Q No 1 Name several repetitive phaenomenon occurring in nature which could serve as reasonable time standard?

ANS = time standard are (A)the rotation of earth around the sun (b)the rotation of earth around its own axis.(C)oscillation of pendulum.(d)human pluses rate(e) half life of a radioactive element.

Q NO 2 Give the draw backs ti use the time period of pendulum as a time standards?

ANS :(1) time period T of simple pendulum depend on the length of the pendulum ,therefore for constant T the length must be remain constant ,which is troublesome.(2) T is depends on 'g' which is different at different places.

Q no 3:why do we find it useful to have two units for the amount of substance, the kilogram and mole ?

ANS: The unit kilogram is big unit and used to measure mass of macroscopic bodies. The unit mole is small unit and used to measure mass of microscopic particles like atoms. That is why both are useful for measurement of mass of a substance.

Q NO 4: The Period Of a Simple Pendulum Is Measured By a Stop Watch .What Type Of Errors Are Possible In The Time Period?

ANS:types of errors (A)error due to calibration (B)zero error in stop watch (c)personal error to start or stop

Q NO 5 : Write the dimensions of (A)pressure(B)density

$\Rightarrow [P] = \frac{[F]}{[A]} = \frac{[MLT^{-2}]}{[L^2]}$ $\Rightarrow [P] = [ML^{-1}T^{-2}]$	$[\rho] = \frac{[\text{mass}]}{[\text{volume}]} \Rightarrow [\rho] = \frac{[M]}{[L^3]} = [ML^{-3}]$

Q # 5 : The wavelength λ of a wave depends on the speed v of the wave and its frequency f. Knowing that

$[\lambda] = [L]$ $[v] = [L\,T^{-1}]$ and $[f] = [T]^{-1}$

Decide which of the following is correct, $f = v\lambda$ or $f = \frac{v}{\lambda}$

(i) $f = v\lambda$ Dimension of LHS $= [f] = [T^{-1}]$ Dimension of RHS $= [v\lambda] = [v][\lambda]$ $\because [v] = [LT^{-1}]$ $\because [\lambda] = [L]$ Dimension of RHS $= [v\lambda] = [LT^{-1}][L]$ $= [L^2T^{-1}]$ As Dimension of LHS $\neq$ Dimension of RHS Hence, the equation $f = v\lambda$ is not dimensionally correct.	**(ii)** $f = \frac{v}{\lambda}$ Dimension of LHS $= [f] = [T^{-1}]$ Dimension of RHS $= \left[\frac{v}{\lambda}\right] = \frac{[v]}{[\lambda]} = \frac{[LT^{-1}]}{[L]}$ $= [T^{-1}]$ As Dimension of LHS = Dimension of RHS Hence, the equation $f = \frac{v}{\lambda}$ is dimensionally correct.

Chapter 2

Q # 1. Define the terms (i) Unit Vector (ii) Position Vector (iii) Component of a Vector.

ANS:Unit Vector :A vector having the unit magnitude is called the unit vector. $\hat{A} = \frac{\mathbf{A}}{|A|}$

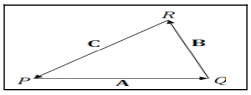
Position Vector :The position vector describes the location of a point with respect to origin.

Component of a Vector:A component of a vector is its effective value in a specific direction.

Q # 2. The vector sum of three vectors gives a zero resultant. What can be the orientation of the vectors?

Ans. If the three vectors are such that they can be represented by the sides of a triangle taken in cyclic order,

then the vector sum of three vectors will be zero.



Q # 3. If one of the rectangular components of a vector is not zero, can its magnitude be zero? Explain.

Ans. If one of the components is not zero, then the magnitude of vector can't be zero. If **Ax**and $\mathbf{A}_y$are the rectangular components of vector **A** ,then its magnitude will be

$$\text{Magnitude of } \mathbf{A} = A = \sqrt{{A_x}^2 + {A_y}^2}$$

$$\text{If } A_x = 0, \text{ then } A = \sqrt{0^2 + {A_y}^2} = A_y \qquad \text{If } A_x = 0, \text{ then } A = \sqrt{{A_x}^2 + 0^2} = A_x$$

Q # 4. Can a vector have a component greater than the vector's magnitude?

