FINALTERM EXAMINATION
Spring 2009
PHY101- Physics (Session - 2)

Question No: 1 (Marks: 1) - Please choose one

The number of significant figures in 0.00150 is:

► 5
► 4
► 3
► 2

Question No: 2 (Marks: 1) - Please choose one

One revolution is the same as:

2π rad

► 1 rad
► 57 rad

► π/2 rad
► π rad
► 2π rad

Question No: 3 (Marks: 1) - Please choose one

For a body to be in equilibrium under the combined action of several forces:

► all the forces must be applied at the same point
all the forces must be applied at the same point
► all of the forces form pairs of equal and opposite forces
► any two of these forces must be balanced by a third force
► the sum of the torques about any point must equal zero

Question No: 4 (Marks: 1) - Please choose one

A bucket of water is pushed from left to right with increasing speed across a horizontal surface. Consider the pressure at two points at the same level in the water.

► It is the same
► It is higher at the point on the left
► It is higher at the point on the right
► At first it is higher at the point on the left but as the bucket speeds up it is lower there

Question No: 5 (Marks: 1) - Please choose one

An organ pipe with both ends open is 0.85m long. Assuming that the speed of sound is 340m/s, the frequency of the third harmonic of this pipe is:

- A. 200 Hz
- B. 300 Hz
- C. 400 Hz
- D. 600 Hz

Question No: 6 (Marks: 1) - Please choose one

Capacitors C1 and C2 are connected in series. The equivalent capacitance is given by

- $C_1C_2/(C_1 + C_2)$
- $(C_1 + C_2)/C_1C_2$
- $1/(C_1 + C_2)$
- C_1/C_2

Question No: 7 (Marks: 1) - Please choose one

If the potential difference across a resistor is doubled:

- only the current is doubled
- only the current is halved
- only the resistance is doubled
- only the resistance is halved

Question No: 8 (Marks: 1) - Please choose one

By using only two resistors, R1 and R2, a student is able to obtain resistances of 3 Ω, 4Ω, 12Ω, and 16 Ω. The values of R1 and R2 (in ohms) are:

- 3, 4
- 2, 12
- 3, 16
- 4, 12

Question No: 9 (Marks: 1) - Please choose one

Faraday's law states that an induced emf is proportional to:

- the rate of change of the electric field
- the rate of change of the magnetic flux
- the rate of change of the electric flux
- the rate of change of the magnetic field

Question No: 10 (Marks: 1) - Please choose one

A generator supplies 100V to the primary coil of a transformer. The primary has 50 turns and the secondary has 500 turns. The secondary voltage is:

► 1000V
► 500V
► 250V
► 100V

Question No: 11 (Marks: 1) - Please choose one

The wavelength of red light is 700 nm. Its frequency is _____.

► $4.30 * 10^4$ Hertz
► $4.30 * 10^3$ Hertz
► $4.30 * 10^5$ Hertz
► $4.30 * 10^2$ Hertz

Question No: 12 (Marks: 1) - Please choose one

In some movies, you sometimes see an actor looking in a mirror and you can see his face in the mirror. During the filming of this scene, what does the actor see in the mirror?

► His face

► Your face

► The movie camera

► The director's face

Question No: 13 (Marks: 1) - Please choose one

A laser in a compact disc player generates light that has a wavelength of 780 nm in air. The light then enters into the plastic of a CD. If the index of refraction of plastic is 1.55, the speed of this light once enter the plastic is _____.

► $3.00 * 10^8$ m/s
► $1.94 * 10^8$ m/s
► $4.29 * 10^8$ km/h
► $3.00 * 10^8$ km/h

Question No: 14 (Marks: 1) - Please choose one

Which of the following electromagnetic radiations has photons with the greatest energy?

- ► blue light
- ► yellow light
- ► x rays
- ► radio waves

Question No: 15 (Marks: 1) - Please choose one

A virtual image is one:

- ► toward which light rays converge but do not pass through
- ► from which light rays diverge as they pass through
- ► toward which light rays converge and pass through
- ► from which light rays diverge but do not pass through

Question No: 16 (Marks: 1) - Please choose one

What is the unit of magnification factor?

- ► meter.Kelvin
- ► radian.Kelvin
- ► degree.Kelvin
- ► no units

Question No: 17 (Marks: 1) - Please choose one

During an adiabatic process an object does 100 J of work and its temperature decreases by 5K. During another process it does 25 J of work and its temperature decreases by 5 K. Its heat capacity for the second process is.

- ► 20 J/K
- ► 100 J/K
- ► 15 J/K
- ► 5 J/K

Question No: 18 (Marks: 1) - Please choose one

An ideal gas expands into a vacuum in a rigid vessel. As a result there is:

► a change in entropy
► a decrease of internal energy
► an increase of pressure
► a change in temperature

Question No: 19 (Marks: 1) - Please choose one

The Stern-Gerlach experiment makes use of:

► a strong uniform magnetic field
► a strong non-uniform magnetic field
► a strong uniform electric field
► a strong non-uniform electric field

Question No: 20 (Marks: 1) - Please choose one

A large collection of nuclei are undergoing alpha decay. The rate of decay at any instant is proportional to:

► the number of undecayed nuclei present at that instant
► the time since the decays started
► the time remaining before all have decayed
► the half-life of the decay

Question No: 21 (Marks: 1)

Which weighs more, a liter of ice or a liter of water?

Question No: 22 (Marks: 1)

Will the current in a light bulb connected to a 220-V source be greater or less than when the same bulb is connected to 110-V source?

Question No: 23 (Marks: 1)

How is the wavelength of light related to its frequency?

Question No: 24 (Marks: 1)

We don't notice the de Broglie wavelength for a pitched baseball. Is this because the wavelength is very large or because it is very small?

Question No: 25 (Marks: 2)

Does every magnet necessarily have a north and south pole? Explain

Question No: 26 (Marks: 2)

In a cool room, a metal or marble table top feels much colder to the touch than does a wood surface even though they are at the same temperature. Why?

Question No: 27 (Marks: 3)

If a water wave oscillates up and down three times each second and the distance between wave crests is 2 m, what is its frequency? What is its wavelength? What is its wave speed?

Question No: 28 (Marks: 3)

A transformer has N_1 = 350 turns and N_2 = 2 000 turns. If the input voltage is □ v(t) = (170 V) cos □□ t, what rms voltage is developed across the secondary coil?

Question No: 29 (Marks: 3)

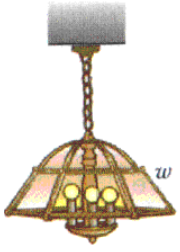
Why do astronomers looking at distant galaxies talk about looking backward in time?

Question No: 30 (Marks: 3)

Some distant astronomical objects, called quasars, are receding from us at half the speed of light (or greater). What is the speed of the light we receive from these quasars?

Question No: 31 (Marks: 5)

Consider a lamp hanging from a chain. What is the tension in the chain?



Question No: 32 (Marks: 5)

A proton travels with a speed of 3.00 * 10^6 m/s at an angle of 37.0° with the direction of a magnetic field of 0.300 T in the + y direction. What are (a) the magnitude of the magnetic force on the proton and (b) its acceleration?

