A. $2A$

B. zero

C. $\sqrt{2}A$

D. $\sqrt{2A}$

Answer: A

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Oscillations Very Short Answer Vsa 1 Mark Each

1. A simple pendulum moves from one end to the other in $1/4$ second. What is its frequency?

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2. A particle executes S.H.M. of 2 cm. At the extreme position, the force is 4 N. What is the force at a point midway between mean and extreme positions ?

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3. A simple pendulum is inside a space craft. What should be its time period of vibration ?

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4. Define amplitude of $S.H.M.$?

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5. What is a second's pendulum?

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6. State the formula for frequency of S.H.M in terms of force constant.

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7. The phase of a particle in S.H.M. is $\pi/2$, then :

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Oscillations Short Answer I Sa 1 2 Marks Each

1. A particle performs linear SHM with amplitude 5 cm and period 2s. Find the speed of the particle at a point where its accleration is half the maximum acceleration.

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2. The acceleration due to gravity on the surface of the moon is $1.7ms^{-2}$. What is the time period of a simple pendulum on the surface of the moon, if its time period on the surface of earth is $3.5s$? Take $g = 9.8ms^{-2}$ on the surface of the earth.

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3. The total energy of a body of mass 2 kg performing S.H.M. is 40 J. Find its speed while crossing the centre of the path.

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4. The differential equation of angular S.H.M. is in the order of

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5. Define linear S.H.M.

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6. State any two laws of simple pendulum.

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Oscillations Short Answer Ii Sa 2 3 Marks Each

1. The period of oscillation of simple pendulum increases by 20 % , when its length is increased by 44 cm. find its initial length.

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2. A particle performing S.H.M. has velocities of 8 cm/s and 6 cm/s at displacements of 3 cm and 4 cm respectively. Calculate the amplitude and period of S.H.M.

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3. A particle performs linear S.H.M. of period 4 seconds and amplitude 4 cm. Find the time taken by it to travel a distance of 1 cm from the positive extreme position.

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4. Define angular S.H.M. and obtain its differential equation.

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5. Obtain the expression for the period of a magnet vibrating in a uniform magnetic field and performing S.H.M.

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Oscillations Long Answer La 4 Marks Each

1. From differential equation of linear S.H.M obtain an expression for acceleration. Velocity and displacement of a particle performing S.H.M.

A sononmeter wire 1 meter long weighing 2 g is in resonsnace with a tunning fork of frequency 300 Hz. Find tension in the sonometer wire.

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2. What is a simple pendulum? Find an expression for the time period and frequency of a simple pendulum.

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3. Deduce the expression for kinetic energy, potential energy and total energy of a particle performing S.H.M. State the factors on which total energy depends.

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Superposition Of Waves Mcqs 1 Mark Each

1. A standing wave is produced on a string on a string clamped at one end and free at the other. The length of the string

A. must be an odd integral multiple of λ

B. must be an odd integral multiple of $\lambda/2$

C. must be an odd integral multiple of $\lambda/4$

D. must be an even integral multiple of λ

Answer: C

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2. The equation of a simple harmonic progressive wave is given by

$$y = 5\cos\pi\left[200t - \frac{x}{150}\right]$$

where x and y are in cm and 't' is in seocnd. The the velocity of the wave is

A. 2 m/s

B. 150 m/s

C. 200 m/s

D. 300 m/s

Answer: C

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3. A man standing unsymmetrical position between two mountains and fires a gun. He hears the first echo after 1.5 s and the second echo after 2.5 s. If the speed of sound in air is

340 m/s, then the distance between the mountains will be

A. 400 m

B. 520 m

C. 640 m

D. 680 m

Answer: D

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4. A set of tuning forks is arranged is ascending order of frequencies each tuning fork gives 8 beats/s with the preceding one. If frequency of the first tuning fork is 120 Hz and the last fork is 200 Hz, then the number of tuning forks arranged will be,

A. 8

B. 9

C. 10

D. 11

Answer: D

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5. In law of tension, the fundamental frequency of vibrating string is

A. inversely proportional to square root of tension

B. directly proportional to the square of tension

C. directly proportional to the square root of tension

D. inversely proportional to density

Answer: C

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6. The integral multiple of fundamental frequencies are

A. beats

B. resonance

C. overtones

D. harmonics

Answer: D

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7. An organ pipe of length 0.4m is open at both ends . The speed of sound in air is $340ms^{-1}$. The fundamental frequency is

A. 405 Hz

B. 415 Hz

C. 425 Hz

D. 435 Hz

Answer: C

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Superposition Of Waves Very Short Answer Vsa 1 Mark Each

1. A wave is represented by -

$y = a\sin(At - Bx + C)$

where A, B, C are constants. The Dimensions of A, B, C are

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2. Progressive wave with doubly periodic motion means.

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3. What is meant by interference of waves?

Watch Video Solution

4. What are beats?

Watch Video Solution

5. What are harmonics?

Watch Video Solution

6. What are fundamental note and overtones?

Watch Video Solution

7. State law of length.

Watch Video Solution

8. In law of tension, the fundamental frequency of vibrating string is

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9. In law of linear density, the fundamental frequency of vibrating string is

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10. What is the resonance?

Watch Video Solution

11. Free vibrations and forced vibrations.

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12. A violin string vibrates with fundamental frequency of 510 Hz. What is the frequency of first overtone? (Ans: n1 = 1020 Hz)

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13. A string 1 m long is fixed at one end. The other end is moved up and down with frequency 20 Hz. Due to this, a stationary wave with four complete loops, gets produced on the string. Find the speed of the progressive wave which produces the stationary wave. [Note: Remember that the moving end is a antinode.]

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Superposition Of Waves Short Answer I Sa 1 2 Marks Each

1. For a stationary wave set up in a string having both ends fixed, what is the ratio of the fundamental frequency to the third harmonic?

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2. What are stationary waves?

Watch Video Solution

3. Distinguish between harmonics and overtones.

Watch Video Solution

4. State any four applications of beats.

Watch Video Solution

5. Prove that a pipe of length 2l open at both ends has same fundamental frequency as another pipe of length l closed at the other end. Also, state whether the total sound will be identical for two pipes.

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6. How does the frequency of a vibrating wire change when the attached load is immersed in water.

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7. A sonometer wire of length 1 m is stretched by a weight of 10 kg. The fundamental frequency of vibration is 100 Hz. Determine the linear density of material of wire.

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Superposition Of Waves Short Answer Ii Sa 2 3 Marks Each

1. Find the amplitude of the resultant wave produced due to interference of two waves given as,

$y_1 A_1 \sin \omega t, y_2 = A_2 \sin(\omega t + \phi)$

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2. Show that even as well as odd harmonics are present as overtones in the case of an air column vibrating in a pipe open at both the ends.

A wheel of momen of intertia 1 kg m^2 is rotating at a speed of 30 rad/s Due to friction on the axis, it comes to rest i n 10 mintes. Calculate the average torque of the friction.

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3. State and explain the laws of vibrations of stretched strings.

Watch Video Solution

4. Two wires of the same material and same cross section are stretched on a sonometer. One wire is loaded with 1 kg and another is loaded with 9 kg. The vibrating length of first wire is 60 cm and its fundamental frequency of vibration is the same as that of the second wire. Calculate vibrating length of the other wire.

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5. The equation of a simple harmonic progressive wave is $y = \sin\frac{\pi}{2}\left[\frac{4t}{0.025} - \frac{x}{0.25}\right]$ where all the quantities are in SI units. What is the amplitude and frequency of the wave ?

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6. A stretched sonometer wire is in unison with a tuning fork. When the length is increased by 4%, the number of beats heard per second is 6. Find the frequency of the fork.