Ans. The magnitude of the component of a vector can never be greater than the vector's magnitude because the component of a vector is its effective value in a specific direction. The maximum value of magnitude of component can be equal to the magnitude of the vector.

Q NO 5 Can the magnitude of a vector have a negative value?

Ans. No, the magnitude of a vector cannot be negative, because the magnitude of vector **A** can be described by the formula:

$$\text{Magnitude of } \mathbf{A} = A = \sqrt{{A_x}^2 + {A_y}^2}$$

Where $\mathbf{A}_x$ and $\mathbf{A}_y$ are the rectangular components of **A.** As the squares of real quantities always gives the positive values. Therefore, the magnitude of a vector will always be positive.

Q NO 6 If A+B=0 , what can you say about the components of the two vectors.

ANS:

Given that: $\mathbf{A} + \mathbf{B} = 0 \Rightarrow \mathbf{A} = -\mathbf{B}$ These vectors can be expressed in terms of rectangular components,

$A_x\hat{\imath} + A_y\hat{\jmath} = -(B_x\hat{\imath} + B_y\hat{\jmath}) \Rightarrow A_x = -B_x$ and $A_y = -B_y$ Hence the components of both vectors are equal in magnitude but opposite in direction.

Q # 8. Under what circumstances would a vector have components that are equal in magnitude?

ANS: The components of a vector will have equal magnitude when it makes an angle of 45˚ with x-axis. If a vector **A** makes an angle of 45˚, then its rectangular components will be:

$A_x = A\cos 45^\circ = 0.707\,A$	$A_y = A\sin 45^\circ = 0.707\,A$

Q # 9. Is it possible to add a vector quantity to a vector quantity to a scalar quantity?

Ans. No it is not possible to add a vector quantity to a scalar quantity because the physical quantities of same nature can be added. Vectors and scalars are different physical quantities. It means that vectors can be added to vectors and scalars are added in scalars, but the vectors can't be added to scalar.

Q # 10. Can you add zero to a null vector?

Ans. No, zero can't be added to a null vector because zero is a scalar and scalars can't be added to vectors. Only the physical quantities of same nature can be added.

Q # 11. Two vectors have unequal magnitudes. Can their sum be zero? Explain.

Ans. No, the sum of two vectors having unequal magnitudes can't be zero. The sum of two vectors will be zero only when their magnitudes are equal and they act in opposite direction.

Q # 18. **Name the three different conditions that could makes $A_1 \times A_2 = 0$**

ANS : (a) if $\mathbf{A}_1$ vector is null vector (b) if $\mathbf{A}_2$ vector is null vector (c) if $\mathbf{A}_1$ **and** $\mathbf{A}_2$ are parallel

Q # 21. Can a body rotate about its center of gravity under the action of its weight?

Ans. No a body can't rotate about the center of gravity under the action of its weight. The whole weight of thebody acts on the center of gravity. The torque due to weight will be zero because the moment arm is zero in this case. Hence, a body cannot rotate about center of gravity under the action of its weight.

Chapter 3

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

ANS; When the object is thrown vertically upward, it will move against the direction of gravity. The sign of acceleration **g** relative to velocity **v** will be taken as negative. It is because of the reason that the direction of **g** is opposite to the direction of **v** during upward motion. If the object is moving downward, then the sign of k relative to **g** will be taken as positive because both k and **v** are in same direction.

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

Ans. Yes, the velocity of a body can reverse its direction with constant acceleration. For example, when a body is thrown vertically upward under the action of gravity, the velocity of the object will go on decreasing because force of gravity is acting downward. When the object reaches the maximum height, its velocity becomes zero, and then the object reverses its direction of motion and start moving vertically downward. During the whole process, the magnitude of the acceleration due to gravity remains constant.

Q # 3. Motion with constant velocity is a special case of motion with constant acceleration. Is this statement is true? Discuss.

Ans. Yes this statement is true. When a body moves with constant velocity in the straight line, its acceleration is zero. Hence, the acceleration of the body will always remains constant during such motion. As the zero is a constant quantity, therefore this is a special case of motion.

Q # 4. Find the change in momentum for an object subjected to a given force for a given time and state the law of motion in terms of momentum.