Question No: 33 (Marks: 5)

1. Light from the Sun takes approximately 8.3 min to reach the Earth. During this time interval the Earth has continued to rotate on its axis. How far is the actual direction of the Sun from its image in the sky?
2. Do all current-carrying conductors emit electromagnetic waves? Explain

2. Yes all current carrying conductors emit electromagnetic waves, and these are at the right angle of the current passes thorough as right hand rule of Fleming's explains it.

Question No: 34 (Marks: 5)

Explain solar convection zone. What is its other name?

Question No: 35 (Marks: 10)

a) Explain why you can't just open your refrigerator to cool your kitchen on a hot day. Why is it that turning on a room air conditioner will cool down the room but opening a refrigerator door will not?
b) On a humid day, water vapor condenses on a cold surface. During condensation, the entropy of the water(a) in-creases, (b) remains constant, (c) decreases, (d) may decreases or remain unchanged. Give its reason.

FINALTERM EXAMINATION
Fall 2009
PHY101- Physics (Session - 1)

Question No: 1 (Marks: 1) - Please choose one

As a 2.0-kg block travels around a 0.50-m radius circle it has an angular speed of 12 rad/s. The circle is parallel to the xy plane and is centered on the z axis, a distance of 0.75m from the origin. The z component of the angular momentum around the origin is:

► **6.0kg · m2/s**

► **6.0kg · m2/s**

► 9.0kg · m2/s

► 11 kg · m2/s

► 14 kg · m2/s

Question No: 2 (Marks: 1) - Please choose one

A net torque applied to a rigid object always tends to produce:

► **rotational equilibrium**

The magnitude of the *torque produced* by a force is defined as **...** If we consider a *rigid body* rotating about a fixed axis

► linear acceleration

► **rotational equilibrium**

► angular acceleration

► rotational inertia

Question No: 3 (Marks: 1) - Please choose one

An object attached to one end of a spring makes 20 vibrations in 10 s. Its angular frequency is:

► **2.0 rad/s**

► 12.6 rad/s

► 1.57 rad/s

► **2.0 rad/s**

► 6.3 rad/s

Angular Frequency is ω = Thetta / T
20/10 = 2.0

Question No: 4 (Marks: 1) - Please choose one

In simple harmonic motion, the restoring force must be proportional to the:

► **displacement f=-kx**

► amplitude

► frequency

► velocity

► **displacement**

Question No: 5 (Marks: 1) - Please choose one

Mercury is a convenient liquid to use in a barometer because:

► **it has a high density** other *liquids* are lighter than *mercury*, they would require much longer columns.

► it is a metal

► it has a high boiling point

► it expands little with temperature

► **it has a high density**

Question No: 6 (Marks: 1) - Please choose one

The units of the electric field are:

► **J/m**

► **J/m**
► J/(C·m)
► J/C
► J·C

Question No: 7 (Marks: 1) - Please choose one

A farad is the same as a

► **J/V**
► **J/V**
► V/J
► C/V
► V/C

Question No: 8 (Marks: 1) - Please choose one

We desire to make an LC circuit that oscillates at 100 Hz using an inductance of 2.5H. We also need a capacitance of:

► **100 µF**

► 1 F
► 1mF
► 1 µF
► **100 µF**

Question No: 9 (Marks: 1) - Please choose one

The wavelength of red light is 700 nm. Its frequency is _____.

► **4.30 * 10^5 Hertz**

► 4.30 * 10^4 Hertz
► 4.30 * 10^3 Hertz
► **4.30 * 10^5 Hertz**
► 4.30 * 10^2 Hertz

Frequency = (speed) / (wavelength)

Wavelength = 700 nm
For speed of light, use 3 x 10^8 meters/sec

Frequency = (3 x 10^8) / (0.7 10^{-6}) = 4.286 x 10^{14} Hz = ***4.286 x 10^5 GHz***

Question No: 10 (Marks: 1) - Please choose one

Which of the following statements is **NOT TRUE** about electromagnetic waves?

► **The electromagnetic radiation from a burning candle is unpolarized.**

► Electromagnetic waves satisfy the Maswell's Equation.
► Electromagnetic waves can not travel through space.
► The receptions of electromagnetic waves require an antenna.

► **The electromagnetic radiation from a burning candle is unpolarized.**

Question No: 11 (Marks: 1) - Please choose one

Radio waves and light waves are _____.

► **Electromagnetic and transverse both**
Both *radio waves and light* are electromagnetic transverse *waves*; their main difference is their frequency.

► Longitudinal waves
► Transverse waves
► **Electromagnetic and transverse both**

► Electromagnetic and longitudinal both

Question No: 12 (Marks: 1) - Please choose one

Wien's Law states that, λ_{max} = _____ K.

► **$2.90 * 10^{-3}$ m**

Where exactly does the peak occur? Wien's Law states that 2.90 10 m K. We can derive this in an advanced physics course, but for now you must take this as given.

Page 98

► $2.90 * 10^{-3}$ Hertz
► $2.90 * 10^{-3}$ s
► $2.90 * 10^{-3}$ kg
► **$2.90 * 10^{-3}$ m**

Question No: 13 (Marks: 1) - Please choose one

Interference of light is evidence that:

► **light is a wave phenomenon**

► the speed of light is very large
► light is a transverse wave
► **light is a wave phenomenon**
► light is electromagnetic in character

Question No: 14 (Marks: 1) - Please choose one

Fahrenheit and Kelvin scales agree numerically at a reading of:

► **-40**

► **-40**
► 0
► 273
► 574

Question No: 15 (Marks: 1) - Please choose one

According to the theory of relativity:

► **moving clocks run fast**

► **moving clocks run fast**
► energy is not conserved in high speed collisions
► the speed of light must be measured relative to the ether
► none of the above are true

Question No: 16 (Marks: 1) - Please choose one

Light from a stationary spaceship is observed, and then the spaceship moves directly away from the observer at high speed while still emitting the light. As a result, the light seen by the observer has:

► **lower frequency and a shorter wavelength than before**

► higher frequency and a longer wavelength than before
► **lower frequency and a shorter wavelength than before**
► higher frequency and a shorter wavelength than before
► lower frequency and a longer wavelength than before

Question No: 17 (Marks: 1) - Please choose one

How fast should you move away from a 6.0×10^{14} Hz light source to observe waves with a frequency of 4.0×10^{14} Hz?

► **38c**

► 20c
► **38c**
► 45c
► 51c

Question No: 18 (Marks: 1) - Please choose one

The quantum number n is most closely associated with what property of the electron in a hydrogen atom?

► **Energy**

Answer:

(i) is the correct answer. If the principal quantum number is n, the energy of the electron is:

► **Energy**
► Orbital angular momentum
► Spin angular momentum
► Magnetic moment

Question No: 19 (Marks: 1) - Please choose one

The quantum number m_s is most closely associated with what property of the electron in an atom?

► **Energy**
► Magnitude of the orbital angular momentum
► **Energy**
► z component of the spin angular momentum
► z component of the orbital angular momentum

Question No: 20 (Marks: 1) - Please choose one

As the wavelength of a wave in a uniform medium increases, its speed will _____.

► **Remain the same**

As the wavelength of a wave in a uniform medium increases, its speed will (C) remain the same, because speed is constant in a uniform medium.

► Decrease
► Increase
► **Remain the same**
► None of these

Question No: 21 (Marks: 3)

Two people are carrying a uniform wooden board that is 3.00 m long and weighs 160 N. If

one person applies an upward force equal to 60 N at one end, at what point does the other person lift? Begin with a free-body diagram of the board.