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Superposition Of Waves Long Answer La 4 Marks Each

1. Explain the formulation of stationary waves by analytical method. What are nodes and antinodes? Show that the distance between two successive nodes or antinodes is $\lambda / 2$

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2. Explain briefly the analytical method of formation of beats.

Watch Video Solution

3. State the laws of vibrating strings using sonometer.

Watch Video Solution

4. Waves produced by two vibrators in a medium have wavelength 2 m and 2.1 m respectively. When sounded together they produce 8 beats/second. Calculate wave velocity and frequencies of the vibrators.

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Wave Optics Mcqs 1 Mark Each

1. When light rays travels from an optically rarer medium to an optically denser medium, the speed of light decreases because of change in which of the following ?

A. Wavelength

B. Frequency

C. Amplitude

D. Phase

Answer: A

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2. Light of wavelength 5000 A.falls on a plane reflecting surface. The frequency of reflected light is...

A. 6×10^{14}Hz

B. 5×10^{14}Hz

C. $2 \times 10^{14} Hz$

D. $1.666 \times 10^{14} Hz$

Answer: A

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3. Light follows wave nature because...

A. Light rays travel in a straight line

B. Light exhibits the phenomenon of reflection and refraction

C. Light exhibits the phenomenon of interference

D. Light causes the phenomenon of photoelectric effect

Answer: C

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4. Young's double slit experiment is carried out by using green, red and blue light, one color at a time. The fringe width recorded are b_G,b_R and b_B respectively. Then,

A. $W_G > W_B > W_R$

B. $W_B > W_G > W_R$

C. $W_R > W_B > W_G$

D. $W_R > W_G > W_B$

Answer: D

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5. The path difference between two waves meeting at a point is $(11/4)\lambda$. The phase difference between the two waves is...

A. $11\pi/4$

B. $11\pi/2$

C. 11π

D. 22π

Answer: B

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6. Which out of the following cannot produce two coherent sources?

A. Lloyd's mirror

B. Fresnel biprism

C. Young's double slit

D. Prism

Answer: D

Watch Video Solution

7. What is the bending of beam of light around corners of obstacle is called?

A. Reflection

B. Diffraction

C. Refraction

D. Interference

Answer: B

Watch Video Solution

8. In a single slit diffraction experiment the first minimum for red light of wavelength 6600Å coincides with the first maximum for other light of wavelength λ. The value of λ is

A. 5500 A.U.

B. 5000 A.U.

C. 4800 A.U.

D. 4400 A.U.

Answer: D

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Wave Optics Very Short Answer Vsa 1 Mark Each

1. What is the shape of the wave front on Earth for Sunlight?

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2. In Young's double slit experiment, if there is no initial phase difference between the light from the two slits, a point on the screen corresponds to the 5^{th} minimum. What is the path difference?

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3. Two coherent sources whose intensity ratio is 25:1 produce interference fringes. Calculate the ratio of amplitudes of light waves coming from them.

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4. Why two light sources must be of equal intensity to obtain a well-defined interference pattern?

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5. The relation between phase difference and path difference is

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6. What should be the slit width to obtain pronounced diffraction with a single slit illuminated by light of wavelength λ?

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7. What must be ratio of the slit width to the wavelength for a single slit, to have the first diffraction minimum at 45°?

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Wave Optics Short Answer I Sa 1 2 Marks Each

1. Wave Optics | Introduction, Huygens Principle, Refraction And Reflection Of Plane Waves Using Huygens Principle

Watch Video Solution

2. Green light of wavelength 5100 Å from a narrow slit is incident on a double slit . If the overall separation of 10 fringes on a screen 200 cm away is 2 cm , find slit separation .

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3. State the conditions for obtaining a steady and distinct interference pattern.

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4. Calculate angular momentum of electron in 7th Bohr orbit of Hydrogen atom ?

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5. OPTICAL PATH LENGTH IN YDSE

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6. What is difference between Fresnel and Fraunhofer diffraction?

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7. White light consists of wavelengths from 400 nm to 700 nm. What will be the wavelength range seen , When white light is passed through glass of refractive index 1.55 ?

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8. The Optical Path of a ray of light of a given wavelength travelling a distance of 3 cm in flint glass having refractive index 1.6 is same as that on travelling a distance x cm through a medium having refractive index 1.25. Determine the value of x.

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Wave Optics Short Answer Ii Sa 2 3 Marks Each

1. Explain reflection of light at a plane surface with the help of a neat ray diagram.

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2. In a biprism experiment, the distance between the consecutive bright bands is 0.32 mm, when red light of wavelength 6400 Å is used. By how much would the band width change, if blue light of wavelenth 4800 Å is used, with the same setting?

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3. A parallel beam of gren light of wavelength 546 nm passes through a slit of width 0.40mm. The transmitted light is collected on a screen 40 cm away. Find the distance between the two first order minima.

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4. Light of wavelength $\lambda = 5000 \text{Å}$ falls normally on a narrow slit. A screen is placed at a distance of $1m$ from the slit and perpendicular to the direction of light. The first minima of the diffraction pattern is situated at $5mm$ from the centre of central maximum. The width of the slit is

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Wave Optics Long Answer La 4 Marks Each

1. What is interference of light?

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Electrostatics Mcqs 1 Mark Each

1. A metal foil of negligible thickness is introduced between the two plates of a capacitor at the centre. The capacitance of capacitor will be

A. Half

B. Double

C. Same

D. K times

Answer: C

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2. Capacitance (in F) of a spherical conductor with radius 1m is

A. $1.1zx10^{-10}$

B. 9×10^{-9}

C. 10^{-6}

D. 10^{-3}

Answer: A

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3. An electric dipole when placed in uniform electric field has zero potential energy. The angle between dipole moment and electric field is ....

A. 2π

B. π

C. $\frac{\pi}{2}$

D. Zero

Answer: D

Watch Video Solution

4. In bringing an electron towards another electron, the electrostatic potential energy of the system

A. decreases

B. increases

C. Becomes zero

D. Remains same

Answer: B

Watch Video Solution

5. The work done in carrying a charge q once round a circle of radius r with a charge Q at the centre is

A. $\frac{1}{4\pi_0}\cdot\frac{Q}{r}$

B. $\frac{Q.q}{4\pi es\pi_0 r}$

C. Zero

D. $\frac{Q.q}{2r}$

Answer: B

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6. You are given a number of capacitors labelled as 8μF - 250V. Find the number of capacitors needed to get an arrangement equivalent of 16μF - 1000V.

A. 4

B. 16

C. 32

D. 64

Answer: B

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7. A parallel plate condenser with oil between the plates (dielectric constant of oil K = 2) has a capacitance C. if the oil is removed , then capacitance of the capacitor becomes

A. 2C

B. $C\sqrt{2}$

C. $\frac{C}{\sqrt{2}}$

D. $\frac{C}{2}$

Answer: D

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Watch Video Solution

Electrostatics Very Short Answer Vsa 1 Mark Each

1. What do you mean by dielectric polarization?

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2. Name the physical quantity which has its unit joule coulomb^{-1}. Is it a scalar or vector quantity?

Watch Video Solution

3. Which of the following is true about linear isotropic dielectric ?

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4. A parallel plate capacitor is connected to a battery. The plates are pulled apart with uniform speed. If x is the separation between the plates, then the rate of change of

electrostatic energy of the capacitor is proportional to

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5. The mean free path of electrons in a metal is $4 \times 10^{-8} m$ The electric field which can give on an average $2eV$ energy to an electron in the metal will be in the units V/m

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6. The electric potential at the surface of an atmoic nucleus $(Z = 50)$ of radius $9.0 \times 10^{-13} cm$ is

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7. The capacity of a parallel plate capacitor is 10 μF when the distance between its plates is 9 cm. What will be its capacity if the distance between the plates is reduced by 6 cm.

