# ASSIGNMENT

# General Physics I
# PHYS 101

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# MECHANICS

# ASSIGNMENT 1

## CHAPTER 1: DYNAMICS OF SYSTEM OF PARTICLES

**1.** A 45.36-kg block of ice slides down an incline 1.52 m long and 0.9144 m high. A man pushes up on the ice parallel to the incline so that it slides down at constant speed. The coefficient of friction between the ice and the incline is 0.1. Find

(a) the force exerted by the man,
(b) the work done by the man on the block,
(c) the work done by the gravity on the block,
(d) the work done by the surface of the incline on the block,
(e) the work done by the resultant force on the block, and
(f) the change in kinetic energy of the block.

[Ans: (a) 231.15N, (b) -352.56 J (c) +406.8 J (d) -54.24 J (e) zero (f) zero.]

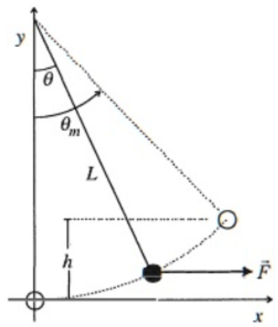
**2.** A man pushes a 27.215-kg block 9.144 m along a level floor at constant speed with the force directed $45^0$ below the horizontal. If coefficient of kinetic friction is 0.2, how much work does the man do on the block? [Ans: 609 J]

**3.** A block of mass $m = 3.57kg$ is drawn at a constant speed a distance $d = 4.06$ *meters* along a horizontal floor by rope exerting a constant force of magnitude $F = 7.68N$ making an angle $\theta = 15^0$ with the horizontal. Compute

(a) the total work done on the block,
(b) the work done by the rope on the block,
(c) the work done by the friction on the block,
(d) the coefficient of kinetic friction between the block and floor.

[Ans: (a) Zero, (b) 30.1 J (c) − 30.1 J, (d)0.225]

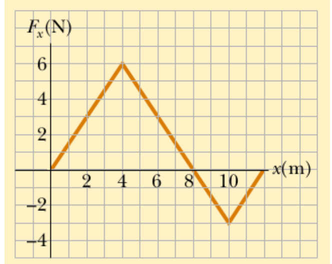
**4.** A small object of mass m is suspended from a string of length L . The object is pulled sideways by a force $\vec{F}$ that is always horizontal, until the string finally makes an angle $\theta_m$ with the vertical as shown in figure. The displacement is accomplished at a small constant speed. Find the work done by all the forces that act on the object.




[Ans: $W_F = mgL(1 - cos\theta_m)$ , $W_g = mgh$ , $W_T = 0$ ]

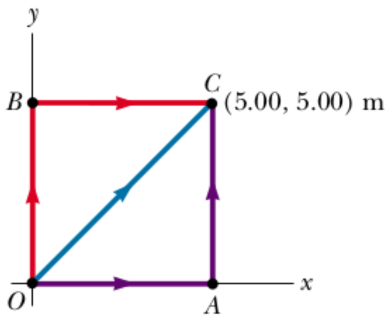
**5.** The force acting on a particle varies as shown in Figure. Find the work done by the force on the particle as it moves

(a) from $x = 0$ to $x = 8.00m$ ,
(b) from $x = 8.00m$ to $x = 10.0m$ , and
(c) from $x = 0$ to $x = 10.0m$.




[Ans: $(a)24.0J$ , $-3.0J$ , $21.0J$ ]

**6.** A force acting on a particle moving in the xy plane is given by $\vec{F} = (2y\hat{i} + x^2\hat{j})$ N , where $x$ and $y$ are in meters. The particle moves from the origin to a final position having coordinates $x = 5.00$ m and $y = 5.00$ m as shown in Figure. Calculate the work done by $\vec{F}$ on the particle as it moves along (a) OAC, (b) OBC, and (c) OC (d) Is $\vec{F}$ conservative or nonconservative? Explain.




[Ans:(a) $W_{OAC} = 125J$ (b) $W_{OBC} = 50.0J$ (c) $W_{OC} = 66.7J$ (d)$F$ is nonconservative]

**7.** The potential energy function for the force between two atoms in a diatomic molecule can be expressed approximately as follows:

$$U(x) = \frac{a}{x^{12}} - \frac{b}{x^6}$$

where $a$ and $b$ are positive constants and $x$ is the distance between atoms.