ANS: the change in momentum of a body of mass m moving with intial velocity $\mathbf{v}_i$ and after time t heaving final velocity $\mathbf{v}_f$ is

$\Delta p = P_f - P_i = mv_f - mv_i$ $\quad a=(v_f - v_i)/t \quad F=ma$

$= m(v_f - v_i) \Rightarrow \Delta p = tm(v_f - v_i)/t \Rightarrow \Delta p = tF$

This change in momentum in term of force and time . The law of motion in term of momentum is stated as "Rate of change in momentum is equal to applied force."

Q # 5. Define impulse and show that how it is related to linear momentum?

ANS When a force is acted on a body for a very short time Δt , the product of force and time is called impulse. It is a vector quantity and its unit is N s.

$I = f \times \Delta t = ma \times \Delta t = m\Delta v \Rightarrow I = \Delta p \quad a \times \Delta t = v$

The impulse is equal to change in momentum . This is relation between ,impulse and change in momentum.

CHAPTER 4

Q # 1. Calculate the work done in kilo joules in lifting a mass of 10 kg (at steady velocity) through a vertical height of 10 m.

ANS: The work done W on the object will be stored in the form of P.E. Therefore:

$W = mgh \quad = (10)(9.8)(10) = 980\,J = 0.98\,kJ$

Q # 2. In which case is more work done? When a 50 kg bag of books is lifted through 50 cm, or when a 50 kg crate is pushed through 2m across the floor with a force of 50 N.

ANS:

Case 1 W = mgh	**Case 2 W=FS**
=50*9.8*.5=245j	**=50*2=100j**
Hence in 1st case, more work is done.	

Q # 3. An object has 1 J of potential energy. Explain what does it mean?

Ans. It means that work has been dome on the body by the force of 1 N which has lifted the body through a distance of 1 m. This work has been stored in the body in the form of P.E. which is 1J.

Q # 4. When a rocker re-enters the atmosphere, its nose cone become very hot. Where does this heat energy come from?

ANS: The atmosphere of earth contains a large number of dust particles and water vapors. So when a rocket enters into the atmosphere and passes through these particles, due to the force of friction, the kinetic energy of the rocket is lost in the form of heat. That's why its nose cone becomes very hot.

Q # 5. What sort of energy is in the following: a) Compressed spring b) Water in a high dam c) A moving car

Ans. a) Elastic Potential Energy b) Gravitational Potential Energy c) Kinetic Energy

Q # 6. A girl drops a cup from a certain height, which breaks into pieces. What energy changes are involved?

ANS: When the cup was in the hands of girl, it had gravitational P.E. When the cup is dropped, its P.E. is converted into the K.E. On striking the ground, this energy is converted into sound energy, heat energy and work done in breaking the cup into pieces.

Q # 10. A boy uses a catapult to throw a stone which accidentally smashes a green house window. List the possible energy changes.

Ans. Initially, the catapult had elastic P.E. when the stone is thrown, its P.E. is converted into K.E. On striking the window, this energy is converted into sound energy, heat energy and work dome in breaking the window into pieces.

CHAPTER N0 5

Q # 1. 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?

ANS: The force which keeps the body to move in the circular path and always directed towards the center of the circle is called the centripetal force. The direction of a body moving in a circular path is always changing. To bend the normally straight path into circular path, a perpendicular force is needed, called centripetal force.

Q # 2. What is meant by moment of inertia? Explain its significance

ANS: The product of mass of the particle and square of its perpendicular distance from axis of rotation is called moment of inertia. It is denoted by the symbol I and is expressed by the relation: $I = m r^2$

The moment of inertia plays the same role in angular motion as the mass in linear motion.

Q # 3. What is meant by angular momentum?

Ans. The cross product of position vector and linear momentum of an object is known as angular momentum.

Q # 4. Show that orbital angular momentum $L_o = mvr.$

Ans. The angular momentum **L** of a particle OF MASS **m** moving with velocity **V** and momentum **p** relative to the origin **O** is defined as: $\mathbf{L} = \mathbf{r} \times \mathbf{p} \Rightarrow L = rp \sin\theta\, \hat{n}$ p=mv

The magnitude of angular momentum will be:

$L = rp \sin\theta \Rightarrow L = r\,m\,v \sin\vartheta \Rightarrow L_o = m\,v\,r$ if $\vartheta = 90^o$

Q # 5. Describe what should be the minimum velocity, for a satellite, to orbit close to earth around it.