ANSWER:
Forces in x direction = 0
Forces in Y = F1 + F2 - W
Given:
L = 3.00 m F1 = 60 N
W = 160 N F2 = ? and x2 = ?
Sum of forces and torques = 0
Sum Force = F1 + F2 - W = 0
60N + F2 - 160 N = 0
F2 = 100 N
My pivot point is at F2.
Sum of torques = 0
Torque F1 = F1(L - x2)
Torque F2 = 0 b/c at pivot point
Torque W = W(L/2 - x2)
F1L - F1x2 + (WL)/2 - Wx2 = 0
(60)(3) - 60x2 + (160 * 3)/2 - 160x2 = 0
180-60x2 + 240-160x2 = 0
420-220x2 = 0
x2 = 1.9m

Question No: 22 (Marks: 3)

If a charged particle moves in a straight line through some region of space, can you say that the magnetic field in that region is zero?

Question No: 23 (Marks: 3)

You want to explore the shape of a cel1ain molecule by scattering electrons of momentum p from a gas of the molecules and studying the deflection of the electrons. You will be able to see finer details in the molecules by (a) increasing p; (b) decreasing p: (c) not worrying what p is.

Question No: 24 (Marks: 3)

A vessel is filled with gas at some equilibrium pressure and temperature. Can all gas molecules in the vessel have the same speed?

Question No: 25 (Marks: 3)

What are the properties of wave function?

ANSWER:

Wave functions contain all the measurable information about the particles

Wave functions are continuous.

They allow energy calculations via schrodinger equation.

They establish the probability distribution in three dimensions.

They permit calculation of most probable values of given variables.

Question No: 26 (Marks: 5)

A bike accelerates uniformly from rest to a speed of 7.10 m/s over a distance of 35.4 m. Determine the acceleration of the bike.

ANSWER:
$2as = vf^2 - vi^2$
$2a(35.4) = (7.10)^2 - (0)^2$
$2a(35.4) = 50.41$
$A = .71\ m/s^2$

Question No: 27 (Marks: 5)

A flat loop of wire consisting of a single turn of cross-sectional area 8.00 cm^2 is perpendicular to a magnetic field that increases uniformly in magnitude from 0.500 T to 2.50 T in 1.00 s. What is the resulting induced current if the loop has a resistance of 2.00 W?

ANSWER:
$E=(Bf-Bi)*A/t=(2.5-0.5)*8*10^{-4}/1=1.6*10^{-3}$ V
$I=E/R=1.23$ mA

Question No: 28 (Marks: 5)

An ideal gas is contained in a vessel at 300 K. If the temperature is increased to 900 K, by what factor does each one of the following change? (a) The average kinetic energy of the molecules. (b) The rms molecular speed. (c) The average momentum change of one molecule in a collision with a wall. (d) The rate of collisions of molecules with walls. (e) The pressure of the gas.

Question No: 29 (Marks: 5)

Who discover the nucleus? Write the experimental setup that he follows.

Ans:

Lord Rutherford discovered the nucleus. He carried out his famous experiment that showed the existence of a small but very heavy core of the atom. He arranged for a beam of alpha particles to strike gold atoms in a thin foil of gold. If the positive and negative charges in the atom were randomly distributed, all ' would go through without any deflection. But a lot of backscattering was seen, and some alphas were even deflected back in the direction of the incident beam. This was possible only if they were colliding with a very heavy object inside the atom.

Question No: 30 (Marks: 5)

In an analogy between electric current and automobile traffic flow, what would correspond to charge? What would correspond to current?

Question No: 31 (Marks: 10)

(a) When can you expect a body to emit blackbody radiation?
(b) Which law is obeyed by Sun and other stars, briefly explain it.

(a) When can you expect a body to emit blackbody radiation?

Ans:

Waves are emitted when charges accelerate. Blackbody radiation occurs for exactly this reason as well. If a body is heated up, the electrons, atoms, and molecules which it contains undergo violent random motion. Light may emit by electrons in one atom and absorbed in another. Even an empty box will be filled with blackbody radiation because

the sides of the box are made up of material that has charged constituents that radiate energy when they undergo acceleration during their random motion. A blackbody is both an ideal absorber and an ideal radiator. At high temperature, a body emits radiation of shorter wavelength. Temperature is inversely proportional to wavelength.

(b) Which law is obeyed by Sun and other stars, briefly explain it.

Ans:

The Sun and other stars obey Wien's Law since the gases they are composed of emit radiation that is in equilibrium with the other materials. Wien's law allows astronomers to determine the temperature of a star because the wavelength at which a star is brightest is related to its temperature.

Virtual University Old & Current Question Papers

PHY101 Final 2009 Paper Shared by Waqas unsolved 2

Published on Thursday, 19 August 2010 20:51
Written by Bonfire

MIDTERM EXAMINATION

Spring 2009

PHY101- Physics (Session - 2)

Shared by Waqas

Question No: 1 (M a r k s: 1)

The lowest tone produced by a certain organ comes from a 3.0-m pipe with both ends open. If the speed of sound is 340m/s, the frequency of this tone is approximately:

► A. 7Hz

► B. 14 Hz

► C. 28 Hz

► D. 57 Hz

Question No: 2 (M a r k s: 1)

1. To raise the pitch of a certain piano string, the piano tuner:

► A. loosens the string

► B. tightens the string

► C. shortens the string

► D. lengthens the string

Question No: 3 (M a r k s: 1)

A force of 5000N is applied outwardly to each end of a 5.0-m long rod with a radius of 34.0 cm and a Young's modulus of 125×10^8 N/m^2. The elongation of the rod is:

► 0.0020mm

► 0.0040mm

► 0.14mm

► 0.55mm

Question No: 4 (M a r k s: 1)

A particle oscillating in simple harmonic motion is:

► never in equilibrium because it is in motion

► never in equilibrium because there is always a force

► in equilibrium at the ends of its path because its velocity is zero there

► in equilibrium at the center of its path because the acceleration is zero there

Question No: 5 (M a r k s: 1)

In simple harmonic motion, the restoring force must be proportional to the:

► amplitude

- ► frequency
- ► velocity
- ► displacement

Question No: 6 (M a r k s: 1)

A 160-N child sits on a light swing and is pulled back and held with a horizontal force of 100 N. The magnitude of the tension force of each of the two supporting ropes is:

- ► 60N
- ► 94N
- ► 120N
- ► 190N

Question No: 7 (M a r k s: 1)

An object attached to one end of a spring makes 20 vibrations in 10 s. Its angular frequency is:

- ► 12.6 rad/s
- ► 1.57 rad/s
- ► 2.0 rad/s
- ► 6.3 rad/s

Question No: 8 (M a r k s: 1)

For an object in equilibrium the net torque acting on it vanishes only if each torque is calculated about:

- ► the center of mass
- ► the center of gravity

- ► the geometrical center
- ► the same point

Question No: 9 (M a r k s: 1)

Ten seconds after an electric fan is turned on, the fan rotates at 300 rev/min. Its average angular acceleration is:

- ► 3.14 rad/s2
- ► 30 rad/s2
- ► 30 rev/s2
- ► 50 rev/min2
- ► 1800 rev/s2

Question No: 10 (M a r k s: 1)

A 4.0-N puck is traveling at 3.0m/s. It strikes a 8.0-N puck, which is stationary. The two pucks stick together. Their common final speed is:

