ONTARIO PHYSICS, GRADE 12, UNIVERSITY PREPARATION (SPH4U) · UNIT D

The Wave Nature of Light and Revolutions in Modern Physics — Practice Test

Ontario Physics, Grade 12, University Preparation (SPH4U) • 25 questions

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **Light exhibits interference, which is evidence for its**

- A Mass
- B Charge
- C Wave nature
- D Particle nature only

Understand It with Pulse | Flag a mistake

2 **In Young double slit experiment, bright fringes occur where waves arrive**

A With zero amplitude

B At different speeds

C In phase

D Out of phase

Understand It with Pulse | Flag a mistake

3 **The central bright fringe in a double slit pattern is the**

A Darkest fringe

B First order only

C Brightest and widest fringe

D Narrowest dark fringe

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4 **Increasing the slit separation in a double slit experiment decreases fringe**

- A Width to zero
- B Number to one
- C Brightness only
- D Spacing

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5 **A diffraction grating produces sharper maxima than a double slit because it has**

- A Many slits
- B No slits
- C Thicker slits
- D One slit

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6 **Single slit diffraction produces a wide central maximum because waves from different parts of the slit**

- A Interfere
- B Are absorbed
- C Arrive in phase
- D Travel at different speeds

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7 **Polarized light has electric field oscillations in**

- A Two opposite planes
- B No plane
- C All directions
- D One plane only

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8 **Light can be polarized by reflection, scattering, and by passing through a**

- A Prism only
- B Polarizing filter
- C Lens
- D Mirror only

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9 **The photoelectric effect shows light also behaves as**

- A Waves only
- B Particles called photons
- C Magnetic fields
- D Sound waves

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10 **In the photoelectric effect, increasing light intensity increases the number of emitted electrons but not their maximum**

A Charge

B Mass

C Speed at all

D Kinetic energy

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11 **The threshold frequency is the minimum frequency needed to**

A Reflect light

B Eject an electron

C Absorb heat

D Refract light

Understand It with Pulse | Flag a mistake

12 **Photon energy is proportional to frequency and given by Planck constant times**

A Amplitude

B Wavelength

C Speed

D Frequency

Understand It with Pulse | Flag a mistake

13 **A photon of frequency 5×10^{14} hertz has energy using Planck constant 6.63×10^{-34} joule seconds . The energy $\times 10^{19}$, in joules , is about**

ANSWER

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14 **The de Broglie wavelength of a particle decreases as its momentum**

A Decreases

B Increases

C Stays the same

D Becomes zero

Understand It with Pulse | Flag a mistake

15 **Heisenberg uncertainty principle limits simultaneous knowledge of position and**

A Energy only

B Mass

C Momentum

D Charge

Understand It with Pulse | Flag a mistake

16 **Special relativity states the speed of light in a vacuum is the same for all**

A Stationary objects only

B Inertial observers

C Materials

D Accelerating observers only

Understand It with Pulse | Flag a mistake

17 **Time dilation means a moving clock runs**

A At the same rate

B Backward

C Faster than a stationary clock

D Slower than a stationary clock

Understand It with Pulse | Flag a mistake

18 **Length contraction occurs along the direction of**

A Time

B Motion

C Gravity

D Light travel only

Understand It with Pulse | Flag a mistake

19 **Mass energy equivalence is expressed by Einstein equation E equals mass times speed of light**

A Cubed

B Doubled

C Squared

D Halved

Understand It with Pulse | Flag a mistake

20 **In the Bohr model, electrons occupy only certain allowed**

- **A** Speeds
- **B** Energy levels
- **C** Positions in space
- **D** Charges

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21 **An electron drops from a higher energy level to a lower one and emits a photon. The photon's energy equals**

- **A** the sum of the two level energies
- **B** the difference between the two level energies
- **C** the mass of the electron
- **D** the charge of the electron

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22 **The hydrogen spectrum consists of discrete lines because energy levels are**

- A Infinite
- B Quantized
- C Continuous
- D Random

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23 **A laser produces light that is coherent, meaning its waves are**

- A Unpolarized
- B Of many colours
- C Random in phase
- D In phase

Understand It with Pulse | Flag a mistake

24 **Stimulated emission in a laser occurs when an incoming photon causes an excited atom to emit a photon that is**

- A Slower
- B Different in energy
- C Identical in energy and phase
- D Absorbed

Understand It with Pulse | Flag a mistake

25 **Quantum tunnelling allows a particle to pass through a barrier it classically does not have enough energy to**

- A Cross
- B Absorb
- C Reflect from
- D Create

Understand It with Pulse | Flag a mistake

ANSWER KEY

1.	C	**10.**	D	**19.**	C
2.	C	**11.**	B	**20.**	B
3.	C	**12.**	D	**21.**	B
4.	D	**13.**	3.32	**22.**	B
5.	D	**14.**	B	**23.**	D
6.	A	**15.**	C	**24.**	C
7.	D	**16.**	B	**25.**	A
8.	B	**17.**	D		
9.	B	**18.**	B		

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