Unique Past Papers Chapter Wise PHYSICS 11

(2018, 2019, 2021, 2022 & 2023)

Lahore Board, Faisalabad Board, Multan Board, Gujranwala Board, Sahiwal Board, D.G. Khan Board, Sargodha Board, Rawalpindi Board & Bahawalpur Board.

Unit 1: Measurements

Introduction to Physics

Q.1: What are the main frontiers of fundamental science? 3 Times

Physical Quantities

Q.2: Write two differences between base and derived quantities. 1 Time

Physical Quantities

Q.3: Draw table for base units. 4 Times
Q.4: Define and explain supplementary units. 24 Times
Q.5: Define and explain scientific notation, also give example. **5 Times**
Q.6: Define metre, Kelvin and kilogram. 2 Times
Q.7: Differentiate between units and derived units. **7 Times**
Q.8: Define light year and base what are the unit and dimensions of light year? 2 Times
Q.9: Differentiate between base quantities and derived quantities. 1 Time
Q.10: What are the characteristics of an ideal standard? 2 Times

Q.11: Write any two points which should be kept in mind, while using units. 1 Time
Q.12: How many micro seconds are in one year? 1 Time
Q.13: Give four conventions for indicating units. 1 Time
Q.14: How many radians account for circumference of circle? How many steradians account for surface area of a sphere? 1 Time

Errors and Uncertainties

Q.15: Differentiate between random error and systematic error. 18 Times
Q.16: The period of a pendulum cannot be used as a time standard why? 1 Time

Significant Figures

Q.17: Using rules of significant figures, compute $\frac{5.348\times10^{-2}\times3.64\times10^{4}}{1.336}$ up to appropriate significant figures. 1 Time
Q.18: What rules are of rounded off the upto required significant figure? 1 Time
Q.19: Is a zero significant or not? Explain. 3 Times
Q.20: Define and explain significant figures. **7 Times**
Q.21: Add the following upto appropriate precision.3.125, 1.2, 0.038 1 Time
Q.22: What is rounding off data? Explain. 1 Time

Precision and Accuracy

Q.23: Distinguish between precise and accurate measurement. 20 Times
Q.24: What is the differences between absolute uncertainty and percentage uncertainty? 1 Time
Q.25: Define precision. Which instrument can measure precise value meteror rod or vernier caliper? 1 Time
Q.26: Given that v = (5.2 $\pm$ 0.1) volt. Find its percentage uncertainty. 3 Times
Q.27: If a precise measurement is also an accurate measurement. Explain your answer. 2 Times
Q.28: Three students measured the length of a needle with a scale on which minimum division is 1 mm and recorded as (i) 0.2145 m (ii) 0.21 m (iii) 0.214m. Which record is correct and why? 2 Times
Q.29: Can measurement taken with as vernier caliper be more precise than a measurement taken with a screw gauge? Explain. 1 Time

Assessment of Total Uncertainty in the Final Result

Q.30: The time of 30 vibrations of simple pendulum recorded by a stop watch accurate up to tenth of a second is 54.6 seconds. Find its period with uncertainty. **7 Times**

Q.31: What are the three steps to find uncertainty in the average value of many measurements? 4 Times

Q.32: What will be the percentage uncertainty in a radius of a small sphere measured as 2.25 cm by a vernier caliper with least count 0.01 cm? 1 Time

Q.33: Suggest one method of reducing the uncertainty in any timing experiment. 1 Time

Q.34: How will you assess the total uncertainty in case of power factor? Give an example. 3 Times

Q.35: How do you assess the total uncertainty in the final result for multiplication and division? 3 Times

Q.36: How uncertainty is estimated in power factor? 1 Time

Q.37: When V = 5.2 $\pm$ 0.IV I = 0.84 $\pm$ 0.05A, what is the percentage uncertainty in R? 1 Time

Dimensions of Physical Quantities

Q.38: Derive the dimensions of coefficient of viscosity and pressure. 34 Times

Q.39: Check the correctness of relation F = ma. 1 Time

Q.40: What are the dimensions and unit of gravitational constant G in the formula $F = \frac{GmM}{r^2}$? **15 Times**

Q.41: Check the correctness of relation $v = r\omega$ 2 Times

Q.42: Show that $S = vt + \frac{1}{2}at^2$ is dimensionally correct. 2 Times

Q.43: Write the dimensions of:
i) Angular Momentum ii) Torque iii) Power iv) Work 3 Times

Q.44: What is physical significance of dimension of physical quantity? **6 Times**

Q.45: Describe the principle homogeneity of dimensional analysis. 2 Times

Q.46: What do you mean by dimension of a physical quantity? 1 Time

Q.47: Calculate the dimension of physical quantities, if possible 2π and rupees hundred? 1 Time

Q.48: Check the correctness of the relation $v = \sqrt{\frac{F \times l}{m}}$ were V is speed of transverse wave on a stretched string. 3 Times

Q.49: Show that formula $T = 2\pi\sqrt{\frac{\ell}{g}}$ is dimensionally correct. 2 Times

Q.50: Define the terms (a) precision (b) dimensions of physical quantities. 1 Time

Exercise Short Questions

Q.51: Name several repetitive phenomenon occurring in nature which could serve as reasonable time standards. 19 Times

Q.52: Give the drawbacks to use the period of simple pendulum as a time standard. 22 Times

Q.53: Why do we find it useful to have two units for the amount of substance, the kilogram and the mole? 19 Times

Q.54: The period of simple pendulum is measured by a stop watch what type of errors are possible in the time period? 24 Times

Q.55: Write the dimension of pressure and density. 16 Times

Q.56: The wavelength λ of a wave depends on the speed v of the wave and its frequency 'f' knowing that[λ] = [L], [V] = [LT^{-1}] and [f] = [T^{-1}]. Decide which of these is correct? F = vλ or f = $\frac{v}{\lambda}$. 8 Times

Unit 2: Vectors and Equilibrium

Basic Concepts of Vectors

Q.1: Define equal vectors and Substraction of vector. **6 Times**

Q.2: Define position vector and resultant vector. **6 Times**

Q.3: How a vector can be determined from its rectangular components? 1 Time

Q.4: Two vectors of magnitude 10 each making angle 180° with each other. Find the magnitude of their resultant. 1 Time

Q.5: Explain rectangular coordinate system. 1 Time

Q.6: Explain Cartesian coordinate system. 2 Times

Q.7: What is the unit vector in the direction of vector $A = 2\hat{i} - 2\hat{j} + 2k$? 1 Time

Q.8: Explain how vector can be subtracted from the other vector? 1 Time

Q.9: How does the direction of a vector specified in three dimensions? Explain with diagram. 1 Time

Q.10: Find unit vector in the direction of the vector $A = 12\hat{i} - 2\hat{j}$. 1 Time

Q.11: How a vector is substracted from another vector? Explain using diagram. 1 Time

Q.12: Is it possible to add $2\vec{A}$ into 6? Explain. 2 Times

Q.13: Is it possible to add 5 in 2i? Explain. 1 Time

Q.14: If a vector lies in x-y plane. Is it possible one of its rectangular components is zero? Explain. 1 Time

Q.15: If two perpendicular vectors have same magnitude, find the angle between their sum and difference. 2 Times

Q.16: Find unit vectors in the direction of vector $\vec{A}$, $\vec{A} = 8\hat{i} + 4\hat{j}$. 1 Time