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Electrostatics Short Answer I Sa 1 2 Marks Each

1. Briefly explain the principle of a capacitor. Derive an expression for the capacitance of a parallel plate capacitor, whose plates are separated by a dielectric medium.

Watch Video Solution

2. Determine the electric field intensity at a point near a uniformly charged infinite plane lamina.

Watch Video Solution

3. What are polar and non-polar dielectrics? Give one example of each.

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4. Two capacitors each of capacity $2\mu F$ are connected in parallel. This system is connected in series with a third capacitance of $12\mu F$

capacity . The equivalent capacity of the system will be

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5. Two spheres A and B of radius a and b respectively are at the same potential. The ratio of the surface charge density of A to B is

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6. A molecule with a dipole moment p is placed in an electric field of strength E. Initially the dipole is aligned parallel to the field. If the dipole is to be rotated to be anti-parallel to the field, the work required to be done by an external agency is

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Electrostatics Short Answer Ii Sa 2 3 Marks Each

1. Derive an expression for the effective capacitance of three capacitors connected in series.

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2. The energy stored in the condenser is

Watch Video Solution

3. Derive an expression for the capacitance of a parallel plate capacitor.

Watch Video Solution

4. Two parallel plate capacitors X and Y have the same area of the plates and same separation between them, are connected in series to a battery of 15 V. X has air between the plates while Y contains a dielectric of constant $k = 2$.

Calculate the capacitance of each capacitor if equivalent capacitance of the combination is 2 μF

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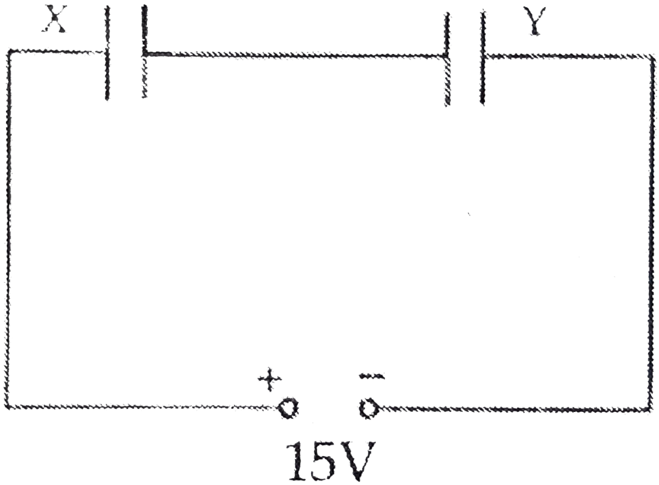
5. Two parallel plate capacitors X and Y have the same area of the plates and same separation between them, are connected in series to a battery of 15 V. X has air between the plates while Y contains a dielectric of constant $k = 2$.

Calculate the potential difference between the plates of X and Y.

Watch Video Solution

6. Two parallel plate capacitors X and Y have the same area of plates and same separation between them.

X has air between the plates while Y contains a dielectric medium of $e_r = 4$



(i) Calculate capacitance of each capacitor if equivalent capacitance of the combination is $4\mu_F$

(ii) Calculate the potential difference between the plates of X and Y

(iii) Estimate the ratio of electrostatic energy stored in X and Y .

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7. Find the amount of work done in rotating an electric dipole of dipole moment 3.2×10^{-8} Cm from its position of stable equilibrium to the position of unstable equilibrium in a uniform electric field if intensity $10^4 N/C$.

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8. Three point charges +q, +2q and Q are placed at the three vertices of an equilateral

triangle. Find the value of charge Q (in terms of q), so that electric potential energy of the system is zero.

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Electrostatics Long Answer La 4 Marks Each

1. Give the expression for the potential energy of a dipole in an external electric field with the help of a neat diagram.

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2. Derive an expression for the capacitance of a parallel plate capacitor with dielectric as the medium between the plates.

Watch Video Solution

3. Derive the expression for the electric potential due to an electric dipole at a point on its axial line.

Watch Video Solution

Current Electricity Mcqs 1 Mark Each

1. Kirchoff's second law is based on the law of conservation of

A. conservation of charge

B. conservation of mass

C. conservation of energy

D. conservation of momentum

Answer: C

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2. When unknown resistance is determined by meter bridge, the error due to contact resistance is minimised by

A. connecting both the resistances only in one gap

B. interchanging the position of known and unknown resistances

C. using uniform wire

D. obtaining the null point near the ends of the wire

Answer: B

View Text Solution

3. S.I. unit of potential gradient is

A. V/cm

B. V-m

C. V/m

D. V-cm

Answer: C

Watch Video Solution

4. Instrument which can measure terminal potential difference as well as electromotive force (e.m.f.) is

A. Wheatstone's meter bridge

B. voltmeter

C. potentiometer

D. galvanometer

Answer: C

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5. When null point is obtained in the potentiometer the current is drawn from

A. main battery

B. cell battery

C. both main and cell battery

D. neither main nor cell battery

Answer: A

Watch Video Solution

6. If potential gradient of a wire decreases, then its length

A. remains constant

B. decreases

C. increases

D. none of the above

Answer: C

Watch Video Solution

7. Four resistances $3\Omega, 6\Omega, 4\Omega,$ and 12Ω are connected so as to form Wheatstone's network. Shunt needed across 12Ω resistor to balance the bridge is

A. 24

B. 18

C. 12

D. 8

Answer: A

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Current Electricity Very Short Answer Vsa 1 Mark Each

1. State Kirchhoff’s first (current) law.

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2. State Kirchhoff’s second (voltage) law.

Watch Video Solution

3. What are the basis of Kirchhoff's current law and voltage law ?

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4. Are Kirchhoff's laws applicable to both AC and DC circuits?

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5. Define potential gradient.

Watch Video Solution

6. On what factors, does the potential gradient of the potentimeter wire depend?

Watch Video Solution

7. What is the SI unit of potential gradient?

Watch Video Solution

8. State any one use of a potentiometer.

Watch Video Solution

9. A voltmeter has resistance of 100 Ω . What will be its reading when it is connected across a cells of e.m.f 2 V and internal resistance 20 Ω ?

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10. In a meter bridge, two unknown resistances R and S, when connected between the two gaps, gives a null point is 60 cm from one end.

What is the ratio of R and S?

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Current Electricity Short Answer I Sa 1 2 Marks Each

1. What are the disadvantages of a potentiometer over a voltmeter?

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2. Give four differences between potentiometer and voltmeter.

Watch Video Solution

3. Distinguish between ammeter and voltmeter.

Watch Video Solution

4. ELECTRIC CIRCUIT

Watch Video Solution

5. PN junction

Watch Video Solution

6. Calculate the value of the shunt resistance when connected across a galvanometer of resistance 18Ω will allow 1/10 th of the current to pass through the galvanometer.

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7. Four resistances 6Ω, 6Ω, 6Ω and 18Ω form a Wheatstone bridge. Find the resistance which connected across the 18Ω resistance will balance the network.

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8. The maximum safe voltage that can be measured using a galvanometer of resistance G is V_m . Find the resistance to be connected in series with the galvanometer so that it becomes a voltmeter of range nV_m.

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Current Electricity Short Answer Ii Sa 2 3 Marks Each

1. Explain with a neat circuit diagram how will you determine unknown resistance 'X' by using meter bridge.

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2. State any 'two' possible sources of errors in meter-bridge experiment. How can they be minimised?