(a) At what values of $x$ is $U(x)$ equal to zero? At what values of $x$ is $U(x)$ a minimum ?

(b) Determine the force between the atoms.

(c) What is the dissociation energy of the molecule?

[Ans: (a) $x = \left(\frac{a}{b}\right)^{\frac{1}{6}}$, (b) $x_m = \left(\frac{2a}{6}\right)^{\frac{1}{6}}$ (c) $F_x = \frac{12a}{x^{13}} - \frac{6b}{x^7}$ (c) $E_d = \frac{b^2}{4a}$]

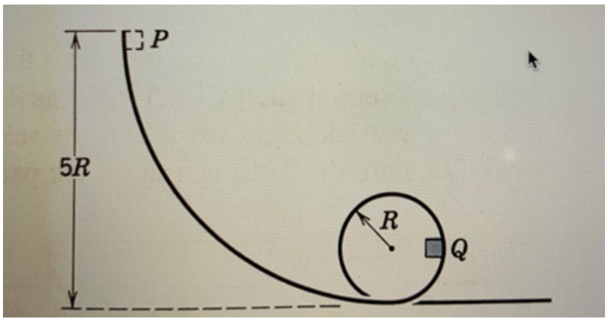
**8.** Find the center of mass of a homogeneous semicircular plate. Let $R$ be the radius of the circle.

[Ans: $\frac{4R}{3\pi}$]

**9.** A small block of mass m slides along the frictionless loop-the-loop track shown in Figure.

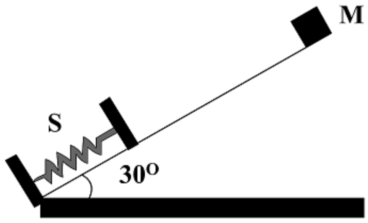
(a) If it starts from rest at P, what is the resultant force acting on it at Q?

(b) At what height above the bottom of the loop should the block be released so that the force it exerts against the track at the top of the loop is equal to its weight?




[Ans: (a) $\sqrt{65}mg$ (b) $3R$]

**10.** An ideal spring $S$ can be compressed 1.0 meter by a force of 100 N. This same spring is placed at the bottom of a frictionless inclined plane which makes an angle of $\theta = 30^0$ with horizontal as shown in figure. A 10 kg mass $M$ is released form rest at the top of the incline and is brought to rest momentarily after compressing the spring 2.0 meters.

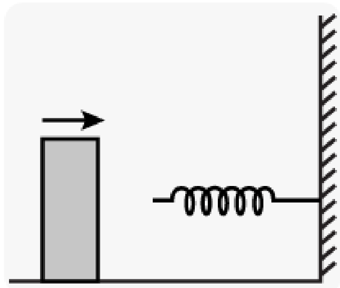



(a) Through hat distance does the mass slide before coming to rest?

(b) What is the speed of the mass just before it reaches the spring ?

[Ans: (a) $4.0, m$ (b) $4.5 m/s$]

**11.** A 1.0-kg block collides with a horizontal weightless spring of force constant 2.0 N/m as shown in Figure. The block compresses the spring 4.0 meters from the rest position. Assuming that the coefficient of kinetic friction between the block and horizontal surface is 0.25, what was that speed of the block at the instant of collision?



[Ans:$7.2 m/s$]

**12.** A vessel at rest explodes, breaking into three pieces. Two pieces, having equal mass, fly off perpendicular to one another with the same speed of 30 m/s. The third piece has three times the mass of each other piece. What is the direction and magnitude of its velocity immediately after the explosion?

[Ans: $10\sqrt{2}$ m/s, $135^0$ from either]

**13.** A projectile is fired form a gun at angle of $45^0$ with the horizontal and with a muzzle speed of 457.2 m/s. At the highest point in its flight the projectile explodes into tow fragments of equal mass. One fragment, whose initial speed is zero, falls vertically. How far from the gun does the other fragment land, assuming a level terrain?