Q.17: Define component of a vector? What are rectangular components? 1 Time

Q.18: Define null vector. What is the difference between null vector and zero vector? 1 Time

Q.19: Write the position vector in one coordinate system, two coordinate system and three coordinate system. 1 Time

Q.20: Add a vector $\vec{A} = 2\hat{i} + 3\hat{j}$ and thirty chairs. 1 Time

Q.21: If all the components of the vectors, $\vec{A}_1$ and $\vec{A}_2$? **7 Times**

Q.22: What units are associated with unit vectors $\hat{i}, \hat{j}$ and $\hat{k}$? 1 Time

Q.23: Suppose he sides of a closed polygon represent vector arranged head to tail rule. What is the sum of these vectors 1 Time

Vector Addition By Rectangular Components

Q.24: What is the unit vector in the direction of the vector $\vec{A} = 3\hat{i} + 2\hat{j}$ 1 Time

Q.25: Write down the five steps for addition of vectors by rectangular component method. **7 Times**

Q.26: What is the orientation when R_x and R_y have opposite sign? 1 Time

Q.27: A force of 10 N makes an angle of 60° with x-axis. 1 Time

Q.28: Can the magnitude of a vector ever be zero? Explain. 1 Time

Q.29: If $\vec{A} = 4\hat{i} - 4\hat{j}$, what is the orientation of $\vec{A}$? 1 Time

Q.30: What is the orientation of three vectors to get their vector sum equal to zero magnitude? 1 Time

Q.31: For what orientation of a vector its components have opposite signs, if vector lies in xy plane? 1 Time

Q.32: If $\vec{A} = 2\hat{i} - 2\hat{j}$, then what will be the orientation of $\vec{A}$? 1 Time

Q.33: Under what circumstances would a vector have rectangular component that are negative? 1 Time

Product of Two Vectors

Q.34: You are falling off the edge. What should you do to avoid falling 2 Times

Q.35: Name different conditions that could make $\vec{A}_1 \times \vec{A}_2 = 0$. 26 Times

Q.36: What do you know about Right Hand Rule? Also state it. 4 Times

Q.37: Name three conditions that could make $\vec{A} \cdot \vec{B} = 0$. 4 Times

Q.38: Write two example of vector product. 1 Time

Q.39: Can the product of two vectors be equal to the product of their magnitude? 3 Times

Q.40: Prove that dot (scalar) product is commutative. 3 Times

Q.41: $\vec{A}$ and $\vec{B}$ are two vectors $\vec{A} = 2\hat{i} + 5\hat{j}$, $\vec{B} = 3\hat{i} + 7k$. Find $\vec{A} \times \vec{B}$. 1 Time

Q.42: Show that $\hat{i}.\hat{j} = \hat{j}.\hat{k} = \hat{k}.\hat{i} = 0$. 1 Time

Q.43: If $\vec{A} = \hat{i} - 2\hat{j} + 3\hat{k}$ and $\vec{B} = 2\hat{i} - \hat{j} + \hat{k}$ then find $\vec{A} - \vec{B}$. 1 Time

Q.44: Find the angle between $\vec{A} = 2\hat{i} - 2\hat{j}$ and $\vec{B} = 2\hat{i} + 2\hat{j}$. 1 Time

Q.45: What is the vector product, give its two characteristics? 1 Time

Q.46: B = 6R If $\vec{A} = 2\hat{i} - 10\hat{j}$ and $B = 6\hat{k}$. Find $\vec{A} \times \vec{B}$ (cross product) 1 Time

Q.47: Find the dot product of two vectors, If $\vec{A} = 3\hat{k}$ and $\vec{B} = -5\hat{j}$. 1 Time

Q.48: If $\vec{A} = 3.\hat{i} - \hat{j}$ and $\vec{B} = 5\hat{k}$. Find the dot product of $\vec{A} \times$ and $\vec{B}$ vectors. . 1 Time

Q.49: Define scalar product of two vectors. 1 Time

Q.50: Prove that scalar product is commutative . 1 Time

Q.51: Find projection of $\vec{A} = 2.\hat{i} - 8\hat{j} + \hat{k}$ in direction of $\vec{B} = 3\hat{i} - \hat{j} - 12\hat{k}$. 1 Time

Q.52: How would you verify that dot and cross product become equal in magnitude? 1 Time

Q.53: $\vec{A}$ and $\vec{B}$ are two non-zero vectors. How can their scalar product be zero? How can their vector product be zero? 1 Time

Torque

Q.54: Mention the criterion for positive and negative torque. 2 Times

Q.55: Define torque. Write its units and dimensions. 2 Times

Q.56: What is the moment of a force about the point lying on the axis of rotation? 1 Time

Q.57: Give two factors on which turning effect depends. 1 Time

Q.58: What is difference between moment arm and moment of force? 2 Times

Equilibrium of Torque

Q.59: Define the two conditions of equilibrium. **5 Times**

Q.60: What conditions are required by a body to be in complete equilibrium? 2 Times

Q.61: State first and second conditions of equilibrium in terms of linear and angular acceleration. 1 Time

Q.62: Distinguish between translational and Rotational equilibrium. 1 Time

Exercise Short Questions

Q.63: Define (i) Unit vector (ii) Position vector. 22 Times

Q.64: The vector sum of three vectors gives a zero resultant. What can be orientation of the vectors? 13 Times

Q.65: Vector $\vec{A}$ lies in xy plane. For what orientations will both of its rectangular components be negative and for what orientations, its rectangular components be positive. 2 Times

Q.65: If one of the rectangular components of a vector is not zero, can its magnitude be zero? Explain. 15 Times

Q.66: Can a vector have a component greater than the vector's magnitude? Explain. 10 Times

Q.67: Can the magnitude of a vector ever be negative? Explain. 13 Times

Q.68: If $\vec{A} + \vec{B} = 0$, what can you say about the components of the two vectors. 6 Times

Q.69: Under what circumstances would a vector have components that are equal in magnitude? **6 Times**

Q.70: Is it possible to add a vector quantity to a scalar quantity? Explain. 16 Times

Q.71: Can you add zero to a null vector? 16 Times

Q.72: Two vectors have unequal magnitude. Can their sum be zero? Explain. 18 Time

Q.73: Show the sum and difference of two perpendicular vectors of equal lengths are also perpendicular and of the same length. **7 Times**

Q.74: How would the two vectors of same magnitude are oriented such that resultant vector has magnitude equal to each vector. 4 Times

Q.75: Suppose the sides of a closed polygon represent vectors arranged head to tail. What is the sum of these vectors? 9 Times

Q.76: A picture is suspended from a wall by two strings. Show by diagram the configuration of the strings for which the tension in strings will be minimum. **2 Times**

Q.77: Can a body rotate about its centre of gravity under the action of its weight? 29 Times

Unit 3: Motion and Force

Displacement

Q.1: Differentiate between distance and displacement. 2 Times

Q.2: Can velocity of an object reverse direction when acceleration is constant? If so, give an example. 1 Time

Velocity

Q.3: Define average and instantaneous velocity. Also give their units. 4 Times

Acceleration

Q.4: What is meant by instantaneous acceleration? Write its formula. 1 Time

Q.5: Under what conditions a body can move with uniform acceleration? 1 Time

Q.6: Define positive and negative acceleration along with their directions. 1 Time

Q.7: What is the difference between uniform velocity and uniform acceleration? 1 Time

