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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)

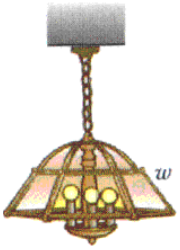
Why do astronomers looking at distant galaxies talk about looking backward in time?

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.