Ans. Consider a satellite of mass **m** is moving in a circle of radius **R** around the earth. In circular orbit for a low flying satellite, the centripetal acceleration is provided by the gravity.

$$g = \frac{v^2}{R} \Rightarrow v = \sqrt{gR} \Longrightarrow v = \sqrt{9.8 \times 6.4 \times 10^6} \Longrightarrow v = 7.9\ kms^{-1}$$

This is the minimum velocity necessary to put a satellite into the orbit and is called critical velocity.

Q # 6.State the direction of following vectors in simple situations; angular momentum and angular velocity.

Ans. The directions of angular momentum and angular velocity are used to described by right hand rule: Grasp the axis of rotation in right hand with the figures curling in the direction of rotation, then the erected thumb will give the direction of angular velocity and angular momentum.

Q # 7. When mud flies off the tyre of a moving bicycle, in what direction does it fly? Explain

Ans. When the mud flies off the tyre of a moving bicycle, it always flies along the tangent to the tyre. This is due to the reason that the linear velocity is always tangent to the circle, and the mud will fly in the direction of

linear velocity.

Q # 8. A disc and a hoop start moving down from the top of an inclined plane at the same time. Which one will have greater speed on reaching the bottom?

Ans. The formula for the velocity of the disc and the hoop are given by:

$$v_{disc} = \sqrt{\frac{4gh}{3}} \text{ and } v_{hoop} = \sqrt{gh}$$

So it is clear from the above relations that the disc will be moving with greater speed on reaching the bottom.

Q # 9. Explain how many minimum number of geo-stationary satellites are required for global coverage of TV transmission.

Ans. A geostationary satellite covers 120^O of longitude. So the whole earth can be covered by three correctly positioned geostationary satellites.

Q # 10. Why a diver does changes its body position before and after diving in the pool?

Ans. When the diver jumps from the diving board, his legs and arm are fully extended. The diver has large moment of inertia I_1 but the angular velocity w_1 is small. When the diver curls his body, the moment of inertia reduces to I_2 . In order to conserve the angular momentum, the value to angular velocity increases to w_2 .

$L = I_1 w_1 = I_2 w_2 = const.$ In this way, the diver can make more somersaults before entering the water.

Chapter no 6

Q # 1. Explain what do you know about the term 'Viscosity'?

Ans. The amount of force required to slide one layer of liquid over another layer is called as viscosity. It is denoted by the Greek word η .

Q # 2. Why fog droplets appear to be suspended in air?

Ans: When the magnitude of the drag force on the fog droplet becomes equal to its weight, the net force acting on the droplet is zero. In such a case, the droplet starts falling with a constant speed and appears to be suspended in air.

Q # 3. Explain what the difference between laminar and turbulent flow.

ANS:Laminar Flow :The flow is said to be streamline or laminar, if every particle that passes a particular point moves along exactly the same path, as followed by particles which passed through that points earlier.

Turbulent Flow :The irregular or unsteady flow of the fluid is called turbulent flow.

Q # 4. State Bernoulli's relation for a liquid in motion and describe some of its applications?

ANS: The principle states that the sum of pressure, the kinetic and potential energy per unit volume for an ideal fluid remains constant at every point of its path. Mathematically, it is described as:

$$P + \frac{1}{2}\rho v^2 + \rho g h = constant$$

Where P is the pressure, v is the velocity and , is density of the fluid.
The Bernoulli relation is important in nozzle design and in flow measurements.

Q # 5. A person is standing near a fast moving train. Is there any danger that he will fall towards it?

Ans. When a person is standing near a fast moving train, then the air between them is also fast. According to Bernoulli, where the speed is high, pressure will be low. So the pressure between the person and train will be low as compared to the pressure of side way. So there will be a chance of force acting on the person from high pressure region to the low pressure region and that he may fall towards the train.

Q # 6. Two row boats moving parallel in the same direction are pulled towards each other. Explain?