Watch Video Solution

3. What is potential gradient ? How is it measured ? Explain.

Watch Video Solution

4. Describe the use of a potentiometer to compare the emf's of two cells by the direct method (i.e., connecting them separately).

Watch Video Solution

5. A cell of e.m.f 1.5V and negligible internal resistance is connected in series with a potential meter of length 10 m and total resistance 20Ω. What resistance should be introduced in the resistance box such that the potential drop across the potentiometer is one microvolt per cm of the wire?

Watch Video Solution

6. (i) In a metre bridge, the balance point is found to be at 39.5 cm from the end A, when the resistor Y is of 12.5Ω. Determine the resistance of X. Made of thick copper strips?

(ii). Determine the balance point of the bridge above if X and Y are interchanged.

(iii). what happens if the galvanometer and cell are interchanged at the balance point of the bridge ? Would the galvanometer show any current?

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7. The emf of a standard cell is 1.5V and is balanced by a length of 300 cm of a potentiometer with 10 m long wire. Find the percentage error in a voltmeter which balances at 350 cm when its reading is 1.8 V.

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Current Electricity Long Answer La 4 Marks Each

1. Describe the use of a potentiometer to compare the emf's of two cells by the direct method (i.e., connecting them separately).

Watch Video Solution

2. State the uses of a potentiometer. Why is a potentiometer preferred over a voltmeter for measuring emf?

Watch Video Solution

Magnetic Effect Of Electric Current Mcqs 1 Mark Each

1. According to right hand thumb rule, if current is directed in upward direction then the direction of magnetic induction is ________

A. perpendicular and inwards

B. perpendicular and outwards

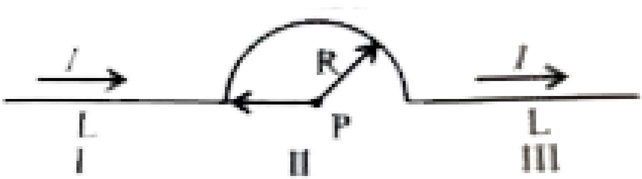
C. same as current

D. opposite to that of current

Answer: B

Watch Video Solution

2. A conductor has three segments, two straights of length L and a semicircular with radius R. It carries a current I What is the magnetic field B at point P?



A. $\frac{\mu_0 I}{4\pi R}$

B. $\frac{\mu_0}{4\pi}\frac{I}{R^2}$

C. $\frac{\mu_0 I}{4R}$

D. $\frac{\mu_0 I}{4\pi}$

Answer: A

Watch Video Solution

3. A strong magnetic field is applied on a stationary electron, then

A. moves in the direction of the field

B. remained stationary

C. moves perpendicular to the direction of the field

D. moves opposite to the direction of the field

Answer: B

Watch Video Solution

4. The force exerting between the two parallel current carrying conductors if F. If the current in each conductor is doubled, what is the value of force acting between them?

A. 4F

B. 2F

C. F

D. F/4

Answer: A

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Watch Video Solution

5. Which of the following is not the unit of magnetic induction ?

A. guass

B. tesla

C. oersted

D. Wb/m^2

Answer: C

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6. The magnetic dipole moment of current loop is independent of

A. number of turns

B. area of loop

C. current in the loop

D. magnetic field in which it is lying

Answer: D

Watch Video Solution

7. A circular loop of radius $0.0157m$ carries a current of 2.0 amp. The magnetic field at the centre of the loop is

$\left(\mu_0 = 4\pi \times 10^{-7}\text{weber}/amp - m\right)$

A. $1.57x \times 10^{-3} Wb/m^2$

B. $8.0x \times 10^{-5} Wb/m^2$

C. $2.0x \times 10^{-3} Wb/m^2$

D. $3.14x \times 10^{-1} Wb/m^2$

Answer: B

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Magnetic Effect Of Electric Current Very Short Answer Vsa 1 Mark Each

1. Lorentz force

Watch Video Solution

2. What is a solenoid?

Watch Video Solution

3. What is a toroid?

Watch Video Solution

4. Calculate the value of magnetic field at a distance of 2 cm from a very long straight wire carrying a current 5 A

Watch Video Solution

5. What happens to the magnetic field at the centre of a circular current carrying coil if we double the radius of the coil keeping the current unchanged?

Watch Video Solution

6. A solenoid of length $0 \cdot 5m$ has a radius of $1cm$ and is made up of 500 turns. It carries a current of $5A$. What is the magnitude of the magnetic field inside the solenoid?

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7. A magnetic dipole is free to rotate in a uniform magnetic field. For what orientation of the magnet with respect to the fiel (a) torque is maximum? (b) potential energy is maximum? (c) rate of change of torque with deflection is maximum?

Watch Video Solution

Magnetic Effect Of Electric Current Short Answer I Sa 1 2 Marks Each

1. A toroid of 4000 turns has outer radius of 26 cm and inner radius of 25 cm. If the current in the wire is 10 A. Calculate the magnetic field of the toroid.

Watch Video Solution

2. Magnetic field lines can be entirely confined within the core of a toroid, but not within a straight solenoid. Why?

Watch Video Solution

3. A solenoid of length π m and 5 cm in diameter has winding of 1000 turns and carries a current of 5 A. Calculate the magnetic field at its centre along the axis.

Watch Video Solution

4. Currents of equal magnitude pass through two long parallel wires having separation of

1.35 cm. If the force per unit length on each wire is 4.76×10^{-2} N/m, what is I ?

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5. Explain " Magnetic force never does any work on moving charges"

Watch Video Solution

Magnetic Effect Of Electric Current Short Answer Ii Sa 2 3 Marks Each

1. MOVING COIL GALVANOMETER

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2. BIOT SAVART LAW

Watch Video Solution

3. A Rectangular coil of 10 turns, each of area 0.05 m^2, is suspended freely in a uniform magnetic field of induction 0.01 T. A current of

30 μA is passed through it. (i) What is the magnetic moment of the coil (ii) What is the maximum torque experienced by the coil?

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4. The expression for magnetic induction inside a solenoid of length L carrying a current I and having N number of turns is

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5. Calculate the torque acting on a rectangular coil carrying current I placed in a uniform magnetic field when the plane of the coil is perpendicular to the magnetic lines of force.

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6. A circular loop of radius 9.7 cm carries a current 2.3 A. Obtain the magnitude of the magnetic field at the centre of the loop .

Watch Video Solution

7. The magnetic field at the centre of a circular loop of radius 12.3 cm is 6.4×10^{-6} T. What will be the magnetic moment of the loop?

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Magnetic Effect Of Electric Current Long Answer La 4 Marks Each

1. The distance between two long and parallel wires is b. If the current flowing through each of them is iA, what will be the force acting per unit length of each wire?

Watch Video Solution

2. Using Ampere's circuital law, obtain an expression for the magnetic induction at a point near an infinitely long straight conductor carrying an electric current.

Watch Video Solution

3. Use Biot-Savart law to derive the expression for the magnetic field on the axis of a current carrying circular loop of radius R.

Draw the magnetic field lines due to circular wire carrying current I.

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Magnetic Materials Mcqs 1 Mark Each

1. The magnetic susceptibility is

A. $\chi = \frac{1}{H}$

B. $\chi = \frac{B}{H}$

C. $\chi = \frac{M_{\text{net}}}{V}$

D. $\chi = \frac{M}{H}$

Answer: D

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2. Write the relation between relative permeability and susceptibility.

