

**MID TERM EXAMINATION**  
**Solved MCQS BY**  
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**PHY101- Physics**  
**Mostly from MID TERM**  
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**Question No: 2 ( Marks: 1 ) - Please choose one**

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

- ▶ **rotational equilibrium**
- ▶ linear acceleration
- ▶ angular acceleration
- ▶ rotational inertia

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

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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: 4 ( Marks: 1 ) - Please choose one**

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

- ▶ amplitude
- ▶ frequency

▶ velocity

▶ **displacement**

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

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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**

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

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The units of the electric field are:

▶ **J/m**

▶ J/(C·m)

▶ J/C

▶ J·C

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

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A farad is the same as a

▶ **J/V**

▶ V/J

▶ C/V

▶ V/C

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

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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  $\mu$ F
- ▶ **100  $\mu$ F**

**Question No: 9 ( 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: 10 ( Marks: 1 ) - Please choose one**

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

- ▶ Electromagnetic waves satisfy the Maxwell'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 \_\_\_\_\_.

- ▶ 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,  $\lambda_{max} =$  \_\_\_\_\_ K.

- ▶  $2.90 * 10^{-3}$  Hertz
- ▶  $2.90 * 10^{-3}$  s

- ▶  $2.90 * 10^{-3}$  kg
- ▶  **$2.90 * 10^{-3}$  m**

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

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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

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

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Fahrenheit and Kelvin scales agree numerically at a reading of:

- ▶ **-40**
- ▶ 0
- ▶ 273
- ▶ 574

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

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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

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

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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

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

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

- ▶ 20c
- ▶ **38c**
- ▶ 45c
- ▶ 51c

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**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**
- ▶ Orbital angular momentum
- ▶ Spin angular momentum
- ▶ Magnetic moment

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**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?

- ▶ Magnitude of the orbital angular momentum
- ▶ **Energy**
- ▶ z component of the spin angular momentum
- ▶ z component of the orbital angular momentum

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

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

- ▶ Decrease
- ▶ Increase
- ▶ **Remain the same**
- ▶ None of these

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

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 ( Marks: 1 ) - Please choose one**

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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: 7 ( Marks: 1 ) - Please choose one**

---

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 ( Marks: 1 ) - Please choose one**

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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 ( Marks: 1 ) - Please choose one**

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

- ▶ **3.14 rad/s<sup>2</sup>**
- ▶ 30 rad/s<sup>2</sup>
- ▶ 30 rev/s<sup>2</sup>
- ▶ 50 rev/min<sup>2</sup>
- ▶ 1800 rev/s<sup>2</sup>

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

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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 ( Marks: 1 ) - Please choose one**

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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 ( Marks: 1 ) - Please choose one**

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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 ( Marks: 1 ) - Please choose one**

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At time  $t = 0$  a car has a velocity of 16 m/s. It slows down with an acceleration given by  $-0.50t$ , in  $m/s^2$  for  $t$  in seconds. It stops at  $t =$

- ▶ 64 s
- ▶ 32 s
- ▶ 16 s
- ▶ **8.0 s**

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

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

- ▶ 15 m/s
- ▶ **25 m/s**
- ▶ 66 m/s
- ▶ 88 m/s

The number of significant figures in 0.00150 is:

- ▶ 5
- ▶ 4
- ▶ **3**
- ▶ 2

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

One revolution is the same as:

$2\pi$  rad

- ▶ 1 rad
- ▶ 57 rad
- ▶  $\pi/2$  rad
- ▶  $\pi$  rad
- ▶  **$2\pi$  rad**

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**

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

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

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

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,  $R_1$  and  $R_2$ , a student is able to obtain resistances of  $3\Omega$ ,  $4\Omega$ ,  $12\Omega$ , and  $16\Omega$ . The values of  $R_1$  and  $R_2$  (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: 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

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

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

Question No: 19 ( Marks: 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

Question No: 20 ( Marks: 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

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

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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 · m<sup>2</sup>/s**
- ▶ 9.0kg · m<sup>2</sup>/s
- ▶ 11 kg · m<sup>2</sup>/s
- ▶ 14 kg · m<sup>2</sup>/s

**Question No: 21 ( Marks: 3 )**

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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 =  $F_1 + F_2 - W$

Given:

$L = 3.00 \text{ m}$   $F_1 = 60 \text{ N}$

$W = 160 \text{ N}$   $F_2 = ?$  and  $x_2 = ?$

Sum of forces and torques = 0

Sum Force =  $F_1 + F_2 - W = 0$

$60\text{N} + F_2 - 160 \text{ N} = 0$

$F_2 = 100 \text{ N}$

My pivot point is at  $F_2$ .

Sum of torques = 0

Torque  $F_1 = F_1(L - x_2)$

Torque  $F_2 = 0$  b/c at pivot point

Torque  $W = W(L/2 - x_2)$

$F_1L - F_1x_2 + (WL)/2 - Wx_2 = 0$

$(60)(3) - 60x_2 + (160 * 3)/2 - 160x_2 = 0$

$180 - 60x_2 + 240 - 160x_2 = 0$

$420 - 220x_2 = 0$

$x_2 = 1.9\text{m}$

**Question No: 22 (Marks: 3)**

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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: 26 (Marks: 5)**

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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.

$$2as = v_f^2 - v_i^2$$

$$2a(35.4) = (7.10)^2 - (0)^2$$

$$2a(35.4) = 50.41$$

$$A = .71 \text{ m/s}^2$$

**Question No: 27 (Marks: 5)**

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A flat loop of wire consisting of a single turn of cross-sectional area 8.00  $\text{cm}^2$  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?

$$E=(B_f-B_i)*A/t=(2.5-0.5)*8*10^{-4}/1=1.6*10^{-3} \text{ V}$$
$$I=E/R=1.23 \text{ mA}$$

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