[Ans: $31.99 \times 10^3$ $m$]

**14.** A 6000-kg rocket is set for a vertical firing. If the exhaust speed is 1000 $m/s$, how much gas must be ejected per second to supply the thrust needed:

(a) to overcome the weight of the rocket,

(b) to give the rocket an initial upward acceleration of 19.6 $m/s^2$?

[Ans: (a) 58.8 $kg/s$, (b) 176.4 $kg/s$]

**15.** A rocket moving in free space has a speed of $3.0 \times 10^3$ $m/s$ relative to earth. Its engines are turned on, and fuel is ejected in a direction opposite the rocket's motion at a speed of $5.0 \times 10^3$ $m/s$ relative to rocket.

(a) What is the speed of the rocket relative to the earth once the rocket's mass is reduced to one-half its mass before ignition?

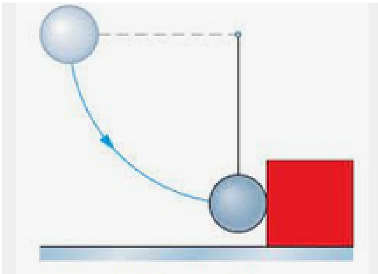
(b) What is the thrust of he rocket if it burns at the rate of 50 $Kg/s$?

[Ans: (a) $6.5 \times 10^3$ $m/s$ (b) $2.5 \times 10^5$ $N$] ,

**16.** A bullet of mass 10 gm strikes a ballistic pendulum of mass 2.0 kg. The center of mass of the pendulum rises a vertical distance of 12 cm. Assuming the bullet remains embedded in the pendulum, calculate its initial speed.

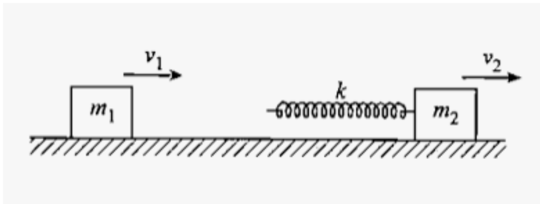
[Ans: 308.3 $m/s$]

**17.** A steel ball weighing 453.59 gm fastened to a cord 68.6 cm long and is released when the cord is horizontal. At the bottom of its path the ball strikes a 2.268 kg steel block initially at rest on a frictionless surface as shown in figure below. The collision is elastic. Find the speed of the ball and the speed of the block initially at just after collision.



[Ans: (a) -2.54 $m/s$, 1.22 $m/s$]

**18.** A block of mass $m_1 = 2.0kg$ slides along a frictionless table with a speed of 10 m/s. Directly in front of it, and moving in the same direction, is a block of mass $m_2 = 5.0kg$ moving at 3 m/s. A massless spring with a spring constant of $k = 1120N/m$ is attached to backside of $m_2$ as shown in figure. When the blocks collide, what is the maximum compression of the spring? Assume that the spring does not bend and always obeys Hook's law.




[Ans:0.25$m$]

**19.** Two vehicles A and B are traveling west and south, respectively, toward the same intersection where they collide and lock together. Before the collision A (total weight, 408.233 kg) is moving with the speed of 17.88 m/s, and B (total weight, 544.310 kg) has a speed of 26.82 m/s. Find the magnitude and direction of the velocity of the (interlocked) vehicles immediately after collision.

[Ans: 17.14 m/s, 63.44$^0$]

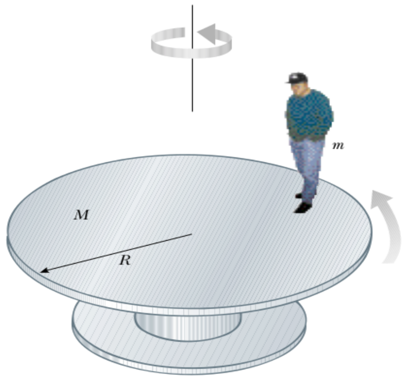
**20.** A gas molecule having a speed of 300 meters/sec collides elastically with another molecule of the same mass which is initially at rest. After collision the first molecule moves at an angle of 30$^0$ to its initial direction. Find the speed of each molecule after collision and the angle made with the incident direction by the recoiling target molecule.