A. $\chi = \mu_r + 1$

B. $\chi = -\mu_r - 1$

C. $\mu_r = 1 - \chi$

D. $\mu_r = 1 + \chi$

Answer: D

Watch Video Solution

3. If an electron of charge (-e) and mass m_e revolves around the nucleus of an atom having magnetic moment M_e, then angular momentum of electron is

A. $L = \frac{m_o e}{2m_e}$

B. $L = \frac{e}{2m_o m_e}$

C. $L = \frac{2m_o m_e}{e}$

D. $L = \frac{2e}{m_o m_e}$

Answer: C

Watch Video Solution

4. If M_0 and L_0 denote the orbital angular moment and angular momentum of the electron due to its orbital motion then the gyromagnetic ratio is given by

A. $\frac{L}{m_o}$

B. $\frac{m_o}{L}$

C. Lm_o

D. $\sqrt{\frac{m_0}{L}}$

Answer: B

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5. Relative permeability of iron is 5500, then its magnetic susceptibility will be

A. 5500×10^{7}

B. 5501

C. 5499

D. 5500×10^{-7}

Answer: C

Watch Video Solution

6. What is the magnetization of a bar magnet having length 6 cm and area of cross section 5 cm^2 ? (M = 1 Am^2)

A. 1.2 $\times 10^{-4} A/m$

B. 3.3 $\times 10^{-4} A/m$

C. 1.25 $\times 10^{-4} A/m$

D. 3.3 $\times 10(-4) A/m$

Answer: B

Watch Video Solution

7. A paramagnetic substance of susceptibility 3×10^{-4} is placed in a magnetic field of $3 \times 10^{-4} Am^{-1}$. . Then , the intensity of magnetisation in units of A m^{-1} is

A. 12 $\times 10^{8}$

B. 1.33 $\times 10^{8}$

C. 0.75 $\times 10^{-8}$

D. 14 $\times 10^{-8}$

Answer: A

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Magnetic Materials Very Short Answer Vsa 1 Mark Each

1. The gyro magnetic ratio of an electron in an H atom according to Bohr model is

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2. What is the correct value of Bohr magneton?

Watch Video Solution

3. Define magnetization. Write its S.I. unit and dimensions.

Watch Video Solution

4. The ratio of magnetisation I to the magnetic field intensity H is

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5. The relative permeability of a medium is 0.075. What is its magnetic susceptibility?

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6. The magnetic moment of a magnet $(15cm \times 2cm \times 1cm) is 1.2A - m^2$. Calculate its intensity of magnetisation

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7. The electron in the hydrogen atom is moving with a speed of 2.5×10^6 m/s in an orbit of radius 0.5 m what is the magnetic moment of the revolving electron ?

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Magnetic Materials Short Answer I Sa 1 2 Marks Each

1. Show that the orbital magnetic dipole moment of a revolving electron is $evr / 2$.

Watch Video Solution

2. Give the expression for Bohr magneton.

Watch Video Solution

3. Define magnetization. Write its S.I. unit and dimensions.

Watch Video Solution

4. Calculate the gyro magnetic ratio of electron

(given 1.6 $\times 10^{-19}$ C, $m_r = 9.1 \times 10^{-3}$ kg)

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5. An iron rod of area ofcross-section $0.1m^2$ is subjected to a magnetising field of $1000A/m$. Calculate the magnetic permeability of the iron rod.

[Magnetic susceotibility of iron $= 59.9$, magneitc permeability of vaccum $= 4\pi \times 10^{-7}$ S.I. unit]

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6. A solenoid has core of a material with relative permeability 500 and its windings carry a current of 1 A. The number of turns of the solenoid is 500 per metre. The magnetization of the material is nearly

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Magnetic Materials Short Answer Ii Sa 2 3 Marks Each

1. Define magnetic intensity. State its dimensions and SI unit.

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2. Deduce an expression for the magnetic dipole moment of an electron orbiting around the central nucleus.

Watch Video Solution

3. Define gyromagnetic ratio.

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4. A rod ferromagnetic with dimensions $10 \times 0.5 \times 0.2$cm is placed in a magnetic field of strength 0.5×10^4 amp/m as a result of which a magnetic moment of $5amp - m^2$ is produced in the rod.The value of magnetic induction will be

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5. A magnet of magnetic moment $3Am^2$ weighs 75 g .The density of the material of the $7500kg/m^3$. what is the magnetization.?

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6. Find the relative permeability ,if the permeability of a metal is 0.1256 TmA^{-1}

Watch Video Solution

Magnetic Materials Long Answer La 4 Marks Each

1. Define magnetization. Write its S.I. unit and dimensions.

Watch Video Solution

2. A circular loop of radius 9.7 cm carries a current 2.3 A. Obtain the magnitude of the magnetic field at the centre of the loop .

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3. An electron in an atom is revolving round the nucleus in a circular orbit of radius 5.3×10^{-11}m, with a speed of $2 \times 10^6 ms^{-1}$. Find resultant orbital magnetic moment and angular momentum of electron.

$(e = 1.6 \times 10^{-19} C, m = 9.1 \times 10kg)$

Watch Video Solution

Electromagnetic Induction Mcqs 1 Mark Each

1. In which of the following devices, the eddy current effect is not used ?

A. Electromagnet

B. Induction furnace

C. Induction furnace

D. Magnetic breaking in train

Answer: C

Watch Video Solution

2. An ideal transformer has 100 turns in the primary and 250 turns in the secondary. The peak value of the ac is $28V$. The r.m.s. secondary voltage is nearest to

A. 100V

B. 70V

C. 50V

D. 40V

Answer: C

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3. The role of self-inductance in a circuit is equivalent to :

A. inertia

B. force

C. energy

D. momentum

Answer: A

Watch Video Solution

4. The energy stored in a 50 mH inductor carrying a current of 4 A will be

A. 0.4 J

B. 0.1 J

C. 0.04 J

D. 0.01 J

Answer: A

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5. In the expression $e = -d\varnothing/dt$, the -ve sign signifies

A. The induced emf is produced only when magnetic flux decreases

B. The induced emf opposes the change in the magnetic flux

C. The induced emf is opposite to the direction of the flux.

D. The induced emf is independent of change in magnetic flux.

Answer: B

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6. Two pure inductors each of self inductance L are connected in series, the net inductance is

A. 2L

B. L

C. L/2

D. L/4

Answer: A

Watch Video Solution

7. A magnet is moved towards a coil (i) quickly (ii) slowly, then the induced e.m.f. is

A. larger in case (i)

B. smaller in case (i)

C. equal to both the cases

D. larger or smaller depending upon the radius of the coil

Answer: A

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Electromagnetic Induction Very Short Answer Vsa 1 Mark Each

1. What is electromagnetic induction? State Faraday's laws of electromagnetic induction.

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2. In step-up transfomer, the relation between number of turns in primary (N_p) and number of turns in secondary (N_S) coils is

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3. State the condition at which we say to the two coils kept close to each other areperfectly coupled with each other.

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4. State Lenz's Law.

A metallic rod held horizontally along east-west direction, is allowed to fall under gravity. Will there be an emf induced at its ends? Justify your answer.

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5. (i) Define mutual inductance.

(ii) A pair of adjecent coils has a mutual inductance of 1.5 H . If the current in one coil changes from 0 to 20 A in 0.5s, what is the change of flux linkage with the other coil ?

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6. An aircraft of wing span of 50 m flies horizontally in earth's magnetic field of 6 x `10^(-5) at a speed of 400 m/s. Calculate the emf generated between the tips of the wings of the aircraft.

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7. A coil of self inductance 3 H carries a steady current of 2 A. What is the energy stored in the magnetic field of the coil?