Acceleration

Q.8: How acceleration and distance can be calculated from velocity time graph? 12 Times

Q.9: Name of quantities which can be calculated from velocity-time graph and how there can be calculated. 1 Time

Q.10: What is the significance of slope of velocity – time graph? 1 Time

Q.11: A ball is thrown vertically up with 20 ms^{-1}. It returns on ground after 4 sec. Show its motion with velocity-time graph. 1 Time

Q.12: Discuss the case in velocity time graph, when the car moves with contant acceleration. 1 Time

Q.13: Discuss the case in velocity time graph, when the acceleration is increasing. 1 Time

Q.14: Draw velocity – time graph for uniformly retarded motion. 1 Time

Q.15: What are signs of velocity and acceleration when the object is speeding up? 1 Time

Acceleration

Q.16: A ball is dropped from a height of 490m. How long does the ball take to reach the ground? 1 Time

Q.17: An object is thrown upward with initial velocity v_1. How much height it gain in terms of velocity? 1 Time

Q.18: Write down three equation of motion. 1 Time

Acceleration

Q.19: Why the first law of motion also called law of inertia? 2 Times

Q.20: State Newton's second law of motion and define the unit of force. **5 Times**

Q.21: State Newton's third law of motion and give at least two examples. **5 Time**

Q.22: What are inertial and non-inertial frames of references? 4 Times

Q.23: What do you mean by inertia? How is it important Newton's first law of motion? 1 Time

Momentum

Q.24: Define momentum and given its unit. 2 Times

Q.25: Which will be more effective in knocking a bear down? A rubber bullet or a lead bullet of same momentum, why? 2 Times

Q.26: When a bullet is fired from a rifle. Why does the rifile move backward? Discuss it with reference to momentum? 1 Time

Q.27: What is impulse? Show that impulse and momentum have same unit. 8 Times

Q.28: A 20 g ball hits the wall of a squash court with a constant force of 50N. If the time of impact of the force is 0.5 sec, find the impulse. 2 Times

Q.29: What is effect on the speed a fighter plane chasing another when it opens fire? What happens to the speed of pursued plane when it returns the fire? 2 Times

Q.30: Calculate the linear momentum of a ball of mass 100 gram which moves with 5 ms^{-1}along a straight line. 1 Time

Q.31: Define isolated system with an example. 8 Times

Q.32: A rubber ball and lead ball of same size, are moving with same velocity. Which ball have greater momentum and why? 2 Times

Q.33: What is the effect on the sped of a fighter plane chasing another when it open fire? What happen to the speed of pursued plane when it returns the fire? 1 Time

Q.34: What will be the velocity of the particle if its momentum and kinetic energy are equal in magnitudes? 2 Times

Q.35: How the helmet safe from injury in accident? 2 Times

Q.36: Is law of conservation of momentum is valid in an inelastic collision? 1 Time

Elastic and Inelastic Collision

Q.37: Write down the impact on the bodies when a lighter body collides with a massive body at rest. Explain by the mathematically rotation. 2 Times

Q.38: Find the velocities of two elastically colliding bodies when $m_1 = m_2$ after collision. 3 Times

Q.39: Describe a case when a massive body collides with light body at rest.1 Time

Q.40: Is momentum is conserved in an inelastic collision? Explain the reason? 1 Time

Force Due to Water Flow

Q.41: Briefly describe the force due to water flow. 4 Times

Q.42: Water flows out from a pipe at 5 kgs^{-1} and its velocity changes from 4 ms^{-1} to zero on striking the wall. Find the force exerted by the water on the wall? 1 Time

Q.43: Water flows out from pipe at 3kg s^{-1} and its velocity changes from 5ms^{-1} to zero on striking the wall. Find the force exerted by the water. 2 Times

Momentum and Explosive Force

Q.44: How would you find the momentum of a explosive force? Explain with one example. 1 Time

Q.45: A bullet is fired from a rifle. Derive the relation for velocity of rifle.1 Time

Rocket Propulsion

Q.46: When rocket re-enters the atmosphere, its nose becomes very hot, why?
Q.47: What is the principle of rocket propulsion? 4 Times
Q.48: How does the rocket propulsion take place? 1 Time

Projectile Motion

Q.49: What is ballistic flight? Explain. 3 Times
Q.50: What is ballistic missile? Define its trajectory? 9 Times
Q.51: Define projectile motion. Derive expression for maximum height. 4 Times
Q.52: Is the range of projectile same for both angles of projectile of 30° and 60°? If your answer is yes then prove it? 2 Times
Q.53: At highest point in the path of a projectile its speed is minimum, why? Explain it. 2 Times
Q.54: Why Ballistic Missiles are not useful for long ranges? 1 Time
Q.55: A man wishes to take long jump. At what angle he should jump? Explain. 1 Time
Q.56: If the angle of projection of a projectile is zero. What is its maximum height? 1 Time
Q.57: Derive formula for the time of Flight a projectile. 3 Times
Q.58: What is trajectory? Explain briefly. 1 Time
Q.59: The horizontal range of projectile is four times of its maximum height. What is angle of projection? 3 Times
Q.60: Which quantity remains same at all points on the trajectory of a projectile; either velocity or acceleration? Explain. 1 Time
Q.61: Find the angle of projectile for which range of projectile is equal to four times maximum height. 1 Time
Q.62: Define two Dimensional motion. 1 Time
Q.63: What value of the angle of projection for which the range of projectile is half of its maximum possible value? 1 Time
Q.64: Draw velocity-time graph of horizontal and vertical components of velocity of a projectile projected at certain angle with the horizontal. 1 Time
Q.65: A projectile is fired at 45" with the horizontal. Show that range = 4 vertical height. 1 Time
Q.66: If 'H' is the height attained by a projectile and "T" is the time of flight then $H = \frac{gT^2}{8}$ 1 Time

Exercise Short Questions

Q.67: What is the difference between uniform and variable velocity? Give S.I. units of velocity and acceleration. 3 Times

Q.68: An object is thrown vertically upward. Discuss the sign of acceleration due to gravity, relative to velocity, while the object is in air. 1 Time

Q.69: Can the velocity of an object reverse the direction when acceleration is constant? If so, give an example. 27 Times

Q.70: A man standing on the top of a tower throws a ball straight up with initially velocity v and at the same time throws a second ball straight downward with the same speed? Which ball will have large speed when it strike the ground. 1 Time

Q.71: Explain the circumstances in which the velocity 'v' and acceleration 'a' of a car are: a) Parallel b) Perpendicular to one another. c) Anti-parallel 30 Times

Q.72: Explain the circumstances in which the velocity and acceleration $\vec{a}$ of a car: d) $\vec{v}$ is zero but $\vec{a}$ is not zero e) $\vec{a}$ is zero but $\vec{v}$ is not zero **7 Time**

Q.73: Motion with constant velocity is a special case of motion with constant acceleration. Is this statement true? Discuss. 13 Times

Q.74: Find the change in change in momentum for an object for a given time and state law of motion in terms of momentum. 10 Times

Q.75: Define impulse and show how it is related to linear momentum? 34 Times

Q.76: State law conservation of linear momentum, pointing out isolated system. Explain, why under certain conditions, the law is useful even through the system is not isolated. 15 Times

Q.77: Differentiate between elastic and inelastic collision. Explain how would a bouncing ball behave in each case? 9 Time

Q.78: Explain what is meant by projectile motion. Derive expression for: a) The time of flight b) The range of projectile 4 Times

Q.79: At what point or points in the path does a projectile have its minimum speed, its maximum speed? 34 Times

Unit 4: Work and Energy

Work Done by a Constant Force

Q.1: What do you understand by work and energy? Give their units. 1 Time

Q.2: Differentiate between positive and negative work. **6 Times**

Q.3: Calculate the loss in work done when angle between force and displacement is changed from 0°" to 60°". 1 Time

Q.4: Calculate the work done when a 50kg bag of books is lifted through 50cm.