[Ans: 260 m/s, 150 m/s, 60$^0$]

**21.** A star rotates with a period of 30 days about an axis through its center. After the star undergoes a supernova explosion, the stellar core, which had a radius $1.0 \times 10^4$ km, collapses into a neutron star of radius 3.0 km. Determine the period of rotation of the neutron star.

[Ans: $T_f = 0.23sec$]

**22.** A horizontal platform in the shape of a circular disk rotates in a horizontal plane about a frictionless vertical axle. The platform has a mass $M = 100$ kg and a radius $R = 2.0$ m. A student whose mass is $m = 60$ kg walks slowly form the rim of the disk toward its center. If the angular speed of the system is 2.0 rad/s when the student is at the rim, what is the angular speed when he has reached a point $r = 0.50$ m from the center.




[Ans: $\omega = 4.1$ rad/s]

**23.** Calculate the reduced mass of Hydrogen atom.

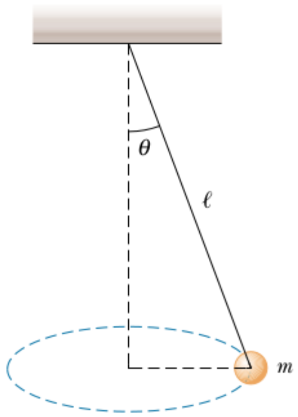
[Ans: $\mu \approx m_e$(mass of electron) ]

# ASSIGNMENT 2

## CHAPTER 2: ROTATIONAL DYNAMICS

**1.** A conical pendulum consists of a bob of mass $m$ in motion in a circular path in a horizontal plane as shown in figure. During the motion, the supporting wire of length $l$ maintains the constant angle $\theta$ with the vertical. Show that the magnitude of the angular momentum of the bob about the circle's is

$$\boxed{L = \left(\frac{m^2 g l^3 sin^4\theta}{cos\theta}\right)^{1/2}}.$$




**2.** Consider an oxygen molecule($O_2$) rotating in the xy plane about z axis. The axis passes through the centre of the molecule, perpendicular to its length. The mass of each oxygen atom is $2.66 \times 10^{-26} kg$ and at room temperature the average separation between the two atoms is $d = 1.21 \times 10^{-10} m$ (the atoms are treated as point masses)

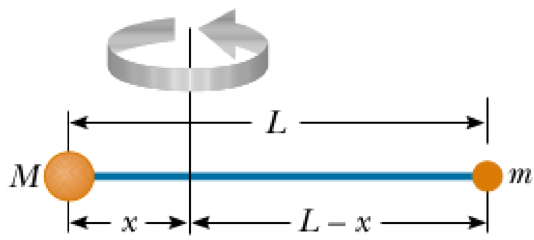
(a) Calculate the moment of inertial of the molecule about the z axis.

(b) If the angular speed of the molecule about the z axis is $4.60 \times 10^{12} rad/s$, what is its rotational kinetic energy?

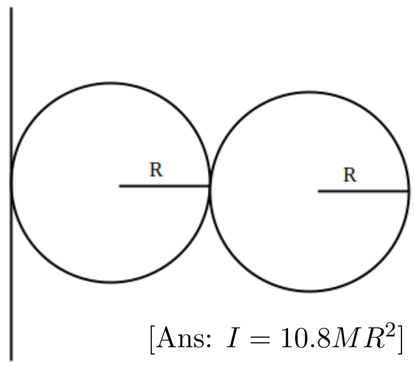
[Ans: $I = 1.95 \times 10^{-46} kg.m^2$, $K_R = 2.06 \times 10^{-21} J$]

**3.** Two masses '$M'$ and '$m'$ are connected by a rigid rod of length $L$ and of negligible mass, as shown in figure. For an axis passes perpendicular to the rod, show that the system has the minimum moment of inertia when the axis passes through the center of mass. Show that this moment of inertia is

$$\boxed{I = \left(\frac{mM}{m+M}\right) L^2}.$$




**4.** Two identical solid spheres of mass $M$ and Radius $R$ are joined together, and the combination is rotated about an axis tangent to one sphere and perpendicular to the line connecting them. What is the rotational inertia of the combination?