Ans. When two boats are moving parallel in the same direction, then the water between them is also flowing fast. According to Bernoulli, where the speed is high, pressure will be low. So the pressure between the tow boats decreases as compared to the pressure of side way. So the side way high pressure pushes the two boats towards each other.

Q # 7. Explain, how the swing is produced in a fast moving cricket ball?

Ans. When the cricket ball is thrown in such a way that is spins as well as moves forward, the velocity of the air on one side of

the ball increases due to the spins and hence the pressure decreases. This gives an extra curvature to the ball known as swing which deceives opponent player.

Q # 8. Explain the working of a carburetor of a motor car using Bernoulli's principal.

Ans. The carburetor of a motor car uses a Venturi duct to give correct mixture of air and petrol to the engine. The petrol tank is attached with a pipe through a very small inlet. Air moves very fast through this pipe. As a result, pressure in the pipe decreases as compared to the pressure in the petrol tank which is atmospheric pressure. So the petrol moves from the tank to the air pipe (i.e., from high pressure to low pressure), and a correct mixture of petrol and air reaches the engine.

Q # 9. In orbiting space station, would the blood pressure in the major arteries in the leg ever be greater than the blood pressure in major arteries in the neck.

Ans. In an orbiting space station, due to weightlessness, the blood pressure in the major arteries in the leg will be equal to the blood pressure in major arteries in the neck.

CHAPTER NO 7

Q # 1. Name the two characteristics of simple harmonic motion?

ANS: i. Acceleration of the body is directly proportional to the displacement and is always directed towards mean position: $a \propto -x$ **Ans.** No, frequency of the oscillator is independent of the amplitude of oscillation:

ii. Total energy of the particle eecuting SHM remains conserve $E_{total} = K.E. + P.E. = const.$

Q # 2. Does frequency depend on the amplitude for harmonic oscillator?

$f = \frac{1}{2\pi}\sqrt{\frac{k}{m}}$ The above expression shows that the frequency of harmonic oscillator does not depend upon its amplitude. It only depend on its mass and spring constant.

Q # 3. Can we realize an ideal simple pendulum?

Ans. No, we can't realize an ideal simple pendulum. An ideal simple pendulum should consist of a heavy but small metallic bob suspended from a frictionless rigid support by means of long, weigh less and inextensible string. These conditions are impossible to attain in nature. So ideal simple pendulum can't be realized.

Q # 4. What is total distance traveled by an object moving with SHM in a time equal to its period, if its amplitude is A?

Ans. The total distance traveled by ab object moving with SHM in its time period is 4A, where A is amplitude of vibration

Q # 5. What is meant by phase angle? Does it define angle between maximum displacement and the driving force? .

Ans. The angle θ which specifies the displacement as well as the direction of motion of the point executing SHM is known as phase. It does not define angle between maximum displacement and driving force. It is the angle that the rotating radius makes with the reference direction.

Q # 6 Under what condition does the addition of two simple harmonic motions produce a resultant, which is also simple harmonic?

Ans. • Simple harmonic motion should be parallel • Simple harmonic motion should have same frequency
• Simple harmonic motion should have constant phase difference

Q #7. In a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop?

Ans. If the mass spring system is hung vertically and set into oscillation, the motion eventually stops due to friction and air resistance and some other damping forces.

Q # 8. Describe some common phenomenon in which resonance plays an important role

Ans.:• In radio sets • In microwave oven • Musical Instruments

Q # 9. Show that in SHM, the acceleration is zero when the velocity is greatest and the velocity is zero when the acceleration is greatest?

Ans: The expressions of velocity and acceleration of the body executing SHM are as follow: **$a=-\omega^2 x$**

v= $\omega\sqrt{x_0^2-x^2}$ at main position x=0 then $a=-\omega^2 x=-\omega^2(0)=0$ $v=\omega\sqrt{x_0^2-x^2}=\omega\sqrt{x_0^2-0^2}=\omega\sqrt{x_0^2}=\omega x_0$
At extreme position, where x=x_0 $a=-\omega^2 x=-\omega^2 x_0$ $v=\omega\sqrt{x_0^2-x_0^2}=\omega(0)=0$
Q # 10. In relation to SHM, explain the equation: $y=A\sin(\omega t+\varphi)$ $a=-\omega^2 x$ **ANS:** $y=$ Instantaneous displacement $A=$ Amplitude $\varphi=$ Initial Phase $\omega t=$ Angle subtended in time t $a=$ Acceleration $\omega=$ Angular Frequency $x=$ Instantaneous displacement

CHAPTER NO 8

Q # 1. What features do longitudinal waves have in common with transverse waves?