Work Done by a Variable Force

Q.5: What do you mean by variable force? Give its two examples. 3 Times

Work Done by a Gravitational Field

Q.6: Define conservation filed. Give its two examples. 4 Times
Q.7: Write two differences between conservative and non-conservative forces. **5 Times**
Q.8: Define conservative force. Give at least its two examples. 1 Time
Q.9: An object has one joule of potential energy. Explain what does it mean? 9 Times
Q.10: Explain what do you understand the work done by gravitational field? 1 Time
Q.11: Define gravitational field and conservative field. 1 Time

Power

Q.12: Define joule and watt. 10 Times
Q.13: Prove that P = F.V 1 Time
Q.14: Differentiate between conservative and non-conservative forces. Give examples. 2 Times
Q.15: Define kilowatt hour. Show tht 1kWh=3.6 × 10^6J. 9 Times
Q.16: Convert 1.4 kW into joule / sec. 1 Time

Energy

Q.17: Define work energy principle. Also write down its equations. 13 Times
Q.18: What is escape velocity of an object? Write its mathematical expression. 9 Times
Q.19: A stone is dropped from a height of 10 m vertically downward. What energy changes are involved? 1 Time
Q.20: An object has 2 Joule of potential energy. Explain what does it mean? 2 Times
Q.21: Define absolute potential energy and write its formula and unit. 4 Times
Q.22: What does negative sign show in the expression $U_g = \frac{-GM_em}{R}$. 2 Times
Q.23: Differentiate between geyser and aquifer. 4 Times
Q.24: Derive he mathematical expression for escape velocity. 1 Time
Q.25: Calculate the distance covered by a free falling body during first second of its motion. 2 Times
Q.26: Discuss the relation and importance of negative sign in the relation $U_g = \frac{-GMm}{r}$. 1 Time

Interconversion of Potential Energy and Kinetic Energy

Q.27: Show that K.E = $\frac{P}{2m}$, where P is momentum. 1 Time

Conservation of Energy

Q.28: State law of conservation of energy. 3 Times
Q.29: A body drops a glass from a certain height which breaks into pieces. What energy changes are involved. 1 Time

Non-Conventional Energy Sources

Q.30: Describe four uses of solar cells. 1 Time
Q.31: Write some methods to obtain solar energy. 1 Time
Q.32: How electrical energy can be obtained by using tides? 4 Times
Q.33: What is geo-thermal energy? 4 Times
Q.34: What do you know about solar constant? Explain. 4 Times
Q.35: How heat is generated within the Earth? 2 Times
Q.36: Explain briefly how the energy is obtained from the fermentation of biomass. 8 Times
Q.37: What are renewable and two non-renewable energy sources? Give one example of each. 3 Times
Q.38: How energy can be obtained from waste products? 1 Time
Q.39: Write merits and demerits of solar cells. 1 Time
Q.40: Write some methods to obtain solar energy. 1 Time
Q.41: What is Salter's Duck? Explain it. 1 Time
Q.42: What is the biomass? Write the names of two methods to obtain energy from biomass. 1 Time
Q.43: Explain Geyser and Aquifer. 1 Time

Exercise Short Questions

Q.44: A person holds a bag of groceries while standing still, talking to a friend. A car is stationary with its engine running. From the stand point of work, how the two situations are similar? **5 Times**
Q.45: Calculate the work done in kilogoules in lifting a mass of 10kg (at a steady velocity) through a vertical height of 10m. 30 Times
Q.46: A force 'F' acts through a distance 'L'. The force is then increased to '3F' and then acts through a further distance of '2L'. Draw the work diagram to scale and calculate total work done. 2 Times
Q.47: In which case is more work done? When a 50kg bag of books is lifted through 50cm or when a 50 kg crate is pushed through 2m across the floor with a force of 50n. 3 Times

Q.48: An object has 1 joule potential energy. What does it mean? Explain. 21 Times

Q.49: What sort of energy is in the following:
a) Compressed spring b) Water in high dam c) A moving car 15 Times

Q.50: A girl drops a cup from a certain height, which energy changes are involved? 30 Times

Q.51: A boy uses a catapult to throw a stone which accidently smashes a green house window. List the possible energy changes. 15 Times

Unit 5: Circular Motion

Angular Displacement

Q.1: State right hand rule to find the direction of angular displacement. 1 Time
Q.2: Define angular displacement and write its S.I unit. 3 Times
Q.3: What is the difference between a degree and radian? 3 Times
Q.4: Derive the relation between radian, degree and revolution. 9 Times
Q.5: How many radian are there in 2 degree? 1 Time
Q.6: Prove that 1 rad = 57.3°. 3 Times
Q.7: Prove that 2 radian = 114.6° 1 Time

Angular Velocity

Q.8: Define angular velocity and what is its S.I Unit. 10 Times

Angular Acceleration

Q.9: Define positive and negative angular acceleration. 3 Times
Q.10: What is difference between angular acceleration and centripetal acceleration? 3 Times
Q.11: Show that $a_1 = r\alpha$ where α is the angular acceration. **5 Times**
Q.12: Prove that $v = r\omega$. 8 Times
Q.13: Write down three equations of Angular Motion. 2 Times

Centripetal Force

Q.14: Banked tracks are needed for turns on highway. Why? 2 Times
Q.15: Define centripetal force and centripetal acceleration. 1 Time
Q.16: Show that work done by centripetal force is zero. 1 Time
Q.17: How centripetal force acts and give two forces which can provide centripetal force to the circulating system? 1 Time

Centripetal Force

Q.18: What will be the effect on moment of inertia of a cylinder of about its axis if its diameter is doubled? 1 Time

Q.19: Define moment of intertia, how it is related to torque. 1 Time
Q.20: What is different between inertia and moment of inertia? 1 Time

Angular Momentum

Q.21: State the direction of the follow's vectors in simple situations, angular momentum and angular velocity. 10 Times
Q.22: Define angular momentum and give its demensions. 2 Times

Law of Conservation of Angular Momentum

Q.23: Why does the coasting rotating system slow down as some material object is added to the system during rotation? 1 Time
Q.24: Explain conservation of direction of angular momentum. 1 Time
Q.25: Why is the axis of rotation of Earth remains fixed in one direction with respect to the universe around it? 1 Time
Q.26: How would you explain the concept of momentum of inertia in orbital and spin angular momentum. 1 Time

Rotational Kinetic Energy

Q.27: What type of energies is possessed by a hoop moving down frictionless inclined plane? 1 Time
Q.28: State the practical use of rotational K.E by fly wheels. 2 Times

Artificial Satellites

Q.29: Find the critical velocity of a low flying satellite. 9 Times

Real and Apparent Weight

Q.30: What do you understand by real and apparent weight? Explain. **6 Times**
Q.31: A lift is ascending with the acceleration 'a'. Derive the expression for apparent weight. The body of mass 'm' in it. 2 Times
Q.32: If a person is falling in an elevator freely. What will be his weight? Measured by himself. 1 Time
Q.33: Explain why an object orbiting around the earth is said to be free falling? 1 Time
Q.34: Define the terms. (a) Rotational energy (b) Orbital velocity 1 Time
Q.35: What is orbital velocity? Write its mathematical formula? 1 Time

Artificial Gravity

Q.36: Define artificial gravity. Write down expression for its frequency. 3 Times
Q.37: How artificial gravity is created in an artificial satellite? 4 Times
Q.38: Define artificial gravity. Give its significance. 1 Time
Q.39: How would you generate a plan to create artificial gravity in a space station?