- ► 1.0m/s
- ► 1.5m/s
- ► 2.0m/s
- ► 2.3m/s

Question No: 11 (M a r k s: 1)

An object moving in a circle at constant speed:

- ► must have only one force acting on it
- ► is not accelerating
- ► is held to its path by centrifugal force
- ► has an acceleration of constant magnitude

Question No: 12 (M a r k s: 1)

A plane traveling north at 200m/s turns and then travels south at 200m/s. The change in its velocity is:

- ► 400m/s north
- ► 400m/s south
- ► zero
- ► 200m/s south

Question No: 13 (M a r k s: 1)

At time t = 0 a car has a velocity of 16 m/s. It slows down with an acceleration given by −0.50t, in m/s2 for t in seconds. It stops at t =

- ► 64 s
- ► 32 s
- ► 16 s
- ► 8.0 s

Question No: 14 (M a r k s: 1)

1 mi is equivalent to 1609 m so 55 mph is:

- ► 15 m/s
- ► 25 m/s
- ► 66 m/s
- ► 88 m/s

Question No: 15 (M a r k s: 1)

If you walk along the top of a fence, why does holding your arms out help you to keep your balance?

because the arms keeps the movement of weight of body easy

Question No: 16 (M a r k s: 2)

Charge is also said to be conserved. What does it mean? Explain.

Question No: 17 (M a r k s: 2)

When a car drives off a cliff, why does it rotate forward as it falls?

Question No: 18 (M a r k s: 2)

Why does a book sitting on a table never accelerate "spontaneously" in response to the trillions of inter-atomic forces acting within it?

Question No: 19 (M a r k s: 3)

'Captain Planet' is somewhere between galaxies. When a gong sounds in a neighboring spaceship, Captain reacts to the sound. What is wrong with this scenario?

Question No: 20 (M a r k s: 3)

If you know the position vectors of a particle at two points along its path and also know the time it took to move from one point to the other, can you determine the particle's instantaneous velocity? Its average velocity? Explain

Question No: 21 (M a r k s: 5)

Steel will rapture if subjected to a shear stress of more that about $4.2 * 10^8$ N/m2. What sideward force is necessary to shear a steel bolt 1 cm in diameter?

Question No: 22 (M a r k s: 5)

A table-tennis ball is thrown at a stationary bowling ball. The table-tennis ball makes a one-dimensional elastic collision and bounces back along the same line. After the collision, compared to the bowling ball, the table-tennis ball has (a) a larger magnitude of momentum and more kinetic energy (b) a smaller magnitude of momentum and more kinetic energy (c) a larger magnitude of momentum and less kinetic energy (d) a smaller magnitude of momentum and less kinetic energy (e) the same magnitude of momentum and the same kinetic energy.

Virtual University Old & Current Question Papers

PHY101 Physics Final 2009 Paper Solved by Farhan and Ali

Published on Monday, 18 July 2011 16:31
Written by Fuad Hasan

PHY101 Final Term PAPERS

Created BY Farhan& Ali

BS (cs) 3rd sem

Hackers Group

Mandi Bahauddin

Remember us in your prayers

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FINALTERM EXAMINATION

Spring 2009

PHY101- Physics (Session - 2)

PHY101 - Physics - Question No: 1 (M a r k s: 1)

The number of significant figures in 0.00150 is:

► 5

► 4

► 3

► 2

PHY101 - Physics - Question No: 2 (M a r k s: 1)

One revolution is the same as:

2π rad

► 1 rad

► 57 rad

► π/2 rad

► π rad

► 2π rad

PHY101 - Physics - Question No: 3 (M a r k s: 1)

For a body to be in equilibrium under the combined action of several forces:

► All the forces must be applied at the same point

all the forces must be applied at the same point

► all of the forces form pairs of equal and opposite forces

► any two of these forces must be balanced by a third force

► the sum of the torques about any point must equal zero

PHY101 - Physics - Question No: 4 (M a r k s: 1)

A bucket of water is pushed from left to right with increasing speed across a

horizontal surface.

Consider the pressure at two points at the same level in the water.

► It is the same

► It is higher at the point on the left

► It is higher at the point on the right

► At first it is higher at the point on the left but as the bucket speeds up it

is lower there

PHY101 - Physics - Question No: 5 (M a r k s: 1)

An organ pipe with both ends open is 0.85m long. Assuming that the speed of

sound is 340m/s, the frequency of the third harmonic of this pipe is:

► A. 200 Hz

► B. 300 Hz

► C. 400 Hz

► D. 600 Hz

PHY101 - Physics - Question No: 6 (M a r k s: 1)

Capacitors C1 and C2 are connected in series. The equivalent capacitance is given by

► $C_1C_2/(C_1 + C_2)$

► $(C_1 + C_2)/C_1C_2$

► $1/(C_1 + C_2)$

► C_1/C_2

PHY101 - Physics - Question No: 7 (M a r k s: 1)

If the potential difference across a resistor is doubled:

► only the current is doubled

► only the current is halved

► only the resistance is doubled

► only the resistance is halved

PHY101 - Physics - Question No: 8 (M a r k s: 1)

By using only two resistors, R1 and R2, a student is able to obtain resistances of 3

Ω, 4Ω, 12Ω, and 16 Ω. The values of R1 and R2 (in ohms) are:

► 3, 4

► 2, 12

► 3, 16

► 4, 12

PHY101 - Physics - Question No: 9 (M a r k s: 1)

Faraday's law states that an induced emf is proportional to:

► the rate of change of the electric field

► the rate of change of the magnetic flux

► the rate of change of the electric flux

► the rate of change of the magnetic field

PHY101 - Physics - Question No: 10 (M a r k s: 1)

A generator supplies 100V to the primary coil of a transformer. The primary has

50 turns and the secondary has 500 turns. The secondary voltage is:

► 1000V

► 500V

► 250V

► 100V

PHY101 - Physics - Question No: 11 (M a r k s: 1)

The wavelength of red light is 700 nm. Its frequency is _____.

► $4.30 * 10^4$ Hertz

► $4.30 * 10^3$ Hertz

► $4.30 * 10^5$ Hertz

► $4.30 * 10^2$ Hertz

PHY101 - Physics - Question No: 12 (M a r k s: 1)

PHY101 - Physics - Question No: 13 (M a r k s: 1)

A laser in a compact disc player generates light that has a wavelength of 780 nm

in air. The light then enters into the plastic of a CD. If the index of refraction of

plastic is 1.55, the speed of this light once enter the plastic is _____.

► $3.00 * 10^8$ m/s

► $1.94 * 10^8$ m/s

► $4.29 * 10^8$ km/h

► $3.00 * 10^8$ km/h

PHY101 - Physics - Question No: 14 (M a r k s: 1)

Which of the following electromagnetic radiations has photons with the greatest energy?

► blue light

► yellow light

► x rays

► radio waves

PHY101 - Physics - Question No: 15 (M a r k s: 1)

A virtual image is one:

► toward which light rays converge but do not pass through

► from which light rays diverge as they pass through

► toward which light rays converge and pass through

► from which light rays diverge but do not pass through

PHY101 - Physics - Question No: 16 (M a r k s: 1) vuzs

What is the unit of magnification factor?