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Electromagnetic Induction Short Answer I Sa 1 2 Marks Each

1. Why and where are eddy currents are undesirable? How are they minimised?

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2. Self Inductance|Mutual Inductance

Watch Video Solution

3. Mutual inductance of two coils can be increased by

Watch Video Solution

4. An emf of 96 mV is induced in the windings of a coil when a current in a nearby coil is increasing at the rate of 1.20 A/s. What is the mutual inductance of the two coil?

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5. Calculate the induced emf between the ends of an axle of a railway carriage 1.75 m long travelling on level ground with a uniform velocity 50 kmph. The vertical component of Earth's magnetic field (Bv) is 5×10^{-5} T.

Watch Video Solution

6. The magnetic flux through a loop varries according to the relation $\varnothing$ = $8t^2 + 6t + 2, \emptyset$ is in milliweber and t is in second. What is the magnitude of the induced emf in the loop at t = 2 seconds?

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7. Distinguish between Step up and Step Down Transformer.

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Electromagnetic Induction Short Answer Ii Sa 2 3 Marks Each

1. What is Transformer? Explain step up and step down transformer?

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2. The primary of a transformer has 200 turns and secondary has 1000 turns. The power output from secondary at 1000 V is 9 kW. Calculate primary voltage and heat loss in primary. Take resistance of primary coil 0.2Ω and efficiency of transformer = 90%.

Watch Video Solution

3. The primary and secondary coil of a transformer each have an inductance of 200

$\times 10^{-6}$H. The mutual inductance (M) between the windings is 4 $\times 10^{-6}$H. What percentage of the flux from one coil reaches the other?

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4. Obtain an expression for the self inductance of a straight solenoid of length l and radius r (l > > r).

Watch Video Solution

5. A plane of coil of 10 turns is tightly wound around a solenoid of diameter 2 cm having 400 turns per centimeter. The relative permeability of the core is 800. Calculate the inductance of solenoid

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Electromagnetic Induction Long Answer La 4 Marks Each

1. Using Ampere's circuital law, obtain an expression for the magnetic induction at a point near an infinitely long straight conductor carrying an electric current.

Watch Video Solution

2. Describe the construction and working of a transformer with a neat labelled diagram

Watch Video Solution

A C Circuits Mcqs 1 Mark Each

1. In an LCR a.c. circuit at resonance, the current

A. The wattless current

B. The displacement current

C. The idle current

D. The apparent current

Answer: A

Watch Video Solution

2. In a series LCR circuit, at resonance the

A. Out of phase

B. Differ in phase by $\pi/4$ radian.

C. Differ in phase by $\pi/2$ radian.

D. In phase

Answer: D

Watch Video Solution

3. In series LCR circuit at resonance,

A. A potential divider circuit

B. A radio wave transmitter

C. A source of displacement current

D. A tunning circuit in a television receiver set.

Answer: D

Watch Video Solution

4. If A.C. voltage is applied to a pure capacitor, then votage across the capacitor ....

A. Leads the current by phase angle π rad

B. Leads the current by phase π/2 rad.

C. Lags the current by phase angle π rad

D. Lags the current by phase angle π/2 rad

Answer: D

Watch Video Solution

5. A parallel resonant circuit can be used

A. a tunning circuit in a television receiver set.

B. a transformer

C. a rectifier

D. a filter circuit

Answer: D

Watch Video Solution

6. An electric bulb operates 10 V d.c. If this bulb is connected to an a.c. source and gives normal brightness, then peak value of the source is ....

A. 141.4 V

B. 14.14 V

C. 1.414 V

D. 0.1414 V

Answer: B

Watch Video Solution

7. A coil of resistance 300Ω and inductance 1.0 henry is connected across an voltages source of frequency $300/2\pi Hz$. The phase difference between the voltage and current in the circuit is

A. 180^0

B. 90^0

C. 45^0

D. 0^0

Answer: C

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A C Circuits Very Short Answer Vsa 1 Mark Each

1. Define capacitive reactance

Watch Video Solution

2. A charged 10 micro farad capacitor is connected to a 81 mH inductor. What is the angular frequency of free oscillations of the circuit?

Watch Video Solution

3. Write the mathematical form of impedance (Z) of an AC circuit .

Watch Video Solution

4. In a series LCR circuit, at resonance the

Watch Video Solution

5. The L-C parallel resonant circuit

Watch Video Solution

6. What is the relation between average current and rms current over half cycle.

Watch Video Solution

7. If the peak value of an alternating emf is 15V, what is its mean value over half cycle?

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A C Circuits Short Answer I Sa 1 2 Marks Each

1. State the average or mean value of an alternating emf? Obtain the expression for it

Watch Video Solution

2. Write the mathematical form of impedance (Z) of an AC circuit .

Watch Video Solution

3. State any two characteristics of resonance in an LCR series circuit.

Watch Video Solution

4. In an LCR series circuit, at resonance

Watch Video Solution

5. A series LCR circuit has resistance 10Ω and reactance is $7\sqrt{2}\ \Omega$. What is the impedance of the circuit?

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6. A coil of resistance $10\ \Omega$ and inductance 100mH and a capacitor of variable capacitance

are connected across a 20V,50Hz A.C. supply. At what capacitance will resonance occur?

Watch Video Solution

7. Find the current in a circuit consisting of a coil and a capacitor in series with an A.C source of 110V (r.m.s.), 60Hz.The inductance of a coil in 0.80 H and its resistance is 50Ω.The capacitance of a capacitor is 8μF.

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8. A 0.5μF capacitor is discharged through a 10 millihenry inductor. Find the frequency of discharged.

Watch Video Solution

9. What is the capacitive reactance of a capacitor of 5μF at a frequency (1) 50 Hz and (2) 20KHZ?

Watch Video Solution

A C Circuits Short Answer Ii Sa 2 3 Marks Each

1. State the rms value of an alternating current? Write the relation between the rms value and peak value of an alternating current that varies with time

Watch Video Solution

2. Define the term 'self-inductance' and write its SI unit.

Watch Video Solution

3. Explain the term capacitive reactance. State its unit and dimensions.

Watch Video Solution

4. What is the inductive reactance of a coil of inductance 10mH at a frequency (1) 50Hz (2) 1000Hz (3) 20kHz?

Watch Video Solution

5. An alternating emf of 230V,50Hz is connected across a pure ohmic resistance of 50Ω. Find (1) the current (2) equations for instantaneous values of current and voltage.

Watch Video Solution

6. A radio can tune over the frequency range of a portion of MW broadcast band (800 kHz to 1200 kHz). If its LC circuit has an effective inductance of $200 \mu H$, what must be the range of its varialbe capacitor ?