Geostationary Orbits

Q.40: What is Geo-stationary satellite? 2 Times
Q.41: Write down at least four uses of Geostationary satellites. 2 Times

Communication Satellite

Q.42: What is meant by INTELSAT? Explain. 3 Times
Q.43: Write down applications of communication satellite. 2 Times

Newton's and Einstein's View of Gravitation

Q.44: Why Einstein views of gravitation are preferred than Newton's views of gravitation? Explain briefly. 4 Times

Exercise Short Questions

Q.45: Explain the difference between tangential velocity and the angular velocity. If one of these is given for a wheel of known radius, how will you find the other? 12 Times

Q.46: Explain what is meant by centripetal force and why it must be furnished to an object if the object is to follow a circular path? 11 Times

Q.47: What is meant by moment of inertia? Given /Explain its significance. 32 Times

Q.48: What is meant by angular momentum? Explain the law of conservation of angular momentum. **7 Time**

Q.49: Show that orbital angular momentum $L_o = mv_o r$. 32 Times

Q.50: Describe what should be the minimum velocity, for a satellite, to orbit close to the Earth around it. 22 Times

Q.51: Explain why an object, orbiting the Earth, is said to be freely falling. Use your explanation to point out why objects appear weightiess under certain circumstances. 2 Times

Q.52: When mud files off the type of a moving bicycle, in what direction does it fly? Explain. 30 Times

Q.53: A disc and a hoop state down from the top of an inclined plane at the same time. Which one will be moving faster on reaching the bottom? 19 Times

Q.53: Why does a driver change his body positions before and after diving in the pool? 26 Times

Q.54: Explain how many minimum numbers of geostationary satellite are required for global coverage of T.V transmission? 19 Time

Q.55: A disc without slipping rolls down a hill of height 10.0 m. If the disc starts from rest at the top of hill, what is its speed at the bottom? 3 Times

Q.56: A 100 kg car is turning round a corner at 10 ms-1 as it travels along an arc of a circle. If the radius of the circular path is 10m, how large force must be

exerted by the pavement on the tyres to hold the car in the circular path? 1 Time

Unit 6: Fluid Dynamics

Viscous Drag and Stokes' Law

Q.1: What is Stoke's Law? Explain briefly. 2 Times

Terminal Velocity

Q.2: Define terminal velocity. Write it formula. 4 Times

Fluid Flow

Q.3: Write the three characteristics of an ideal fluid. 1 Time

Bernoulli's Equation

Q.4: Explain how the lift is produced in an Aeroplane? 4 Times
Q.5: State Bernoullies theorem. Give its mathematical form. 1 Time

Applications of Bernoulli's Equation

Q.6: Derive the relation between speed and pressure of the fluid. **6 Times**
Q.7: State Torricelli's theorem and write its relation. 4 Times
Q.8: Give two applications of the Bernoulli's equation. 1 Time
Q.9: Explain the term systolic and diastolic pressure. 1 Time

Exercise Short Questions

Q.10: Explain the term viscosity. 9 Times
Q.11: Define drag force. 14 Times
Q.12: Why fog droplets appear to be suspended in air? 2 Times
Q.13: Explain the difference between laminar flow and turbulent flow. 12 Times
Q.14: What do you mean by laminar flow and turbulent flow? 12 Times
Q.15: State Bernoulli's relation for a liquid in motion and describe some of its applications. **7 Times**
Q.16: A person is standing nearby a fast moving train. Is there any danger that he will fall towards it? 11 Times
Q.17: Two row boats moving parallel in the same direction are pulled towards each other. Explain. 14 Times
Q.18: Explain, how the swing is produced in a fast moving cricket ball? 24 Times
Q.19: Explain the working of a carburetor of a motor carusing Bernoulli's principle. 4 Times

Unit 7: Oscillations

Simple Harmonic Motion

Q.1: Define simple harmonic motion with example. 4 Times
Q.2: Explain restoring force and what is its direction? 2 Times
Q.3: Define time period and frequency. What is the relation between them? 2 Times
Q.4: State Hook's Law write it in mathematical form. 4 Times
Q.5: Differentiate between instantaneous displacement and amplitude in SHM. 2 Time
Q.6: What is the effect of amplitude on frequency and period of simple pendulum? 4 Times
Q.7: Show that for a body attached with a spring $\vec{a} = \frac{-k}{m}\vec{x}$. 1 Time
Q.8: It equation for simple harmonic motion is $x = 10\sin\left(\frac{\pi}{6}\right)t$, then calculate the instantaneous displacement after 3 seconds. 1 Time

SHM and Uniform Circular Motion

Q.9: Show that in simple harmonic motion, the acceleration is zero when the velocity is greatest and the velocity is zero when the acceleration is greatest. 7 Times
Q.10: What is slinky spring? 1 Time

Phase

Q.11: **Does the frequency depend on amplitude of a harmonic oscillators. Explain briefly. 8 Times**
Q.12: What is meant by phase angle and initial phase? 9 Times

A Horizontal Mass Spring System

Q.13: In an oscillating mass spring system if mass is doubled, how its time period will change? 1 Time
Q.14: Prove that $\omega = \sqrt{\frac{k}{m}}$ for mass spring system? 1 Time
Q.15: If mass of a spring-mass vibrating system is increased by four times. What is the effect on its frequency? 2 Times
Q.16: A mass-spring system is vibrating with amplitude 10cm. Find its K.E. and P.E at equilibrium position, when spring constant is $20 Nm^{-1}$.
Q.17: On what factors does the velocity of mass-spring system depends? 1 Time

Q.18: How displacement and amplitude are related for mass spring system.1 Time

Simple Pendulum

Q.19: Calculate the length of the simple pendulum which completes one vibration in one second. **6 Times**

Q.20: What should be the natural period of simple pendulum whose length is 90 cm? 1 Time

Q.21: Why the amplitude of the lead ball is greater than of pitch ball of same size and length? Explain. 1 Time

Q.22: What happens to the period of the simple pendulum if the length is halved and mass of bob is doubled? 3 Times

Q.23: What is simple pendulum? Write down its formula for time period. 1 Time

Q.24: Find the time period of simple pendulum, if the value of "g" increase by 2-times and mass of the Bob increases 2-times? 1 Time

Q.25: Define simple pendulum and second pendulum. 2 Times

Q.26: What should be the frequency of a simple pendulum whose period is 0.5 second at a place where $g = 9.8\ ms^{-2}$? 2 Times

Q.27: Show that when a pendulum moves from mean position to half of amplitude, time taken by it is $\frac{T}{12}$. 1 Time

Q.28: What would be length of simple pendulum whose period is 2 sec? 1 Time

Energy Conservation in SHM

Q.29: State the total energy of the vibrating mass and spring is constant. 2 Times