► meter.Kelvin

► radian.Kelvin

► degree.Kelvin

► no units

PHY101 - Physics - Question No: 17 (M a r k s: 1)

During an adiabatic process an object does 100 J of work and its temperature decreases by 5K. During another process it does 25 J of work and its temperature decreases by 5 K. Its heat capacity for the second process is.

► 20 J/K

► 100 J/K

► 15 J/K

► 5 J/K

PHY101 - Physics - Question No: 18 (M a r k s: 1)

An ideal gas expands into a vacuum in a rigid vessel. As a result there is:

► a change in entropy

► a decrease of internal energy

► an increase of pressure

► a change in temperature

PHY101 - Physics - Question No: 19 (M a r k s: 1)

The Stern-Gerlach experiment makes use of:

► a strong uniform magnetic field

► a strong non-uniform magnetic field

► a strong uniform electric field

► a strong non-uniform electric field

PHY101 - Physics - Question No: 20 (M a r k s: 1)

A large collection of nuclei are undergoing alpha decay. The rate of decay at any

instant is proportional to:

► the number of undecayed nuclei present at that instant

► the time since the decays started

► the time remaining before all have decayed

► the half-life of the decay

PHY101 - Physics - Question No: 21 (M a r k s: 1)

Which weighs more, a liter of ice or a liter of water?

PHY101 - Physics - Question No: 22 (M a r k s: 1)

Will the current in a light bulb connected to a 220-V source be greater or less

than when the same bulb is connected to 110-V source?

PHY101 - Physics - Question No: 23 (M a r k s: 1)

How is the wavelength of light related to its frequency?

PHY101 - Physics - Question No: 24 (M a r k s: 1)

We don't notice the de Broglie wavelength for a pitched baseball. Is this because

the wavelength is very large or because it is very small?

PHY101 - Physics - Question No: 25 (M a r k s: 2)

Does every magnet necessarily have a north and south pole? Explain

PHY101 - Physics - Question No: 26 (M a r k s: 2)

In a cool room, a metal or marble table top feels much colder to the touch than

does a wood surface even though they are at the same temperature. Why?

PHY101 - Physics - Question No: 27 (M a r k s: 3) vuzs

If a water wave oscillates up and down three times each second and the distance

between wave crests is 2 m, what is its frequency? What is its wavelength?

What is its wave speed?

PHY101 - Physics - Question No: 28 (M a r k s: 3)

A transformer has $N_1 = 350$ turns and $N_2 = 2\,000$ turns. If the input voltage is

coil?

PHY101 - Physics - Question No: 29 (M a r k s: 3)

Why do astronomers looking at distant galaxies talk about looking backward

in time?

PHY101 - Physics - Question No: 30 (M a r k s: 3)

Some distant astronomical objects, called quasars, are receding from us at half

the speed of light (or greater). What is the speed of the light we receive from

these quasars?

PHY101 - Physics - Question No: 31 (M a r k s: 5)

Consider a lamp hanging from a chain. What is the tension in the chain?

PHY101 - Physics - Question No: 32 (M a r k s: 5)

Aproton travels with a speed of 3.00 * 10_6 m/s at an angle of 37.0° with the

direction of a magnetic field of 0.300 T in the + y direction. What are (a) the

magnitude of the magnetic force on the proton and (b) its acceleration?

PHY101 - Physics - Question No: 33 (M a r k s: 5)

1.Light from the Sun takes approximately 8.3 min to reach the Earth. During this

time interval the Earth has continued to rotate on its axis. How far is the

actual direction of the Sun from its image in the sky?

2. Do all current-carrying conductors emit electromagnetic waves? Explain

2. Yes all current carrying conductors emit electromagnetic waves, and these

are at the right angle of the current passes thorough as right hand rule of

Fleming’s explains it.

PHY101 - Physics - Question No: 34 (M a r k s: 5)

Explain solar convection zone. What is its other name?

PHY101 - Physics - Question No: 35 (M a r k s: 10)

a)Explain why you can't just open your refrigerator to cool your kitchen on a hot

day. Why is it that turning on a room air conditioner will cool down the room

but opening a refrigerator door will not?

b) On a humid day, water vapor condenses on a cold surface. During

condensation, the entropy of the water(a) in-creases, (b) remains constant, (c)

decreases, (d) may decreases or remain unchanged. Give its reason.

Virtual University Old & Current Question Papers

PHY101 Physics Final 2009 Paper Solved by Farhan and Ali (s1)

Published on Monday, 18 July 2011 16:39
Written by Fuad Hasan

FINALTERM EXAMINATION

Fall 2009

PHY101- Physics (Session - 1)

Solved by Farhan & Ali

Mindhacker124@gmail.com

Hearthacker124@gmail.com

Time: 120 min

M a r k s: 70

PHY101 - Physics - Question No: 1 (M a r k s: 1)

As a 2.0-kg block travels around a 0.50-m radius circle it has an angular speed of

12 rad/s. The circle is parallel to the xy plane and is centered on the z axis, a

distance of 0.75m from the origin. The z component of the angular momentum

around the origin is:

► **6.0kg · m2/s**

► 9.0kg · m2/s

► 11 kg · m2/s

► 14 kg · m2/s

PHY101 - Physics - Question No: 2 (M a r k s: 1)

A net torque applied to a rigid object always tends to produce:

► linear acceleration

► rotational equilibrium

► **angular acceleration**

► rotational inertia

PHY101 - Physics - Question No: 3 (M a r k s: 1)

An object attached to one end of a spring makes 20 vibrations in 10 s. Its angular

frequency is:

► 1.57 rad/s

► **2.0 rad/s**

► 6.3 rad/s

PHY101 - Physics - Question No: 4 (M a r k s: 1)

In simple harmonic motion, the restoring force must be proportional to the:

► amplitude

► frequency

► velocity

► displacement

PHY101 - Physics - Question No: 5 (M a r k s: 1)

Mercury is a convenient liquid to use in a barometer because:

► it is a metal

► it has a high boiling point

► it expands little with temperature

► it has a high density

PHY101 - Physics - Question No: 6 (M a r k s: 1)

The units of the electric field are:

► J/m

► J/(C·m)

► J/C

► J·C

PHY101 - Physics - Question No: 7 (M a r k s: 1)

A farad is the same as a

► **J/V**

► V/J

► C/V

► V/C

PHY101 - Physics - Question No: 8 (M a r k s: 1)

We desire to make an LC circuit that oscillates at 100 Hz using an inductance of

2.5H. We also need a capacitance of:

► 1 F

► 1mF

► 1 µF

► **100 µF**

PHY101 - Physics - Question No: 9 (M a r k s: 1) vuzs

The wavelength of red light is 700 nm. Its frequency is _____.

► 4.30 * 10_4 Hertz

► 4.30 * 10_3 Hertz

► **4.30 * 10_5 Hertz**

► 4.30 * 10_2 Hertz

PHY101 - Physics - Question No: 10 (M a r k s: 1)

Which of the following statements is **NOT TRUE** about electromagnetic waves?

► Electromagnetic waves satisfy the Maswell's Equation.

► Electromagnetic waves can not travel through space.

► The receptions of electromagnetic waves require an antenna.

► **The electromagnetic radiation from a burning candle is unpolarized.**

PHY101 - Physics - Question No: 11 (M a r k s: 1)

Radio waves and light waves are _____.