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A C Circuits Long Answer La 4 Marks Each

1. State Ohm's law. Derive an expression for the equivalent resistance of a number of resistances in parallel.

Watch Video Solution

2. Resonance in series LCR circuit

Watch Video Solution

Dual Nature Of Radiation And Matter Mcqs 1 Mark Each

1. The electrons are emitted in the photoelectricm effect from a metal surface

A. only if the frequency of radiation is above a certain threshold value.

B. only if the temperature of the surface is high .

C. at the that is independent of the nature of metal.

D. with a maximum velocity proportional to the frequency of incident radiation

Answer: A

Watch Video Solution

2. As the intensity of incident light increases

A. photoelectric current increase

B. photoelectric current decreases

C. kinetic energy of emitted photoelectrons increases

D. kinetic energy of emitted photoelectrons decreases

Answer: A

Watch Video Solution

3. The maximum kinetic energy of the photoelectrons depends only on

A. potential

B. frequency

C. incident angle

D. pressure

Answer: A

Watch Video Solution

4. According to De-Broglie, the waves are associated with

A. moving neutral particles only.

B. moving charged particle only

C. electrons only

D. all moving matter particles

Answer: D

Watch Video Solution

5. The work function of a metal is $4.2eV$, its threshold wavelength will be

A. 4000 A°

B. 3500 ?°

C. 2959 ?°

D. 2500 ?°

Answer: C

Watch Video Solution

6. Ultraviolet radiations of 6.2 eV fall on an aluminium surface (work function 4.2 eV) . The kinetic energy (in joule) of the fastest electron emitted is approximately

A. $3.2xx10^{-21}$

B. 3.2×10^{-19}

C. 3.2×10^{-1}

D. 3.2×10^{-15}

Answer: B

Watch Video Solution

7. The momentum of a photon of electromagnetic radiation is 3.3×10^{-29} kg m/s . The frequency of radiation is

$\left[h = 6.6 \times 10^{-34} Js\right]$

A. 2×10^{10} m

B. 2×10^{7}m

C. 2×10^{5}m

D. 2×10^{-5}m

Answer: D

Watch Video Solution

Dual Nature Of Radiation And Matter Very Short Answer Vsa 1 Mark Each

1. Define photoelectric effect

Watch Video Solution

2. Define threshold frequency

Watch Video Solution

3. What is cut off or stopping potential

Watch Video Solution

4. Define work function of the metal. Also give its unit

Watch Video Solution

5. The minimum frequency for photoelectric effect on a metal is 7×10^{14} Hz, Find the work function of the metal.

Watch Video Solution

6. Find the kinetic energy of emitted electron, if in a photoelectric effect energy of incident Photon is 4 eV and work function is 2.4 eV.

Watch Video Solution

7. Find energy of photon which have momentum 2×10^{-16} gm-cm/sec.

Watch Video Solution

Dual Nature Of Radiation And Matter Short Answer I Sa 1 2 Marks Each

1. Explain the term 'wave particle duality' of matter

Watch Video Solution

2. Draw a neat labelled diagram of schematic of experimental set up for photoelectric effect

Watch Video Solution

3. What is mean by dual nature of matter.

Watch Video Solution

4. Explain the concept of photoelectric effect

Watch Video Solution

5. If the total energy of radiation of frequency `10^(14)Hz is 6.63 J , Calculate the number of photons in the radiation

Watch Video Solution

6. An electron is accelerated through a potential of 120 V. Find its de Broglie wavelength

Watch Video Solution

7. What is the stopping potential when the metal with work function $0.6eV$ is illuminated with the light of $2eV$?

Watch Video Solution

Dual Nature Of Radiation And Matter Short Answer Ii Sa 2 3 Marks Each

1. State Einstein's photoelectric equation. Explain any two characteristics of photoelectric effect on the basis of this equation.

Watch Video Solution

2. With the help of circuit diagram describe an experiment to study photoelectric effect.

Watch Video Solution

3. What is photelectric effect ? Define (i) Stopping potential (ii) Photoelectric work function.

Watch Video Solution

4. Calculate De Broglie wavelength of bullet moving with speed 90m/sec and having a mass 5 gm.

Watch Video Solution

5. The energy of photon is 2 eV.Find its frequency and wavelength

Watch Video Solution

6. The work function of a surface is 3.1 eV. A photon of frequency$1x10^{15}$Hz. Is incident on it. Calculate the incident wavelength is photoelectric emission occur or not.

Watch Video Solution

Dual Nature Of Radiation And Matter Long Answer La 4 Marks Each

1. With the help of circuit diagram describe the experiment to study the characteristics of photoelectric effect,. Hence discuss any 2 characteristics of photoelectric effect

Watch Video Solution

2. State Einstein's photoelectric equation. Explain any two characteristics of photoelectric effect on the basis of this equation.

Watch Video Solution

3. State de-Broglie hypothesis.

Watch Video Solution

Structure Of Atoms And Nuclei Mcqs 1 Mark Each

1. When an electron jumps from higher energy orbit to lower energy orbit, the difference in the energies in the two orbits is radiated as quantum (photon) of....

A. $E = mc^2$

B. $E = \frac{h}{v}h$

C. $E = \frac{hc}{\lambda}$

D. $E = \frac{\lambda}{hc}$

Answer: C

Watch Video Solution

2. The radii of Bohr's orbit are directly proportional to

A. Principal quantum number

B. Square of principal quantum number

C. Cube of principal quantum number

D. Independent of principal quantum number

Answer: B

Watch Video Solution

3. According to Bohr second postulate, the angular momentum of electron is the integral multiple of $\frac{h}{2\pi}$. The S.I unit of Plank constant h is same as......

A. Linear momentum

B. angular momentum

C. Energy

D. Centripetal force

Answer: B

Watch Video Solution

Watch Video Solution

4. The ionization energy of Hydrogen atom in its ground state is......

A. 3.4 e V

B. 10.2 eV

C. 13.6 eV

D. – 13.6 eV

Answer: C

Watch Video Solution

5. In a hydrogen atom, if energy atom, if energy of an electron in group state is $-13.6eV$, then that in the 2^{nd} excited state is :

A. 3.4 e V

B. 10.2 eV

C. 13.6 eV

D. – 10.2 eV

Answer: B

Watch Video Solution

6. The dimension of the Rydberg constant are

A. $[M^0 L^1 T^0]$

B. $[M^0 L^{-1} T^0]$

C. $[M^0 L^1 T^1]$

D. $[M^0 L^{-1} T^{-1}]$

Answer: B

Watch Video Solution

7. In a Hydrogen, electron jumps from fourth orbit to second orbit. The wave number of the radiations emitted by electron is

A. $\frac{R}{16}$

B. $\frac{3R}{16}$

C. $\frac{5R}{16}$

D. $\frac{7R}{16}$

Answer: B

Watch Video Solution

8. The speed of electron having de Broglie wavelength of10^{10} m is

(me = 9.1×10^{-31} kg, h =6.63×10^{-34} J-s)

A. 7.28×10^{6} m/s

B. 4×10^{6} m/s

C. 8×10^{5} m/s

D. 5.25×10^{5} m/s

Answer: A

Watch Video Solution

9. The decay constant λ of a certain radioactive material is 0.2166 per day. The average life τ of the radioactive material is....

A. 5.332 days

B. 4.617days

C. 2.166 days

D. 1.083 days

Answer: B

Watch Video Solution

10. The ratio of the areas of the circular orbits of an electron in the ground state that of the first excited state of an electron in the hydrogen atom is

A. $16:1$

B. $4:1$

C. $1:4$

D. $1:16$

Answer: D

Watch Video Solution

Structure Of Atoms And Nuclei Very Short Answer Vsa 1 Mark Each

1. What is the value of angular momentum of electron in the second orbit of Bohr's model of hydrogen atom?

Watch Video Solution

2. Given the relation between radius and principal Quantum number of an atom .

Watch Video Solution

3. In which region of electromagnetic spectrum for Hydrogen, does the Lyman series lies?

Watch Video Solution

4. How much energy must be supplied to hydrogen atom, to free (remove) the electron in the ground state?

Watch Video Solution

5. State the value of minimum excitation energy for Hydrogen atom.

Watch Video Solution

6. What is the energy of electron in hydrogen atom for n =∞.

Watch Video Solution

7. The radius of the smallest orbit of the electron(aO) in hydrogen atom is 0.053 nm. What is the radius of the 4th orbit of the electron in hydrogen atom.

Watch Video Solution

8. The half life of a certain radioactive species is 6.93 × 10^5 seconds. What is the decay constant?

Watch Video Solution

9. The linear momentum of the particle is 6.63 kg m/s. Calculate the de Broglie wavelength.

Watch Video Solution

Structure Of Atoms And Nuclei Short Answer I Sa 1 2 Marks Each

1. Starting with ? r= $\frac{\varepsilon_o h^2 n^2}{\pi m Z e^2}$, Show that the speed of electron in nth orbit varies inversely to principal quantum number.