Q.30: What will be the potential energy of mass attached to a spring at amplitude of 5 cm, if its spring constant is $10Nm^{-1}$? 1 Time

Free and Forced Oscillations

Q.31: What is driven harmonic oscillator? Give example. 2 Times

Q.32: Differentiate between free and forced vibrations. 18 Times

Resonance

Q.33: How the resonance is applicable in microwave oven? 8 Times

Q.34: Define simple harmonic oscillator and driven harmonic oscillator? 4 Times

Q.35: Write one advantage and one disadvantage of resonance. 2 Times

Q.36: How a particular station is tuned in radio? 1 Time

Q.37: Describe the condition under which a vibrating body resonates with other body. 1 Time

Q.38: Why soldiers are advised to break their steps when marching on bridge? 3 Times

Q.39: Define resonance. Give its types. 1 Time

Damped Oscillations

Q.40: Define (a) Resonance (b) Damping 4 Times
Q.41: What are damped oscillations? Describe its applications. 4 Times
Q.42: Differentiate between damped oscillation and undamped oscillations. 2 Times
Q.43: Draw the graph between amplitude and time in damped oscillation. 1 Time
Q.44: Define driven harmonic oscillator and damped oscillations. 2 Times

Sharpness of Resonance

Q.45: Define sharpness of resonance. 3 Times

Exercise Short Questions

Q.46: Name two characteristics of simple harmonic motion. 17 Times
Q.47: Does frequency depends on amplitude for harmonic oscillators? Explain. 13 Time

Q.48: Can we realize an ideal simple pendulum? 22 Times
Q.49: What is the total distance travelled by an object moving withSHM in a time equal to its period, if its amplitude is A? 10 Times
Q.50: What happens to the period of a simple pendulum if its length is doubled? What happens if the suspend mass is doubled? 19 Time
Q.51: Does the acceleration of a simple harmonic acceleration ever zero? 20 Times
Q.52: What is meant by phase angle? Does it define angle between maximum displacement and the driving force? 14 Times
Q.53: Under what conditions does the addition of two simple harmonic motions produce a resultant, which is also simple harmonic? **5 Times**
Q.54: In relation to SHM, explain the equation:
(i) $a = -\omega^2 x$ (ii) $y = A \sin(\omega t + \phi)$ **2 Times**
Q.55: Explain relation between total energy, potential energy and kinetic energy for a body oscillating with SHM. 10 Times
Q.56: Describe some common phenomena in which resonance plays an important role. 28 Times
Q.57: If a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop? 29 Times

Unit 8: Progressive Waves

Progressive Waves

Q.1: Define mechanical waves and electromagnetic waves Give examples of each. 4 Times

Q.2: What is difference between longitudinal and transverse wave? Draw their diagrams also. 9 Times

Q.3: When happens when a pebble is dropped into a quiet pond? 1 Time

Periodic Waves

Q.4: Why sound travels faster in hydrogen than in oxygen? 2 Times

Q.5: Explain why energy remains "standing" in the medium between nodes? 1 Time

Q.6: Taking an example of periodic wave, Prove that $v = f\lambda$. 2 Times

Speed of Sound in Air

Q.7: How temperature and density of the medium affect the speed of sound? 22 Times

Q.8: What is the effect of pressure and temperature on the speed of sound? 1 Time

Q.9: What are the factors upon which speed of sound in air depends? 2 Times

Q.10: What happened when a jet plane like a concrode flies faster than speed of sound? 3 Times

Q.11: Why did Newton fail to calculate the velocity of sound accurately? 2 Times

Q.12: Why sound travel faster in hydrogen than in oxygen? 1 Time

Q.13: Find the temperature of air if the velocity of sound is 340 ms^{-1} at that temperature. 1 Time

Q.14: If velocity of sound is 332 ms^{-1}at 0°C the what will be its velocity at 10°C? 1 Time

Q.15: Speed of sound in air at 0°C is 332 ms^{-1}. Find its speed at 15°C. 1 Time

Q.16: If the speed of sound 332 ms^{-1} in air at 0°C then find its speed at 20°C. 2 Times

Q.17: What is period of 250 cycles per second of sound waves? 1 Time

Q.18: How much greater is the speed of sound in hydrogen to that of oxygen? 1 Time

Q.19: Why Newton's formula of speed of sound has 16% error? Support your answer by proper reasoning. 1 Time

Q.20: Find the temperature at which the velocity of sound in air is two times its velocity at 10°C? 3 Times

Q.21: Find the temperature at which the velocity of sound in air is four times its velocity at 10°C. 1 Time

Principle of Superposition

Q.22: Explain / State the "Principle of Superposition". 8 Times

Interference

Q.23: What is path difference? What should be the path difference for constructive and destructive interference? 3 Times
Q.24: Differentiate between constructive and destructive of sound. **7 Times**
Q.25: Write the equations of conditions for constructive and destructive interference. 1 Time
Q.26: What are the conditions for interference of two sound waves? 2 Times

Beats

Q.27: What do you observe in the collective effect of dots in the form of a picture?
Q.28: What changes are observed if a wave is reflected from a denser medium? 2 Times
Q.29: Define beat and explain it with an example. 9 Times
Q.30: What is the difference between interference and beats? 1 Time

Stationary Waves

Q.31: What is the affect on phase of a wave when it is reflected from a boundary?
Q.32: Explain the terms in phase and out of phase. 1 Time

Stationary Waves

Q.33: Differentiate between travelling waves and stationary waves. 1 Time
Q.34: What are stationary waves and how are they produced? **5 Times**
Q.35: Why can microwaves not detect underwater objects? 1 Time
Q.36: Why "stationary waves" are called standing waves? 1 Time
Q.37: Write the characteristics of stationary waves? 1 Time

Stationary Waves in a Stretched String

Q.38: On what factors does the fundamental frequency in a stretched string depends? 1 Time
Q.39: Define electromagnetic waves. Give example. 1 Time
Q.40: If a string vibrate in four segments at a frequency of 120Hz, determine its fundamental frequency. 1 Time

Stationary Waves in Air Column

Q.41: Which is richer in harmonics? An open organ pipeor a closed organ pipe.
Q.42: What is the difference between open and closed organ pipe? 2 Times
Q.43: A pipe has a length of 1 m. Determine the frequencies of fundamental, if the pipe is open at both ends. Speed of sound = 240 ms^{-1}. 1 Time
Q.44: What is the frequency and the wavelength of third harmonic in a closed organ pipe. 1 Time

Q.45: Open organ pipes are richer in harmonic than closed organ pipes. Explain. 1 Time

Doppler Effect

Q.46: How Doppler's effect is applied to radar system? 1 Time
Q.47: What do you mean by red shift? What it tells about the motion of stars? 2 Times
Q.48: State Doppler Effect. Writer down its one application. 8 Times
Q.49: How the Dopler's shift can be used in radar speed. 1 Time
Q.50: Explain the term red shift and blue shift in Doppler's effect. 3 Times
Q.51: Astromers use the Dopplereffect to calculate the speed of distance starts. How? 1 Time
Q.52: What is effect on frequency of sound waves, when source and observer are moving towards each other? 1 Time
Q.53: What is effect on frequency of sound waves, when source and observer are moving towards each other? 1 Time
Q.54: How Doppler effect can be used to monitor blood flow? 1 Time
Q.55: Why radar cannot detect under water objects? 1 Time