► Longitudinal waves

► Transverse waves

► **Electromagnetic and transverse both**

► Electromagnetic and longitudinal both

PHY101 - Physics - Question No: 12 (M a r k s: 1)

Wien's Law states that, λ_{max} = _____ K.

► 2.90 * 10^{-3} Hertz

► 2.90 * 10^{-3} s

► 2.90 * 10^{-3} kg

► 2.90 * 10^{-3} m

PHY101 - Physics - Question No: 13 (M a r k s: 1)

Interference of light is evidence that:

► the speed of light is very large

► light is a transverse wave

► light is a wave phenomenon

► light is electromagnetic in character

PHY101 - Physics - Question No: 14 (M a r k s: 1)

Fahrenheit and Kelvin scales agree numerically at a reading of:

► -40

► 0

► 273

► 574

PHY101 - Physics - Question No: 15 (M a r k s: 1)

According to the theory of relativity:

► **moving clocks run fast**

► energy is not conserved in high speed collisions

► the speed of light must be measured relative to the ether

► none of the above are true

PHY101 - Physics - Question No: 16 (M a r k s: 1)

Light from a stationary spaceship is observed, and then the spaceship moves

directly away from the observer at high speed while still emitting the light. As

a result, the light seen by the observer has:

► higher frequency and a longer wavelength than before

► **lower frequency and a shorter wavelength than before**

► higher frequency and a shorter wavelength than before

► lower frequency and a longer wavelength than before

PHY101 - Physics - Question No: 17 (M a r k s: 1)

How fast should you move away from a 6.0×10^{14} Hz light source to observe

waves with a frequency of 4.0×10^{14} Hz?

► 20c

► **38c**

► 45c

► 51c

PHY101 - Physics - Question No: 18 (M a r k s: 1)

The quantum number n is most closely associated with what property of the electron in a hydrogen atom?

► **Energy**

► Orbital angular momentum

► Spin angular momentum

► Magnetic moment

PHY101 - Physics - Question No: 19 (M a r k s: 1)

The quantum number m_s is most closely associated with what property of the electron in an atom?

► Magnitude of the orbital angular momentum

► **Energy**

► z component of the spin angular momentum

► z component of the orbital angular momentum

PHY101 - Physics - Question No: 20 (M a r k s: 1)

As the wavelength of a wave in a uniform medium increases, its speed will _____.

► Decrease

► Increase

► Remain the same

► None of these

PHY101 - Physics - Question No: 21 (M a r k s: 3)

Two people are carrying a uniform wooden board that is 3.00 m long and

weighs 160 N. If one person applies an upward force equal to 60 N at one end,

at what point does the other person lift? Begin with a free-body diagram of the

board.

Forces in x direction = 0

Forces in Y = F1 + F2 - W

Given:

L = 3.00 m F1 = 60 N

W = 160 N F2 = ? and x2 = ?

Sum of forces and torques = 0

Sum Force = F1 + F2 - W = 0

60N + F2 - 160 N = 0

F2 = 100 N

My pivot point is at F2.

Sum of torques = 0

Torque F1 = F1(L - x2)

Torque F2 = 0 b/c at pivot point

Torque W = W(L/2 - x2)

F1L - F1x2 + (WL)/2 - Wx2 = 0

(60)(3) - 60x2 + (160 * 3)/2 - 160x2 = 0

180-60x2 + 240-160x2 = 0

420-220x2 = 0

x2 = 1.9m

PHY101 - Physics - Question No: 22 (M a r k s: 3)

If a charged particle moves in a straight line through some region of space, can

you say that the magnetic field in that region is zero?

PHY101 - Physics - Question No: 23 (M a r k s: 3)

You want to explore the shape of a cel1ain molecule by scattering electrons of

momentum p from a gas of the molecules and studying the deflection of the

electrons. You will be able to see finer details in the molecules by (a)

increasing p; (b) decreasing p: (c) not worrying what p is.

PHY101 - Physics - Question No: 24 (M a r k s: 3)

A vessel is filled with gas at some equilibrium pressure and temperature. Can all gas molecules in the vessel have the same speed?

PHY101 - Physics - Question No: 25 (M a r k s: 3)

What are the properties of wave function?

Wave functions contain all the measurable information about the particles

Wave functions are continuous.

They allow energy calculations via schrodinger equation.

They establish the probability distribution in three dimensions.

They permit calculation of most probable values of given variables.

PHY101 - Physics - Question No: 26 (M a r k s: 5)

A bike accelerates uniformly from rest to a speed of 7.10 m/s over a distance of

35.4 m. Determine the acceleration of the bike.

$2as = vf^2 – vi^2$

$2a(35.4) = (7.10)^2 – (0)^2$

$2a(35.4) = 50.41$

$A = .71\ m/s^2$

PHY101 - Physics - Question No: 27 (M a r k s: 5)

A flat loop of wire consisting of a single turn of cross-sectional area 8.00 cm^2 is

perpendicular to a magnetic field that increases uniformly in magnitude from

0.500 T to 2.50 T in 1.00 s. What is the resulting induced current if the loop

has a resistance of 2.00 W?

$E=(Bf-Bi)*A/t=(2.5-0.5)*8*10^{-4}/1=1.6*10^{-3}$ V

I=E/R=1.23 mA

PHY101 - Physics - Question No: 28 (M a r k s: 5)

An ideal gas is contained in a vessel at 300 K. If the temperature is increased to

900 K, by what factor does each one of the following change?

(a) The average kinetic energy of the molecules.

(b) The rms molecular speed.

(c) The average momentum change of one molecule in a collision with a wall.

(d) The rate of collisions of molecules with walls.

(e) The pressure of the gas.

PHY101 - Physics - Question No: 29 (M a r k s: 5)

Who discover the nucleus? Write the experimental setup that he follows.

Ans:

Lord Rutherford discovered the nucleus. He carried out his famous experiment that showed the existence of a small but very heavy core of the atom. He arranged for a beam of alpha particles to strike gold atoms in a thin foil of gold. If the positive and negative charges in the atom were randomly distributed, all ' would go through without any deflection. But a lot of backscattering was seen, and some alphas were even deflected back in the direction of the incident beam. This was possible only if they were colliding with a very heavy object inside the atom.

PHY101 - Physics - Question No: 30 (M a r k s: 5)

In

an analogy between electric current and automobile traffic flow, what would correspond to charge? What would correspond to current?

PHY101 - Physics - Question No: 31 (M a r k s: 10)

(a)When can you expect a body to emit blackbody radiation?

(b) Which law is obeyed by Sun and other stars, briefly explain it.

(a) When can you expect a body to emit blackbody radiation?

Ans:

Waves are emitted when charges accelerate. Blackbody radiation occurs for

exactly this reason as well. If a body is heated up, the electrons, atoms, and molecules which it contains undergo violent random motion. Light may emit by electrons in one atom and absorbed in another. Even an empty box will be filled with blackbody radiation because the sides of the box are made up of material that has charged constituents that radiate energy when they undergo acceleration during their random motion. A blackbody is both an ideal absorber and an ideal radiator. At high temperature, a body emits radiation of shorter wavelength. Temperature is inversely proportional to wavelength.

(b) Which law is obeyed by Sun and other stars, briefly explain it.

Ans:

The Sun and other stars obey Wien's Law since the gases they are composed of emit radiation that is in equilibrium with the other materials. Wien's law allows astronomers to determine the temperature of a star because the wavelength at which a star is brightest is related to its temperature.

