

Physics II (part 2)**Intermediate exam**

Without formula sheet

Only one answer per question ! (except for question 8)

I) Chapter 31 – EM oscillations and alternating current

- 1) Which component of an RLC circuit stores energy in the form of a magnetic field?

A – Resistor	B - Capacitor
C – Inductor	D - Transformer

- 2) In a series RLC circuit, at resonance, the impedance
- Z
- is

A – Equal to zero	B - Equal to the inductive reactance X_L
C – Equal to the capacitive reactance X_C	D - Equal to the resistance R

- 3) In a serie RLC circuit, at resonance, the current through the inductor and capacitor:

A – Are equal in magnitude and in phase	B - Are equal in magnitude but out of phase
C – Are different in magnitude and in phase	D - Are different in magnitude and out of phase

- 4) What is the effect of increasing the resistance
- R
- in a series RLC circuit on the bandwidth of the resonance?

A – Increases the bandwidth	B- Decreases the bandwidth
C – Has no effect on the bandwidth	D- Causes the circuit to become more inductive

- 5) What is the effect on the resonant frequency if the inductance in a series RLC circuit is doubled?

A – The resonant frequency is doubled	B - The resonant frequency is halved
C – The resonant frequency increases by a factor of $\sqrt{2}$	D- The resonant frequency decreases by a factor of $\sqrt{2}$

- 6) In a transformer electric power is transferred from primary winding to secondary winding

A – By electric flux	B - By magnetic flux
C – Through conductive medium	D - none of the above

- 7) In a step up-up transformer, the value of current in the secondary coil in comparison to primary coil is

A – Equal	B - More
C – Less	D - There is no relation

II) Chapter 32 – Magnetism of matter

- 8) Electrons, like all particles, possess mass, charge, and spin, which contribute to the origin of magnetism in matter. Spin is often described as "similar to a rotating ball, but fundamentally different because..."

A – It involves quantum properties	B - It is not a physical rotation
C – It creates a magnetic moment	D - It can be measured with only two possible values

For this specific question, several answers are possible

9) The spin of an electron can be oriented in which two primary directions?

A – Up and down	B- Left and right
C – Forward and backward	D- Clockwise and counterclockwise

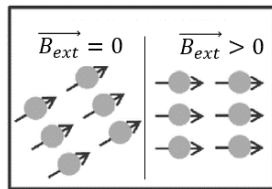
10) How does the orbital magnetic moment of an electron in an atom arise?

A – From the electron's spin	B- From the motion of the electron around the nucleus
C – From the vibration of the nucleus	D- From the electric field of the atom

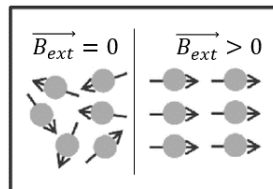
11) What is the primary characteristic of diamagnetic materials?

A – They have no net magnetic moment	B- They have a strong attraction to magnetic fields
C – They can retain magnetization after the external field is removed	D- They align their magnetic moments with the external magnetic field

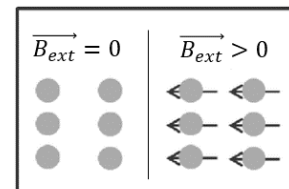
12) These images show the magnetic moments of different material. Link each picture to the corresponding materials



Diamagnetic material



Paramagnetic material



Ferromagnetic material

13) Paramagnetic materials are characterized by:

A – Strongly opposing magnetic fields	B- Weak attraction to magnetic fields
C – Permanent magnetic moments even without an external field	D- Strongly retaining magnetization after the field is removed

14) Which of the following correctly describes the behavior of ferromagnetic materials when the external magnetic field is removed?

A – They lose all magnetization immediately	B- They retain some of the magnetization
C – They become diamagnetic	D- They become paramagnetic

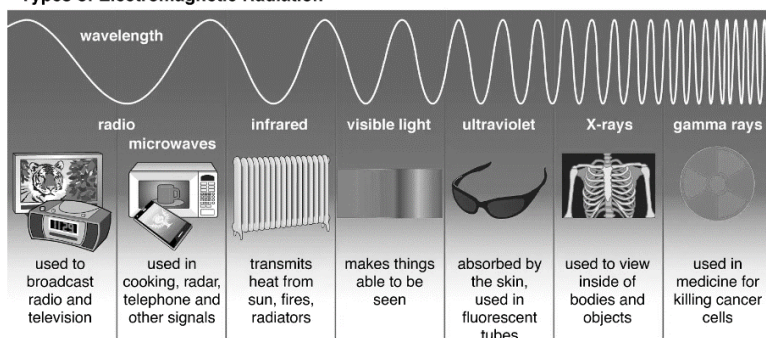
15) Which of the following describes the Curie temperature?

A – The temperature at which a material becomes superconducting	B- The temperature at which a paramagnetic material becomes diamagnetic
C – The temperature at which a ferromagnetic material becomes paramagnetic	D- The temperature at which a ferromagnetic material melts

III) Chapter 33 – Electromagnetics waves

16) Which of the following EM wave has the maximum frequency?

Types of Electromagnetic Radiation



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A – visible light	B- gamma rays
C – infrared	D- microwave

16) In electromagnetic waves the phase difference between electric and magnetic oscillations is?

A – 0	B - $\pi/4$
C – $\pi/2$	D - π

17) Which of the following statement **is false** for the properties of electromagnetic waves?

A – Electromagnetic waves can be produced by alternating moving charges	B- Both electric and magnetic field vectors attain the maximum and minimum at the same place and same time.
C – Both electric and magnetic field vectors are parallel to each and perpendicular to the direction of propagation of wave.	D- These waves do not require any material medium for propagation.

18) How do EM waves carry energy?

A – Through the Poynting vector	B - Thanks to quantum physics
C – Through the polarization angle	D - Through $E=mc^2$

19) How does the intensity of an electromagnetic wave vary with distance from a point source of power?

A – Decreases linearly with distance	B - Decreases exponentially with distance
C – Remains constant regardless of distance	D - Decreases with the squared distance from the source

20) What is the characteristic of radiation pressure in EM waves?

A – Light does not carry momentum	B - Light carries mass but does not have momentum
C – Light carries momentum but does not have mass	D - Light has mass and carries momentum

21) The EM waves when travel into different media gets

A – refracted	B - transmitted
C – reflected	D - partially refracted and partially reflected