Exercise Short Questions

Q.56: What features do longitudinal waves have in common with transverse waves? 28 Times
Q.57: Is it possible for two identical waves travelling in the same direction along a string to give rise to a stationary wave? Explain briefly? 23 Times
Q.58: A wave is produced along a stretched string but some of its particles permanently show zero displacement. What type of wave is it? 2 Times
Q.59: Why does sound travel faster in solids than in gases? 31 Times
Q.60: How are beats useful in tuning musical instruments. 31 Times
Q.61: As a result of a distant explosion, an observer senses a ground tremor and than hears the explosion. Explain the time difference. 11 Times
Q.62: Explain why sound travels faster in warm air than in cold air. 28 Times
Q.63: How should a sound source move with respect to an observer so that the frequency of its sound does not change? 10 Times

Unit 9: Physical Optics

Wavefronts

Q.1: Define a ray of light. 8 Times
Q.2: Define diffraction of light. **5 Times**
Q.3: What is meant by wavefront? **7 Times**
Q.4: What is usuall way to obtained plane wave front from a point source? 1 Time
Q.5: How does one can obtain a plane wave? 2 Times

Q.6: Define beam of light. 1 Time

Huygen's Principle

Q.7: State Huygen's Principle. 22 Times
Q.8: For what purpose Huygen's Principle is used? 1 Time

Interference of Light Waves

Q.9: Write the conditions for detectable interference. **5 Times**
Q.10: What do you mean by coherent sources? Explain a common method for producing two coherent sources . 2 Times

Young's Double Slit Experiment

Q.11: Explain whether the Young's experiment is an experiment for studying interference or diffraction effects of light? **5 Times**
Q.12: On what factors, the distance between adjacent bright fringes in Young's double slit experiment depends? 1 Time
Q.13: How will you increase the fringe width in young's double slit experiment? 1 Time
Q.14: If white light is incident on a film of irregular thickness at all possible angles, what will be the pattern of interference fringes? Explain your answer. 1 Time
Q.15: How the distance between interference fringes will be affected if the distance between the slits in the young's experiment is doubled? 1 Time
Q.16: If wavelength of light 600 mm illuminates two slits 0.5 mm apart. The distance between the slits and screen is 200 cm. Calculate its fringe spacing. 1 Time
Q.17: Hold two fingers close together to form a slit. Look at the light bulb through the silt pattern of light being seen. What phenomenon is used in this case? Define this phenomenon. 1 Time
Q.18: In Young's double slit experiment, one of the slits is covered with blue filter and other with red filter. What would be the pattern of light intensity on the screen? 1 Time

Interference in Thin Film

Q.19: Define thin film write two example. 1 Time

Newton's Rings

Q.20: Why central spot of Newton's rings is dark? 10 Time
Q.21: What are Newton's rings? **5 Times**
Q.22: In Newton's ring, why are the fringes circular. 1 Time
Q.23: Draw experimental arrangement for observing Newton's ring. 1 Time

Michelson's Interferometer

Q.24: Describe the construction of Michelson's interferometer with the help of diagram. 2 Times

Q.25: What is the contribution of Michelson to measure the length of standard meter using interfereometer? 1 Time

Diffraction of light

Q.26: What is the difference between interference and diffraction of light waves? 8 Times

Diffraction Grating

Q.27: Define diffraction grating. Write the formula for grating element. **6 Times**

Q.28: A typical diffraction grating has 5000 lines per centimeter. What will be the grating element of this diffraction grating in meters? 3 Times

Diffraction of X-rays by Crystals

Q.29: Why diffraction grating cannot be used for X-rays diffraction? 1 Time

Q.30: Write two uses of X-rays diffraction by Crystals? 1 Time

Q.31: What is Bragg's law? Derive Bragg's equation. 1 Time

Q.32: Why X-rays cannot be diffracted by ordinary glass grating. 1 Time

Polarization

Q.33: What aspect of nature of light is proved by phenomena of polarization? 3 Times

Q.34: Write down two methods by which we can obtain plane-polarized beam of light from un-polarized light. 4 Times

Q.35: what is optical rotation or optical activity? **5 Times**

Q.36: Write the names of any four processes to obtain plane polarized beam of light from unpolarized light. 1 Time

Exercise Short Questions

Q.37: Under what conditions two or more sources of light behave as coherent sources. 28 Times

Q.38: How is the distance between interference fringes affected by the separation between the slits of Young's experiment? Can fringes disappear? 11 Times

Q.39: Can visible light produce interference fringes? Explain. 28 Times

Q.40: An oil film spreading over a wet footpath shows colours. Explain how does it happen? 29 Times

Q.41: Could you obtain Newton's rings with transmitted light? If yes, would the pattern be different from that obtained with reflected light? 15 Time

Q.42: How would you manage to get more orders of spectra using a diffraction grating? 33 Times
Q.43: Why are Polaroid sunglasses better than ordinary sunglasses? 21 Times
Q.44: How would you distinguish between un-polarized and plane polarized light? 29 Times

Unit 10: Optical Instruments

Least Distance of Distinct Vision

Q.1: What is least distance of distinct vision? Give its value. 3 Times

Magnifying Power and Resolving Power of Optical Instruments

Q.2: What is optical resolution and resolving power of an optical. **6 Time**

Q.3: What is difference between magnifying power and resolving power of optical instrument? **6 Times**
Q.4: Define Snell's Law and write its mathematical form. 1 Time
Q.5: Describe with the help of ray diagrams, how a single-bioconvex lens can be used as a magnifying glass? 2 Times
Q.6: How a convex lens is used as a magnifier? 8 Times
Q.7: Find magnifying power of convex lens 25cm focal length acts as a magnifying glass. 1 Time
Q.8: Define near point and resolving power. 2 Times
Q.9: Focal length of a convex lens of 5cm. Calculate its magnification. 1 Time
Q.10: A magnifying glass gives a five times enlarged image at a distance of 25 cm from the lens. Find, by ray diagram, the length of the lens. 1 Time
Q.11: A simple microscope has convex 1 Time
Q.12: Differentiate between real and virtual image. 1 Time
Q.13: Draw the ray diagram of a compound microscope and write its total magnification. 3 Times
Q.14: How can the resolving power of compound microscope be increased?

Astronomical Telescope

Q.15: What do you mean by "Normal adjustment" in an astronomical telescope? 1Time
Q.16: What do you mean by "Normal adjustment" in an astronomical telescope? 4 Times
Q.17: When the telescope is said to be in normal adjustment? 1 Time

Q.18: Write down the main parts of spectrometer and two uses of spectrometer.
Q.19: Write function of collimator in spectrometer? **7 Times**

Introduction to Fibre Optics

Q.20: Write the advantage use of light as transmission carrier wave over radio wave carriers. 3 Times

Q.21: Calculate the value of critical angle for glass by the total internal reflection. 1 Time

Q.22: Define total internal reflection. **7 Times**

Q.23: What is condition for internal reflection? 2 Times

Q.24: Define angle of incidence should be greater than the critical angle of the denser medium. 1 Time

Q.25: Define the critical angle. 1 Time

Q.26: What is optical fibre? Write down two uses of fibre optics. 1 Time

Q.27: Find the refractive index of medium if critical angle is 39°C. 1 Time

Types of Optical Fibers

Q.28: Differentiate between multimode step index and multimode grade index fibre? 2 Times

Q.29: What is the use of light emitting diode and Microphone in signal transmission in optical fiber? 1 Time