Virtual University Old & Current Question Papers

PHY101 Final 2009 Paper Shared by Waqas unsolved 2

Published on Thursday, 19 August 2010 20:51
Written by Bonfire

MIDTERM EXAMINATION

Spring 2009

PHY101- Physics (Session - 2)

Shared by Waqas

Question No: 1 (M a r k s: 1)

The lowest tone produced by a certain organ comes from a 3.0-m pipe with both ends open. If the speed of sound is 340m/s, the frequency of this tone is approximately:

► A. 7Hz

► B. 14 Hz

► C. 28 Hz

► D. 57 Hz

Question No: 2 (M a r k s: 1)

1. To raise the pitch of a certain piano string, the piano tuner:

► A. loosens the string

► B. tightens the string

► C. shortens the string

► D. lengthens the string

Question No: 3 (M a r k s: 1)

A force of 5000N is applied outwardly to each end of a 5.0-m long rod with a radius of 34.0 cm and a Young's modulus of 125×10^8 N/m^2. The elongation of the rod is:

► 0.0020mm

► 0.0040mm

► 0.14mm

► 0.55mm

Question No: 4 (M a r k s: 1)

A particle oscillating in simple harmonic motion is:

► never in equilibrium because it is in motion

► never in equilibrium because there is always a force

► in equilibrium at the ends of its path because its velocity is zero there

► in equilibrium at the center of its path because the acceleration is zero there

Question No: 5 (M a r k s: 1)

In simple harmonic motion, the restoring force must be proportional to the:

► amplitude

- ► frequency
- ► velocity
- ► displacement

Question No: 6 (M a r k s: 1)

A 160-N child sits on a light swing and is pulled back and held with a horizontal force of 100 N. The magnitude of the tension force of each of the two supporting ropes is:

- ► 60N
- ► 94N
- ► 120N
- ► 190N

Question No: 7 (M a r k s: 1)

An object attached to one end of a spring makes 20 vibrations in 10 s. Its angular frequency is:

- ► 12.6 rad/s
- ► 1.57 rad/s
- ► 2.0 rad/s
- ► 6.3 rad/s

Question No: 8 (M a r k s: 1)

For an object in equilibrium the net torque acting on it vanishes only if each torque is calculated about:

- ► the center of mass
- ► the center of gravity

- ► the geometrical center
- ► the same point

Question No: 9 (M a r k s: 1)

Ten seconds after an electric fan is turned on, the fan rotates at 300 rev/min. Its average angular acceleration is:

- ► 3.14 rad/s2
- ► 30 rad/s2
- ► 30 rev/s2
- ► 50 rev/min2
- ► 1800 rev/s2

Question No: 10 (M a r k s: 1)

A 4.0-N puck is traveling at 3.0m/s. It strikes a 8.0-N puck, which is stationary. The two pucks stick together. Their common final speed is:

- ► 1.0m/s
- ► 1.5m/s
- ► 2.0m/s
- ► 2.3m/s

Question No: 11 (M a r k s: 1)

An object moving in a circle at constant speed:

- ► must have only one force acting on it
- ► is not accelerating
- ► is held to its path by centrifugal force
- ► has an acceleration of constant magnitude

Question No: 12 (M a r k s: 1)

A plane traveling north at 200m/s turns and then travels south at 200m/s. The change in its velocity is:

- ► 400m/s north
- ► 400m/s south
- ► zero
- ► 200m/s south

Question No: 13 (M a r k s: 1)

At time t = 0 a car has a velocity of 16 m/s. It slows down with an acceleration given by −0.50t, in m/s2 for t in seconds. It stops at t =

- ► 64 s
- ► 32 s
- ► 16 s
- ► 8.0 s

Question No: 14 (M a r k s: 1)

1 mi is equivalent to 1609 m so 55 mph is:

- ► 15 m/s
- ► 25 m/s
- ► 66 m/s
- ► 88 m/s

Question No: 15 (M a r k s: 1)

If you walk along the top of a fence, why does holding your arms out help you to keep your balance?

because the arms keeps the movement of weight of body easy

Question No: 16 (M a r k s: 2)

Charge is also said to be conserved. What does it mean? Explain.

Question No: 17 (M a r k s: 2)

When a car drives off a cliff, why does it rotate forward as it falls?

Question No: 18 (M a r k s: 2)

Why does a book sitting on a table never accelerate "spontaneously" in response to the trillions of inter-atomic forces acting within it?

Question No: 19 (M a r k s: 3)

'Captain Planet' is somewhere between galaxies. When a gong sounds in a neighboring spaceship, Captain reacts to the sound. What is wrong with this scenario?

Question No: 20 (M a r k s: 3)

If you know the position vectors of a particle at two points along its path and also know the time it took to move from one point to the other, can you determine the particle's instantaneous velocity? Its average velocity? Explain

Question No: 21 (M a r k s: 5)

Steel will rapture if subjected to a shear stress of more that about $4.2 * 10^8$ N/m2. What sideward force is necessary to shear a steel bolt 1 cm in diameter?

Question No: 22 (M a r k s: 5)

A table-tennis ball is thrown at a stationary bowling ball. The table-tennis ball makes a one-dimensional elastic collision and bounces back along the same line. After the collision, compared to the bowling ball, the table-tennis ball has (a) a larger magnitude of momentum and more kinetic energy (b) a smaller magnitude of momentum and more kinetic energy (c) a larger magnitude of momentum and less kinetic energy (d) a smaller magnitude of momentum and less kinetic energy (e) the same magnitude of momentum and the same kinetic energy.

PYH101 (Feb 08, 2012)

Total Questions	41
MCQ's	26

Subjective

- What is difference between reflected ray and refracted ray? (2)
- What is Major difference between Galvanometer and Simple electric motor? (2)
- Which is denser, dry with water vapors? (2)
- There was a question on Bullet. (5)

  Data:

  Mass = 0.05 (kg)
  Speed = 60 (m/s)
  Length = 4.0 (cm)
  Force =?
- What is Plum Law? What are its basic features? Why it was wrong? (5)
- There was a question on Woman and Disk. (3)

  Data:

  Mass of a Woman = 50 kg
  Mass of Disk =110 kg
  Time = ----- (rev/s)
  Radius = -----
  Angular momentum of a Woman =?
  Angular momentum of a Disk =?
- What is Composition of Sun?(3)

Objective

The inner side of sun is called ----------

- Core
- Radiation zone
- Nucleus

The fundamental dimensions are ----------

Options were given

The fundamental dimensions of angular momentum are ----------

- $M.L^2T^{-1}$ **(True)**

FINALTERM EXAMINATION
Spring 2009
PHY101- Physics (Session - 2)

Question No: 1 (Marks: 1) - Please choose one

The number of significant figures in 0.00150 is:

- ► 5
- ► 4
- ► 3
- ► 2

Question No: 2 (Marks: 1) - Please choose one

One revolution is the same as:

2π rad

- ► 1 rad
- ► 57 rad

- ► π/2 rad
- ► π rad
- ► 2π rad

Question No: 3 (Marks: 1) - Please choose one

For a body to be in equilibrium under the combined action of several forces:

- ► all the forces must be applied at the same point

all the forces must be applied at the same point

- ► all of the forces form pairs of equal and opposite forces
- ► any two of these forces must be balanced by a third force

- ► the sum of the torques about any point must equal zero

Question No: 4 (Marks: 1) - Please choose one

A bucket of water is pushed from left to right with increasing speed across a horizontal surface. Consider the pressure at two points at the same level in the water.