Watch Video Solution

2. State Bohr second postulate for atomic model. Express it in its mathematical form.

Watch Video Solution

3. State any two limitations of Bohr's atomic model.

Watch Video Solution

4. On the basis of the de Broglie hypothesis, obtain the expression for the de Broglie wavelength associated with an electron accelerated from rest through a p.d. V.

Watch Video Solution

5. Half-life period for radioactive element is a.)Always constant b)Variable c)Independent of final concentrationn d)Independent of initial concentration

Watch Video Solution

6. Define (i) Excitation energy (ii) Ionization energy

Watch Video Solution

7. Calculate longest wavelength of Paschen series. Given $R = 1.097 \times 10^7 m^{-1}$.

Watch Video Solution

8. The angular momentum of electron in 3rd Bohr orbit of Hydrogen atom is $3.165 \times 10^{-34} kgm^2$ /s. Calculate Plank's constant h.

Watch Video Solution

9. The half-life of a certain radioactive nucleus is 3.2 days. Calculate (i) decay constant (ii) average life of radioactive nucleus.

Watch Video Solution

10. Draw a neat labelled diagram showing energy levels and transition between them for hydrogen atom.

Watch Video Solution

Structure Of Atoms And Nuclei Short Answer Ii Sa 2 3 Marks Each

1. Derive an expression for the radius of n^{th} Bohr's orbit in Hydrogen atom.

Watch Video Solution

2. Using the expression for energy of electron in the nth orbit, Show that $\frac{1}{\lambda} = R_H\left(\frac{1}{n^2} - \frac{1}{m^2}\right)$, Where symbols have their usual meaning.

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3. Show that for radioactive decay N(t) = NO e-λt , where symbols have their usual meaning.

Watch Video Solution

4. Write the relation between Half-Life and Mean-Life of radio active element.

Watch Video Solution

5. Calculate the wavelength for the first three lines in Paschen series.

(GivenRH =$1.097 \times 10^7 m^{-1}$)

Watch Video Solution

6. Calculate the shortest wavelength in Paschen series if the longest wavelength in Balmar series is 6563 $A \circ$.

Watch Video Solution

7. A radioactive substance decays to $\left(\frac{1}{10}\right)^{t}h$ of its original value in 56 days. Calculate its decay constant.

Watch Video Solution

Structure Of Atoms And Nuclei Long Answer La 4 Marks Each

1. Obtain an expression for wavenumber, when electron jumps from higher energy orbit to lower energy orbit. Hence show that the shortest wavelength for Balmar series is 4/RH.

Watch Video Solution

2. State the law of radioactivity and hence, show that $N = N_0 e^{-\lambda t}$.

Watch Video Solution

3. Using the expression for the radius of orbit for Hydrogen atom , show that the linear speed varies inversely to principal quantum number n the angular speed varies inversely to the cube of principal quantum number n.

Watch Video Solution

Semiconductors Devices Mcqs 1 Mark Each

1. In a Bipolar junction transistor, the largest current flows though

A. in the emitter

B. in the collector

C. in the base

D. through CB junction

Answer: A

Watch Video Solution

2. A LED emits visible white light when its

A. junction is reversed biased

B. depletion layer widens

C. holes and electrons recombine

D. junction becomes hot

Answer: C

Watch Video Solution

3. A solar cell works on the principle of

A. diffusion

B. recombination

C. photovoltaic action

D. carrier flow

Answer: C

Watch Video Solution

4. The Boolean expression for Exculsive OR gate (X-OR gate) is

A. A+B

B. $A \oplus B$

C. $\overline{A + B}$

D. A.B

Answer: B

Watch Video Solution

5. In a common base configuration, the transistor has emitter current of 10 mA and collector current of 9.8 mA. The value of base current is....

A. 0.1 mA

B. 0.2 mA

C. 0.3 mA

D. 0.4 mA

Answer: B

Watch Video Solution

6. For a transistor β =75 and IE = 7.5 mA. The value of α is....

A. 0.1

B. 0.66

C. 0.75

D. 0.98

Answer: D

Watch Video Solution

7. In a transistor amplifier, IC = 5.5 mA , IE = 5.6 mA. The current amplification facto β is...

A. 45

B. 50

C. 55

D. 60

Answer: C

Watch Video Solution

8. For which logic gate the following statement is true? The output is low, if and only if all inputs are low.

A. AND

B. NOR

C. NAND

D. OR

Answer: D

Watch Video Solution

Semiconductors Devices Very Short Answer Vsa 1 Mark Each

1. State any two special purpose diodes

Watch Video Solution

2. What is the basic purpose of using a capacitor?

Watch Video Solution

3. State the logical expression for NAND gate.

Watch Video Solution

4. To use a transistor as an amplifier

Watch Video Solution

5. Draw the circuit symbol of PNP transistor.

Watch Video Solution

6. For a transistor $I_C = 15 mA, I_B$ = 0.5 mA.

What is the current amplification factor(β)?

Watch Video Solution

7. Give the truth table for NOR gate.

Watch Video Solution

8. What is the need of rectification in regulated power supply? Short

Watch Video Solution

Semiconductors Devices Short Answer I Sa 1 2 Marks Each

1. Draw a neat labelled circuit diagram of full wave rectifier using semiconductor diode.

Watch Video Solution

2. Draw a labelled circuit diagram for a common emitter amplifier using n-p-n transistor. Write down the expression for its voltage gain. What is the phase difference between input and output signals?

Watch Video Solution

3. State any two advantage and disadvantage of a photodiode.

Watch Video Solution

4. State the advantages of full wave rectifier.

Watch Video Solution

5. Define current amplification factor α_{DC} and β_{DC} Obtain the relation between them.

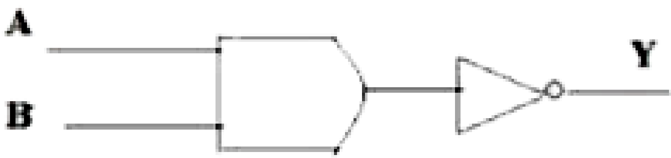
Watch Video Solution

6. Draw the block diagram of a simple half wave rectifier circuit with respective output wave form

Watch Video Solution

7. Give the truth table and Boolean expression

for



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Semiconductors Devices Short Answer Ii Sa 2 3 Marks Each

1. Draw the circuit diagram of a half wave rectifier. Hence explain its working.

Watch Video Solution

2. Write the construction and working of dry cell.

Watch Video Solution

3. Explain the working of LED.

Watch Video Solution

4. Explain the principle of operation of a photodiode.

Watch Video Solution

5. What is a logic gate? Draw the symbol and give the truth table for NOT gate. Why NOT gate is called inverter?

Watch Video Solution

6. Draw the circuit symbol for NPN and PNP transistor. What is the difference in Emitter, Base and Collector regions of a transistor?

Watch Video Solution

Semiconductors Devices Long Answer La 4 Marks Each

1. With the help of a labelled circuit diagram, explain how an n-p-n transistor can be used as an amplifier in common-emitter configuration. Explain how the input and output voltages are out of phase by 180 for a common-emitter transistor amplifier.

Watch Video Solution

2. What are the advantages and disadvantages of photodiode?

Watch Video Solution

3. Draw a circuit diagram of a transistor amplifier in CE configuration. Define the terms (i) Input resistance and (ii) Current amplification factor. How are these determined using input and output characteristics?

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