[Ans: $I = 10.8MR^2$]

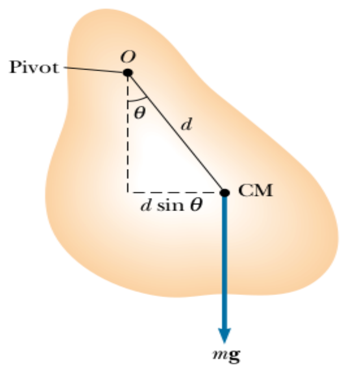
# ASSIGNMENT 3

## CHAPTER 3: WAVE AND OSCILLATION

**1.** Consider a physical pendulum as shown in figure below. Representing its moment of inertia about an axis passing through its centre of mass and parallel to the axis passing through its pivot point as $I_{cm}$. Show that its period is

$$\boxed{I = 2\pi\sqrt{\frac{I_{cm} + md^2}{mgd}}}$$

Where $d$ is the distance between the pivot point and center of mass . Show that the period has a minimum value when $d$ satisfies $md^2 = I_{cm}$




**2.** In an engine, a piston oscillates with simple harmonic motion so that its position varies accoring to the expression

$$x = (5.00cm)\cos\left(2t + \frac{\pi}{6}\right)$$

Where $x$ is in centimeters and $t$ is in seconds. At $t = 0$, find

(a) the position of the particle,

(b) its velocity, and

(c) its acceleration.

(d) the period ad amplitude of the motion.

[Ans: (a) $x = 4.33cm$ (b) $v = -5.00cm/s$ (c) $a = -17.3cm/s^2$ (d) $A = 5.00cm, T = 3.14s$]

**3.** A 0.500-kg cart connected to a light spring for which the force constant is 20.0N/m oscillates on a horizontal, frictionless air track.

(a) Calculate the total energy of the system and the maximum speed of the cart if the amplitude of the motion is 3.00 cm.

(b) What is the total velocity of the cart when the position is 2.00 cm?

(c) Compute the kinetic and potential energies of the system when the position is 2.00 cm.

[Ans: (a) $E = 9.00 \times 10^{-3}J$; $v_{max} = 0.190m/s$, (b) $v = \pm 0.141m/s$, (c)$K = 5.00 \times 10^{-3}J, U = 4.00 \times 10^{-3}J$]

**4.** A 10.6-kg object oscillates at the end of a vertical spring has a spring constant of $2.05 \times 10^4 N/m$. The effect of air resistance is represented by the damping coefficient $b = 3.00$ Ns/m. Calculate the frequency of the damped oscillation.

[Ans: $f = 7.00Hz$]

**5.** A 2.00-kg object attached to a spring moves without friction and is driven by an external force givn by $F = (3.00N)\sin(2\pi t)$. The force constant of the spring is 20.0 N/m. Determine

(a) the period and

(b) the amplitude of the motion.

[Ans: (a) T=1.00s (b) 5.09 cm]

# ASSIGNMENT 4

## CHAPTER 5: ELASTICITY

**1.** A wire of length $L$, Young's modulus $Y$, and cross-sectional area $A$ is stretched elastically by an amount $\Delta L$. By Hooke's law, the restoring force is $-k\Delta L$ Show that:

(a) $k = \frac{YA}{L}$

(b) the work done in stretching the wire by an amount $\Delta L$ is $W = \frac{1}{2}YA\frac{(\Delta L)^2}{L}$

**2.** A 200-kg liad is hung on a wire of length 4.00 m, cross-sectional area $0.200 \times 10^{-4} m^2$, and Young's modulus $8.00 \times 10^{10} N/m^2$. What is its increase in length?

[Ans: $\Delta L = 4.90mm$]

**3.** Assume Young's modulus for bone is $1.50 \times 10^{10} N/m^2$. The bone breaks if stress greater than $1.50 \times 10^8 N/m^2$ is imposed on it.

(a) What is the maximum force that can be exerted on the femur bone in the leg if it has a minimum effective diameter of 2.50 cm?

(b) If this much force is applied compressively, by how much does the 25.0 cm long bone shorten?