- ► It is the same

- It is higher at the point on the left
- It is higher at the point on the right
- At first it is higher at the point on the left but as the bucket speeds up it is lower there

Question No: 5 (Marks: 1) - Please choose one

An organ pipe with both ends open is 0.85m long. Assuming that the speed of sound is 340m/s, the frequency of the third harmonic of this pipe is:

- A. 200 Hz
- B. 300 Hz
- C. 400 Hz
- D. 600 Hz

Question No: 6 (Marks: 1) - Please choose one

Capacitors C1 and C2 are connected in series. The equivalent capacitance is given by

- $C_1C_2/(C_1 + C_2)$
- $(C_1 + C_2)/C_1C_2$
- $1/(C_1 + C_2)$
- C_1/C_2

Question No: 7 (Marks: 1) - Please choose one

If the potential difference across a resistor is doubled:

- only the current is doubled
- only the current is halved
- only the resistance is doubled
- only the resistance is halved

Question No: 8 (Marks: 1) - Please choose one

By using only two resistors, R1 and R2, a student is able to obtain resistances of 3 Ω, 4Ω, 12Ω, and 16 Ω. The values of R1 and R2 (in ohms) are:

► 3, 4
► 2, 12
► 3, 16
► 4, 12

Question No: 9 (Marks: 1) - Please choose one

Faraday's law states that an induced emf is proportional to:

► the rate of change of the electric field
► the rate of change of the magnetic flux
► the rate of change of the electric flux

► the rate of change of the magnetic field

Question No: 10 (Marks: 1) - Please choose one

A generator supplies 100V to the primary coil of a transformer. The primary has 50 turns and the secondary has 500 turns. The secondary voltage is:

► 1000V
► 500V
► 250V
► 100V

Question No: 11 (Marks: 1) - Please choose one

The wavelength of red light is 700 nm. Its frequency is _____.

► $4.30 * 10^4$ Hertz
► $4.30 * 10^3$ Hertz
► $4.30 * 10^5$ Hertz
► $4.30 * 10^2$ Hertz

Question No: 12 (Marks: 1) - Please choose one

In some movies, you sometimes see an actor looking in a mirror and you can see his face in the mirror. During the filming of this scene, what does the actor see in the mirror?

► His face

► Your face

► The movie camera

► The director's face

Question No: 13 (Marks: 1) - Please choose one

A laser in a compact disc player generates light that has a wavelength of 780 nm in air. The light then enters into the plastic of a CD. If the index of refraction of plastic is 1.55, the speed of this light once enter the plastic is _____.

► $3.00 * 10^8$ m/s

► $1.94 * 10^8$ m/s

► $4.29 * 10^8$ km/h

► $3.00 * 10^8$ km/h

Question No: 14 (Marks: 1) - Please choose one

Which of the following electromagnetic radiations has photons with the greatest energy?

► blue light
► yellow light
► x rays
► radio waves

Question No: 15 (Marks: 1) - Please choose one

A virtual image is one:

► toward which light rays converge but do not pass through
► from which light rays diverge as they pass through
► toward which light rays converge and pass through

► from which light rays diverge but do not pass through

Question No: 16 (Marks: 1) - Please choose one

What is the unit of magnification factor?

► meter.Kelvin
► radian.Kelvin
► degree.Kelvin
► no units

Question No: 17 (Marks: 1) - Please choose one

During an adiabatic process an object does 100 J of work and its temperature decreases by 5K. During another process it does 25 J of work and its temperature decreases by 5 K. Its heat capacity for the second process is.

► 20 J/K
► 100 J/K
► 15 J/K
► 5 J/K

Question No: 18 (Marks: 1) - Please choose one

An ideal gas expands into a vacuum in a rigid vessel. As a result there is:

► a change in entropy
► a decrease of internal energy
► an increase of pressure
► a change in temperature

Question No: 19 (Marks: 1) - Please choose one

The Stern-Gerlach experiment makes use of:

► a strong uniform magnetic field
► a strong non-uniform magnetic field
► a strong uniform electric field
► a strong non-uniform electric field

Question No: 20 (Marks: 1) - Please choose one

A large collection of nuclei are undergoing alpha decay. The rate of decay at any instant is proportional to:

- ► the number of undecayed nuclei present at that instant
- ► the time since the decays started
- ► the time remaining before all have decayed
- ► the half-life of the decay

Question No: 21 (Marks: 1)

Which weighs more, a liter of ice or a liter of water?

Question No: 22 (Marks: 1)

Will the current in a light bulb connected to a 220-V source be greater or less than when the same bulb is connected to 110-V source?

Question No: 23 (Marks: 1)

How is the wavelength of light related to its frequency?

Question No: 24 (Marks: 1)

We don't notice the de Broglie wavelength for a pitched baseball. Is this because the wavelength is very large or because it is very small?

Question No: 25 (Marks: 2)

Does every magnet necessarily have a north and south pole? Explain

Question No: 26 (Marks: 2)

In a cool room, a metal or marble table top feels much colder to the touch than does a wood surface even though they are at the same temperature. Why?

Question No: 27 (Marks: 3)

If a water wave oscillates up and down three times each second and the distance between

wave crests is 2 m, what is its frequency? What is its wavelength? What is its wave speed?

Question No: 28 (Marks: 3)

A transformer has N_1 = 350 turns and N_2 = 2 000 turns. If the input voltage is □ v(t) = (170 V) cos □□ t, what rms voltage is developed across the secondary coil?

Question No: 29 (Marks: 3)

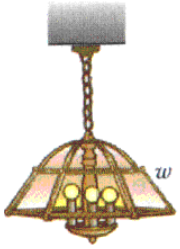
Why do astronomers looking at distant galaxies talk about looking backward in time?

Question No: 30 (Marks: 3)

Some distant astronomical objects, called quasars, are receding from us at half the speed of light (or greater). What is the speed of the light we receive from these quasars?

Question No: 31 (Marks: 5)

Consider a lamp hanging from a chain. What is the tension in the chain?



Question No: 32 (Marks: 5)

A proton travels with a speed of 3.00 * 10^6 m/s at an angle of 37.0° with the direction of a magnetic field of 0.300 T in the + y direction. What are (a) the magnitude of the magnetic force on the proton and (b) its acceleration?

Question No: 33 (Marks: 5)

1. Light from the Sun takes approximately 8.3 min to reach the Earth. During this time

interval the Earth has continued to rotate on its axis. How far is the actual direction of the Sun from its image in the sky?
2. Do all current-carrying conductors emit electromagnetic waves? Explain

2. Yes all current carrying conductors emit electromagnetic waves, and these are at the right angle of the current passes thorough as right hand rule of Fleming's explains it.

Question No: 34 (Marks: 5)

Explain solar convection zone. What is its other name?

Question No: 35 (Marks: 10)

a) Explain why you can't just open your refrigerator to cool your kitchen on a hot day. Why is it that turning on a room air conditioner will cool down the room but opening a refrigerator door will not?
b) On a humid day, water vapor condenses on a cold surface. During condensation, the entropy of the water(a) in-creases, (b) remains constant, (c) decreases, (d) may decreases or remain unchanged. Give its reason.