

Jerusalem Science Contest 2008-2009 - 5769 חידון המדע הירושלמי
Electromagnetic and Ionizing radiation
Test #1 (Qualifying) — Chapter 26; Properties of Light

Name: _____

Date: _____

Raw Score: _____

Proctor for this Examinator: _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) What creature has the largest eye size? 1) _____
A) the whale
B) the giraffe
C) the elephant
D) the giant squid
E) none of the preceding
- 2) What EM waves are responsible for sunburn? 2) _____
A) infrared radiation
B) ultraviolet radiation
C) microwaves
D) x-radiation
E) none of the preceding
- 3) At the blue end of the spectrum 3) _____
A) rods are more receptive to light than are cones
B) both cones and rods are equally receptive
C) cones are more receptive to light than are rods
D) rods are more receptive in bright light and cones are more receptive in dim light
E) none of the preceding
- 4) How many types of visual cones are there? 4) _____
A) three B) four C) one D) two E) five
- 5) In a lunar eclipse 5) _____
A) the dark side of the moon becomes partially visible
B) the earth casts a shadow on the moon
C) the moon casts a shadow on the earth
D) all of the preceding
E) none of the preceding

- 6) The unit of frequency, equal to one wave/second is known by what name? 6) _____
A) Einstein
B) Maxwell
C) Hertz
D) Ampère
E) Planck
- 7) What is the "blind spot"? 7) _____
A) An area of the retina that has been damaged
B) A point where the optic nerve passes through the retina
C) A cloudiness in a section of the cornea that prevents light from reaching the retina
D) An area of the retina where there are no nerves
E) None of the preceding
- 8) Metals are reflective because 8) _____
A) light is absorbed by metal nuclei and reemitted
B) light cannot penetrate their dense structures.
C) light causes free electrons in a metal to vibrate, reemitting the light as a reflection
D) photons of light bounce off nuclear particles
E) None of the preceding
- 9) Maxwell's equations enabled him to calculate what fundamental constant? 9) _____
A) Planck's constant
B) The mass of a photon
C) Maxwell's constant
D) The velocity of an electron
E) The velocity of light through a vacuum
- 10) The area of the eye having the most distinct vision is the 10) _____
A) retina
B) iris
C) fovea
D) lens
E) cornea
- 11) What type of electromagnetic radiation has a wavelength slightly shorter than visible light? 11) _____
A) ultraviolet
B) x ray
C) infrared
D) radio
E) microwave
- 12) Glass is not transparent to which of the following types of radiation? 12) _____
A) radio waves
B) short wave ultraviolet
C) long wave ultraviolet
D) x rays
E) microwaves

- 13) The hottest stars are what color? 13) _____
A) red
B) orange
C) yellow
D) blue
E) all stars are white
- 14) Gamma radiation 14) _____
A) is caused by vibrations of electrons in atoms.
B) is less energetic than x-radiation.
C) results from primary x-ray emission..
D) has the highest frequency of all electromagnetic radiation.
E) None of the preceding statements is true.
- 15) Outside of primates, only one other type of mammal is known to have full color vision. What is it? 15) _____
A) the cat
B) the octopus
C) the whale
D) a species of ground squirrel
E) the dog
- 16) What does an oscillating magnetic field induce? 16) _____
A) a magnetic field of opposite polarity
B) the emission of electromagnetic radiation
C) an electric current
D) the emission of light
E) none of the preceding
- 17) The phenomenon in which radiation of a particular frequency can excite atoms or molecules and cause them to vibrate at the same frequency is called 17) _____
A) precession
B) opacity
C) harmonic motion
D) resonance
E) transparency
- 18) The lowest frequency of light that the human eye can perceive appears in what region of the visible spectrum? 18) _____
A) blue B) violet C) red D) yellow E) green
- 19) The receptors in the eye responsible for color vision are known by what name? 19) _____
A) cones
B) optic fibers
C) optic neurons
D) rods
E) none of the preceding

- 20) A large nearby light source produces a blurry shadow, consisting of a dark inner area and a lighter area of partial shadow called a(n) 20) _____
- A) translucency
 - B) penumbra
 - C) umbra
 - D) opaque region
 - E) none of the preceding
- 21) The most energetic of all electromagnetic radiation occurs in what region of the spectrum? 21) _____
- A) microwave
 - B) x ray
 - C) ultraviolet
 - D) gamma ray
 - E) radio
- 22) Which of the following statements is false? 22) _____
- A) Radio waves can travel in a complete vacuum
 - B) Radio waves are at the least energetic end of the electromagnetic spectrum
 - C) Radio waves have a low frequency
 - D) Sound is transmitted by radio waves
 - E) Radio waves have been detected with frequencies of 0.01 Hz
- 23) What is the name of the colored part of the eye? 23) _____
- A) the cornea
 - B) the pupil
 - C) the iris
 - D) the fovea
 - E) none of the preceding
- 24) An electromagnetic wave having a frequency of 10^4 cycles per second would have what wavelength? 24) _____
- A) 30 kilometers
 - B) 30000 kilometers
 - C) 3000 kilometers
 - D) 300 kilometers
 - E) none of the preceding
- 25) What part of the eye changes size in response to emotional signals? 25) _____
- A) the cornea
 - B) the fovea
 - C) the retina
 - D) the lens
 - E) the pupil