[Ans: (a) $F = 73.6kN$ (b) $\Delta L = 2.50mm$]

**4.** A solid brass sphere is initially surrounded by air, and the air pressure exerted on it is $1.0 \times 10^5 N/m^2$ (normal atmospheric pressure). The sphere is lowered into the ocean to a depth where the pressure is $2.0 \times 10^7 N/m^2$. The volume of the sphere in air is $0.50m^3$. By how much does this volume change once the sphere is submerged? Given that the Bulk Modulus of the brass is $6.1 \times 10^{10} N/m^2$.

[Ans: $\Delta V = -1.6 \times 10^{-4} m^3$]

# ASSIGNMENT 5

## CHAPTER 5: VISCOSITY

**1.** Castor oil, which has a density of $0.96 \times 10^3 kg/m^3$ at room temperature, is forced through a pipe of circular cross section by pump that maintains a gauge pressure of 950 pa. The pipe as a diameter of 2.6 cm and a length of 65 cm. The castor oil emerging from the free end of the pipe and at atmospheric pressure is collected. After 90 s, a total of 1.23 kg has been collected. What is the coefficient of viscosity of castor oil at this temperature?

[Ans: $\eta = 1.15 Ns/m^2$]

**2.** A large storage tank, open at the top and filled with water, develops a small hole in its side at a point 16.0 m below the water level. The rate of flow from the leak is $2.50 \times 10^{-3} m^3/min$. Determine:

(a) the speed at which the water leaves the hole.

(b) the diameter of the hole.

[Ana: (a) $v_2$=17.7 m/s, (b) $d$=1.73 mm]

**3.** In ideal flow, a liquid of density 850 $kg/m^3$ moves from a horizontal tube of radius 1.00 cm into a second horizontal tube of radius 0.500 cm. A pressure difference $\Delta P$ exists between the tubes.

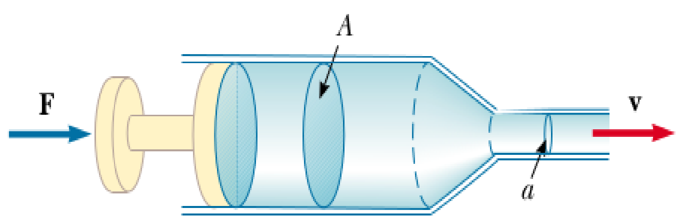
(a) Find the volume flow rate as a function of $\Delta P$.

(b) Evaluate the volume flow rate for $\Delta P = 6.00 kPa$.

(c) State how the volume flow rate depends on $\Delta P$

[Ans: (a) $(3.93 \times 10^{-6} \sqrt{\Delta P}) m^3/s$ where $\Delta P$ is in pascals, (b) 0.305 L/s, (c) Volume flow rate $\propto \sqrt{\Delta P}$]

**4.** A hypodermic syringe contains a medicine having density of water as shown in figure below. The barrel of the syringe has a cross-sectional area $A = 2.50 \times 10^{-5} m^2$, and the needle has cross-sectional area $a = 1.00 \times 10^{-8} m^2$. In the absence of a force on the plunger, the pressure everywhere is 1 atm. A force $\vec{F}$ of magnitude 2.00 N acts on the plunger, making medicine squirt horizontally form the needle. Determine the speed of the medicine as it leaves the needle's tip.




[Ans: $v_2 = 12.6 m/s$]

# OPTICS

# ASSIGNMENT 6

## CHAPTER 1: INTERFERENCE

### Intensity Distribution

**1.** Two coherent sources of intensity ratio $\beta$ interfere. Prove that in interference pattern,

$$\frac{I_{max} - I_{min}}{I_{max} + I_{min}} = \frac{2\sqrt{\beta}}{1+\beta}.$$

**2.** Show that the two waves with wave functions $E_1 = 6.00 \sin(100\pi t)$ and $E_2 = 8.00 \sin(100\pi t + \frac{\pi}{2})$ add to give a wave function $E_R \sin(100\pi t + \phi)$. Find the required values for $E_R$ and $\phi$.

[$E_R = 10.0$ ; $\phi = 0.927$]

### Young's Double Slit Experiment

**3.** The distance between two coherent sources in Young's double slit experiment is 0.2 mm and the interference pattern is observed on a screen 80 cm from the sources. If the wavelength used is $6000\mathring{A}$, then

(i) How far is second bright fringe from the central bright fringe?