Ans: • Both are mechanical waves.• Particles oscillate about their mean position in both types of waves.

• Particles oscillate about their mean position in both types of waves.• Both satisfy the equation: $v=f\lambda$

Q # 2. Is it possible for two identical waves traveling in the same direction along a string to give rise to stationary waves?

Ans. No, it is not possible for two identical waves traveling in the same direction along a string to give rise to stationary waves. For stationary waves, two identical waves must travel in opposite direction.

Q # 3. A wave is produced along a stretched string but some of its particles permanently show zero displacement. What type of wave is it?

Ans. It is a stationary wave and the pints are called Nodes.

Q # 4. Explain the terms crest, trough, node and anti-node.

Ans. Crest. The portion of the wave above the mean level is called crest**.Trough.** The portion of the wave below the mean level is called trough. **Node**. The points of zero displacement in stationary waves are called Nodes. **Anti-node**. The points of maximum displacement in stationary waves are called anti-nodes.

Q # 5. Why should sound travel faster in solids than in gases?

Ans. The formula for speed of sound is $v=\sqrt{\frac{E}{\rho}}$ Where

E = Modulus of Elasticity ρ = Density

Although the density of solids is greater than the density of gases but the modulus of elasticity for solids is much greater than gases. Hence, sound travel faster in solids than in gases.

Q # 6. How are the beats useful in tuning musical instruments?

ANS; The number of beats produced per second is equal to the difference between the frequency of two tuning forks .if we know the frequency of one fork ,the frequency of the other can be calculated by counting beats .therefore beats are useful for tuning a musical instrument.

Q # 7. As a result of a distant explosion, an observer senses a ground tremor and then hears the explosion. Explain the time difference.

ANS. The waves produced by the explosion reach the observer quickly through the ground as compared to the sound waves reaching through the air. This is due to the reason that sound travels faster in solid than gases.

Q # 8. Explain why sound travels faster in warm air than in cold air.

Ans. The speed of sound varies directly as the square root of absolute temperature.That's why sound travel faster in warm air than in cold air.

Q # 9. How should a sound source move wit frequency of its sound does not change?

Ans. If the relative velocity between the source and the observer is zero, then there will be no change in frequency of the source and the apparent frequency will be zero.

CHAPTER NO 9

QNO,1:Under what condition two or more sources of light behaves as coherent sources ?

ANS :When the sources emit contentiously light waves of same period ,same wavelength having the same phase or constant phase difference. They behaves as coherent sources.

Q NO 2:Can visible light produced interference fringes?

ANS:Yes , the visible light can produced interference fringes , provided waves of visible light have coherent sources.

Q NO 3:Explain whether the young's experiment is an experiment for studying interference /diffraction effect of light?

ANS:Young's experiment is primary the experiment for studying the interference effect on the screen.The two slits S_1,S_2 get light due two diffraction from single slits S_o .Two waves from S_1 ,S_2 superpose to produced interference fringes at the screen.

Q NO 4 An oil spreading over a wet footpath shows colors.Explain, how todoes it happen?

Ans : The oil films behaves as a thin film when while light fall on this film.At a place the angle of incidence and thickness of film is such that the condition for destructive interference for one of the seven colors is satisfied.this colors becomes absent and remaining colors can be seen .

Q NO 5 How would you mange to get more order of spectra using a diffraction grating?

Ans: In order to get more orders of spectra we should increase the grating elements or decrease the number of lines on the grating .

Q NO 6 Why the polarized sunglasses are better than ordinary sunglasses ?

Ans: The polarized sunglasses produced plane polarized light . So this avoid the glare due to greater sun light .

Q NO ,7 How would you distinguish between un-polarized and polarized light.

Ans : The plane polarized light has vibration only in one plane,whereas,the unpolarized light has vibration in many planes. They can be checked by using a polariod. The plane polarized light will be cut off on the rotation of the using a polaroid but the unpolarized light pass through the polaroid on its rotation.