Signal Transmission and Conversion to Sound

Q.30: Write down the three major components on which a fiber optic communication system consists. 3 Times

Q.31: What is the function of receiver in signal transmission through optical fiber? 1 Time

Exercise Short Questions

Q.32: What do you understand by linear magnification and angular magnification? Explain how to convex lens is used as magnifier? 15 Times

Q.33: Explain the difference between angular magnification and resolving power of an optical instrument. 14 Times

Q.34: Why would it be advantageous to use blue light with a compound microscope? 36 Times

Q.35: One can buy a cheap microscope for use by the children. The images seen in such a microscope have coloured edges. Why is this so? 8 Times

Q.36: If a person was looking through a telescope at the full moon, how would the appearance of the moon be changed by covering half of the objective lens? 18 Times

Q.37: A magnifying glass give five times enlarged image at a distance of 25 cm from the lens. What will be the focal length of the lens? **2 Times**

Q.38: Draw sketch showing the different light paths through a single-mode fibre preferred in telecommunications. **2 Times**

Q.39: **How the light istransmitted through the optical fiber? 14 Times**

Q.40: **How the power is lost in optical fiber through dispersion? Explain. 16 Times**

Unit 11: Heat and Thermodynamics

Kinetic Theory of Gases

Q.1: **Write down the main postulates of kinetic theory of gases. 14 Times**

Q.2: Define pressure of gas. 1 Time

Q.3: **Derive Boyl's Law from the expression for pressure of gas. 10 Times**

Q.4: **Define Charles's law how it is derived from Kinetic front cycheory of gases. 14 Times**

Q.5: Why should chimney be tall for its better working? 1 Time

Q.6: Define Thermodynamics. 1 Time

Q.7: Why does the pressure of gas in car tyre increase when it is driven through some distance? 3 Times

Q.8: Starting from the relation of pressure of a gas prove that absolute temperature of an ideal gas is directly proportional to the average translational K.E of gas molecules. 1 Time

Internal Energy

Q.9: Define internal Energy of a substance. Is it state function? 4 Times

Q.10: Why absolute value of internal energy cannot be measured? 1 Time

Q.11: What is similarly and difference between internal energy and gravitational P.E.? 1 Time

Q.12: Internal energy is a state function. Explain. 1 Time

Q.13: Prove that $W = P\Delta V$. 4 Times

Q.14: Differentiate between internal energy of a substance and internal energy of an ideal gas. 1 Time

Q.15: How can we increase the internal energy? Explain. 1 Time

Work and Heat

Q.16: Justify! Work and heat are similar. 1 Time

Q.17: State first law of thermo dynamics and give its mathematical form. **7 Times**

Q.18: What is meant by reversible process? Give its example. 3 Times

Q.19: What is an isothermal process? How it is expressed on a PV-diagram. 2 Times

Q.20: What is an adiabatic process? Draw a graph between pressure and volume of an adiabatic process and give name of this graph. **7 Times**

Q.21: Write two limitations of first law of thermo dynamics. 1 Time

Q.22: What will be the heat lost if internal energy decreases by 300 J and work of 120 J is doen by the system. 1 Time

Q.23: Explain bicycle pump as an example of first law of thermodynamics. 2 Times

Q.24: What would be the heat loss if internal energy decreases by 10 J and 20 J of work is done on the system, simaltenous? 1 Time

Q.25: Give two examples of the adiabatic process. 2 Times

Q.26: Calculate the work done during isothermal process? 1 Time

Q.27: How first of thermo dynamics explains human metabolism? Explain. 1 Time

Q.28: How would you explain sign convection of first law of thermodynamics? 1 Time

Q.29: For an adiabatic process, write down the form of first law of thermodynamics. 1 Time

Q.30: As we know, PV^{γ} = constant. What do you know about γ (gamma) in this relation? 1 Time

Q.31: Why efficiency of a real heat engine is always less than one? 1 Time

Molar Specific Heats of a Gas

Q.32: We talk about molar specific heat of gases but not talk about molar specific heat of solids and liquids. Why? 1 Time

Q.33: Define molar specific heat of gas at constant volume and specific heat at constant pressure. **5 Times**

Reversible and Irreversible Process Gas

Q.34: What are reversible and irreversible processes? **6 Times**

Heat Engine

Q.35: What is heat engine? Define efficiency. 3 Times

Second Law of Thermodynamics

Q.36: State second law of thermodynamics. 5 Times

Carnot Engine and Carnot's Theorem

Q.37: Define absolute zero and Carnot cycle. 2 Times

Q.38: Under what circumstance the efficiency of a Carnot engine will be 100%? Is it possible? 2 Times

Q.39: Sketch the schematic diagram of refrigerator. 3 Times
Q.40: Areal heat engine is less efficient than carnot engine. Why? 2 Times
Q.41: Give the statement second law of thermodynamics and Carnot's theorem. 7 Times
Q.42: How can the efficiency of real heat engine be increased? 1 Time
Q.43: Carnot Cycle provides the basis to define a temperature scale that is independent of material properties. Explain. 1 Time
Q.44: What are source and sink for carnot Engine? 1 Time
Q.45: Draw PV-diagram which show four steps of Carnot engine. 3 Times

Thermodynamics Scale of Temperature

Q.46: What is triple point cell? Also define thermodynamic scale. 14 Times

Petrol Engine

Q.47: Name the two / four strokes of petrol engine. 4 Times
Q.48: What is Diesel Engine? 2 Times
Q.49: Why spark plug is not needed in a diesel engine? 3 Times
Q.50: What is negative entropy? Give example and its unit. 1 Time

Entropy

Q.51: Define entropy. Give its mathematical form and S.I. Units. 1 Time
Q.52: State second law of thermodynamics in terms of entropy. **6 Times**
Q.53: Does the entropy of interior of refrigerator increase or decrease when it is working? 1 Time
Q.54: A system absorbs 200 Joule heat at an absolute temperature 200 K. Calculate the change in entropy. 2 Times
Q.55: Show that: Change in entropy is always positive. 1 Time
Q.56: What is degradation of energy? 1 Time

Environmental Crises as Entropy Crises

Q.57: Why the entropy of the universe always increases? 2 Times
Q.58: How can air pollution be reduced? 1 Time

Exercise Short Questions

Q.59: Explain that the average velocity of the molecules in a gas is zero, but the average of the square of the velocities is not zero. 23 Times
Q.60: Why does pressure of a gas in a car tyre increase when it is driven through some distance? 24 Times
Q.61: Specific heat of gas at constant pressure is greater than specific heat at constant volume. Why? 39 Times
Q.62: Give an example of a process in which no heat is transferred to or from the system but temperature of the system changes. **6 Times**

Q.63: Is it possible to convert internal energy into mechanical energy? Explain with an example. 21 Times

Q.63: Is it possible construct a heat engine that will not expel heat into the atmosphere? 20 Times

Q.64: A thermos flask containing milk as a system is shaken rapidly. Does the temperature of milk rise? 24 Times

Q.65: What happens to the temperature of the room when an air conditioner is left running on a table in the an air of the room? 8 Times

Q.66: Can the mechanical energy be converted completely into heat energy? If so give an example. 20 Times

Q.67: Does entropy of a system increase or decrease due to friction? 22 Times

Q.68: Give an example of a natural process that involves an increase in entropy. 10 Times

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Lecture 11	Molar Specific Heat of a Gas.

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