(ii) How far is the second dark fringe from central bright fringe?

[(i) 0.48 cm ; (ii) 0.36 cm]

**4.** In Young's double slit experiment, the slits are separated by 0.28 mm and the screen is 1.4 m away. The distance between the central bright fringe and the fourth bright fringe is 1.2 cm. Find the frequency of light used. Use the standard value of velocity of light.

[$5 \times 10^{-14}$ Hz]

### Interference in Thin Film

**5.** Calculate the minimum thickness of a soap-bubble film that results in constructive interference in the reflected light if the film is illuminated with light whose wavelength in free space is $\lambda = 600$ nm. The index of refraction of the soap film is 1.33. What if the film is twice as thick? Does this situation produce constructive interference?

[113 nm]

**6.** A thin film of oil ($\mu = 1.25$) is located on smooth, wet pavement. When viewed perpendicular to the pavement, the film reflects most strongly red light at 640 nm and reflects no green light at 512 nm. How thick is the oil film?

[512 nm]

# Newton's Ring

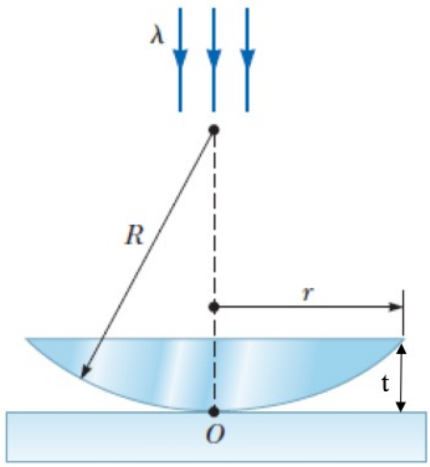
**7.** In a Newton's rings experiment, the diameter of $12^{th}$ dark ring changes form 1.40 to 1.27 cm as a liquid is introduced between the lens and the glass plate. Calculate the refractive index of the liquid.

[1.235]

**8.** In a Newton's rings experiment, a plano-convex glass ($\mu = 1.52$) lens having radius $r = 5.00$ cm is placed on a flat plate as shown in figure. When light of wavelength $\lambda = 650$ nm is incident normally, 55 bright rings are observed, with the last one precisely on the edge of the lens.

(a) What is the radius 'R' of curvature of the convex lens?

(b) What is the focal length of the lens?




[(a) 70.6 m, (b) 136 m]

# ASSIGNMENT 7

## CHAPTER 2: DIFFRACTION

**1.** Monochromatic light from helium-neon laser ($\lambda_1 = 632.8nm$) is incident on a diffraction grating containing 6000 grooves per cnetimeter. Find the angles at which the first and second order maxima are observed. What if you looked for the third maximum? Would you find it?

[$22.31^0; 49.41^0$; No]

**2.** A helium-neon laser ($\lambda = 632.8nm$) is used to claibrate a diffraction grating. If the first-order maximum occurs at $20.5^0$, what is the spacing between adjacent grooves in the grating?

[1.81 $\mu m$]

**3.** A plane transmission grating has 6000 lines/cm. It is used to obtain a spectrum of light from sodium lamp in second order. Calculate the angular separation between two sodium lines $5890\mathring{A}$ and $5896\mathring{A}$.

[4 min]

**4.** A diffraction grating used at normal incidence gives a line, $\lambda_1 = 6000\mathring{A}$ in a certain order superimposed on another line $\lambda_2 = 4500\mathring{A}$ of the next higher order. If the angle of diffraction is $30^0$, how many lines are ther in a 'cm' in the grating ?

[2778 lines/cm]

**5.** Assume that limits of the visible spectrum are arbitrarily chosen as $4300\mathring{A}$ and $6800\mathring{A}$. Design a grating that will spread the first order spectrum through an angular range of $20^0$?

[27700 lines/inch]

# ASSIGNMENT 8

## CHAPTER 9: POLARIZATION

**1.** Light traveling in water strikes a glass plate at an angle of incidence of $53.0^0$, part of the beam is reflected. If the reflected and refracted portions make an angle of $90.0^0$ with each other, what is the index of refraction of the glass?