CHAPTER NO 10

Q NO,1;Why would it be advantage to use blue light with a compound microscope?

ANS: It is useful to use blue light (relativity shorter wavelength) with compound microscope because it reduces the diffraction ($d \sin\theta = n\lambda$) and increase resolving power.

Q NO,2:One can buy a cheap microscope for use by the children the image seen in such a microscope have colored edge, why it is so?

Ans: The lens used in cheap microscope have low quality and lens defects.The image seen in such microscope have colored edges due to lens defect called chromatic aberration.These lens act as prism and gives rise to dispersion of light into seven colors.

Q NO 3: If a person was looking through a telescope at full moon,how the appearance of moon would be changed by covered half to objective lens?

ANS: If a person was looking through a telescope at the full moon,the appearance of the full moon would not be changed by covering half of the objective lens but its brightness is reduced .the intensity of light received from moon will decrease because its depends upon the diameter of the objective lens.

Q NO,4:How the light signals is transmitted through the optical fiber?

ANS: The light signals transmitted through optical fiber involves the phenomenon of total internal reflection and continuous refraction.The fiber optical communication system consists of three major components called transmitter converts electrical signals into light signals.These light signals travel through fiber optics due to total internal reflection and continuous refraction

Q NO 5:How the power is lost in optical fiber through dispersion ?Explain.

ANS;The narrow band of wavelength will disperse in different direction and spread into different wavelength when light signal traveling down the fiber optics is not monochromatic.The output signals having different wavelengths reaches the other end of the fiber at different times.the signals or information received at other end of fiber is faulty so power is lost in optical fiber through dispersion.

CHAPTER NO 11

Q NO 1:Why does the pressure of a gas in a car tyre increase when it is driven through some distance ?

ANS: When a car is driven on the road the K.E of the tyre and gas molecule inside the tyre increase due to friction between the tyre and road.Since pressure of the gas is directly proportional to the average K.E of the gas so pressure inside the tyre also increases.

Q NO 2:Specific heat of a gas at constant pressure is greater than specific heat at constant volume.Why?

ANS:when a gas is heated at constant pressure in this case, the heat supplied in two ways

1 A part of heat is used in doing work to move the piston up against the external pressure .

2 The other part of heat does work to increase the external energy and temperature.

If the gas is heated at constant volume, no extra work is done to expand the gas .In this case all the heat is used to increase the internal energy and temperature of the gas.Thus more heat is required at constant pressure than that constant volume .

Q NO 3 Is it possible to convert internal energy into mechanical energy?Explain with example

Ans: Yes.it is possible to convert internal energy into mechanical energy

Example ;In case of adiabatic expansion ,the piston is pushed up at the cost of internal energy is converted into mechanical energy.

Q NO,4:Is it possible to construct a heat engine that will not expel that into the atmosphere?

ANS: According to second law of thermodynamics , it is not possible to construct an engine with out a cold body.Therefore, every heat engine gives a part of heat energy to the atmosphere which appears in the form of smoke .

Q NO 5; A thermal flask containing milk as a system is shaken rapidly.Does the temperature of milk rise?

ANS: YES,when milk in a thermos flask is shaken rapidly work is done in shaking.This is converted K.E of molecules of milk due to which temperature of the milk rises.

Q NO 6 Can the mechanical energy be converted completely into heat energy?If so gives an example

ANS:YES, The mechanical energy can be completely converted in heat energy.

EXAMPLE: when the gas is compressed in isothermal process the work done on the system completely converted into heat while the internal energy of the gas remains constant. According to first law of thermodynamics

$Q = \Delta u + w \qquad \Delta u = 0$

$Q = w$ hence proved

Q NO 7: Does entropy of a system increase or decrease due to friction?

Ans: The entropy of a system will increase due to friction .When a body slides over the surface of another body,the disorder of molecules increase which cause the increase in entropy.

Q NO 8 :Gives an example of a natural process that involves an increase in entropy?

Ans: in all the natural processes entropy increase.For example when ice melts into water,the solids molecule which are in an order are converted into water molecules which are in disorder. Thus disorder in molecule cause the increase in entropy.