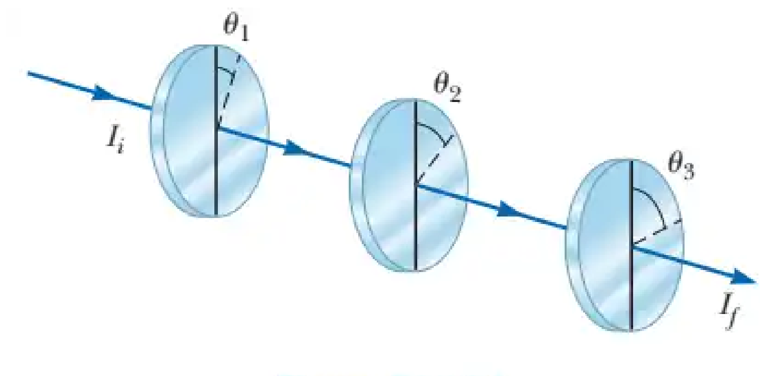
[1.76]

**2.** Unpolarized light traveling in a liquid with refractive index $\mu$ is incident on the surface of the liquid, above which there is air. If the light incident on the surfae at an angle of $31.2^0$ with respect to the normal, the light reflected back into the liquid is completely polarized. (a) What is dthe refractive index of the liquid? (b) What angle does the refractive light traveling in air make with the normal to the surface?

$[(a)1.65; (b)58.8^0]$

**3.** Three polarizing plates whose planes are parallel are centered on a common axis. The directions of the transmission axes relative to the common vertical direction are shown in figure below. A linearly polarized beam of light with the plane of polarization parallel to the vertical reference direction is incidetn from the left on the first disk with intensity $I_1 = 10.0 units$(arbitrary). Calculate the transmitted intensity $I_f$ when $\theta_1 = 20.0^0, \theta_2 = 40.0^0, \theta_3 = 60.0^0$.

[6.89 units]




**4.** Calculate the specific rotation if the plane of polarization is turned through $26.4^0$, traversing 20cm length 20% sugar solution.

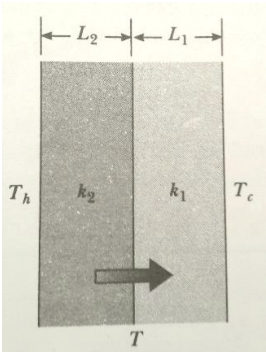
[66 $deg(dm)^{-1}g^{-1}cm^3$]

# HEAT

# ASSIGNMENT 9

## CHAPTER 1: HEAT TRANSFER

**1.** Two slabs of thickness $L_1$ and $L_2$ and thermal conductivities $k_1$ and $k_2$ are in themal contact with each other as shown in figure. The temperature of their outer surfaces are $T_h$ and $T_c$, respectively and $T_h > T_c$. Determine the temperature at the interface and the rate of energy transfer by conduction through the slabs in steady condition.




$$\left[T = \frac{k_1 L_2 T_c + k_2 L_1 T_h}{k_1 L_2 + k_2 L_1}, Q = \frac{A k_1 k_2 (T_h - T_c)}{k_1 L_2 + k_2 L_1}\right]$$

**2.** Calculate the average energy $\bar{\varepsilon}$ of an oscillator of frequency $0.60 \times 10^{14}$ $sec^{-1}$ at temperature $T = 1800$ K treating it as (i) Classical oscillator. (ii) Planck's oscillator. [Boltzmann constant (k)=$1.38 \times 10^{-23}$Joule/K and Planck's constant(h)=$6.6 \times 10^{-34}$Js )]

[(i) $2.484 \times 10^{-20}$ joule (ii) $1.01 \times 10^{-20}$ joule]

**3.** When the temperature of a black body increases, it is observed that the wavelength corresponding to maximum energy changes from $0.26\mu m$ to $0.13\mu m$. Calcualte the ratio of emissive power of the body at the respective temperature.

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**4.** The radiation emitted by a star is 10,000 times more than that of the sun. If the surface temperature of the sun and the star is 6000 K and 2000 K respectively. Calculate the ratio of the radii of the star and the sun.

[900:1]

THE END