

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 does an oscillating magnetic field induce? 1) _____
A) the emission of light
B) a magnetic field of opposite polarity
C) an electric current
D) the emission of electromagnetic radiation
E) none of the preceding
- 2) Glass is not transparent to which of the following types of radiation? 2) _____
A) radio waves
B) x rays
C) short wave ultraviolet
D) long wave ultraviolet
E) microwaves
- 3) How many types of visual cones are there? 3) _____
A) four B) two C) three D) one E) five
- 4) What type of electromagnetic radiation has a wavelength slightly shorter than visible light? 4) _____
A) microwave
B) x ray
C) infrared
D) radio
E) ultraviolet
- 5) What EM waves are responsible for sunburn? 5) _____
A) ultraviolet radiation
B) x-radiation
C) infrared radiation
D) microwaves
E) none of the preceding

- 6) 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) _____
A) opaque region
B) umbra
C) penumbra
D) translucency
E) none of the preceding
- 7) The most energetic of all electromagnetic radiation occurs in what region of the spectrum? _____
A) radio
B) x ray
C) microwave
D) ultraviolet
E) gamma ray
- 8) An electromagnetic wave having a frequency of 10^4 cycles per second would have what wavelength? _____
A) 30 kilometers
B) 3000 kilometers
C) 300 kilometers
D) 30000 kilometers
E) none of the preceding
- 9) In a lunar eclipse _____
A) the dark side of the moon becomes partially visible
B) the moon casts a shadow on the earth
C) the earth casts a shadow on the moon
D) all of the preceding
E) none of the preceding
- 10) The hottest stars are what color? _____
A) red
B) yellow
C) blue
D) orange
E) all stars are white
- 11) The unit of frequency, equal to one wave/second is known by what name? _____
A) Ampère
B) Einstein
C) Maxwell
D) Hertz
E) Planck

- 12) Metals are reflective because 12) _____
A) light causes free electrons in a metal to vibrate, reemitting the light as a reflection
B) light is absorbed by metal nuclei and reemitted
C) photons of light bounce off nuclear particles
D) light cannot penetrate their dense structures.
E) None of the preceding
- 13) 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 13) _____
A) precession
B) resonance
C) opacity
D) transparency
E) harmonic motion
- 14) The receptors in the eye responsible for color vision are known by what name? 14) _____
A) optic fibers
B) rods
C) optic neurons
D) cones
E) none of the preceding
- 15) What is the "blind spot"? 15) _____
A) An area of the retina that has been damaged
B) A cloudiness in a section of the cornea that prevents light from reaching the retina
C) An area of the retina where there are no nerves
D) A point where the optic nerve passes through the retina
E) None of the preceding
- 16) Outside of primates, only one other type of mammal is known to have full color vision. What is it? 16) _____
A) the octopus
B) the dog
C) a species of ground squirrel
D) the whale
E) the cat
- 17) At the blue end of the spectrum 17) _____
A) rods are more receptive to light than are cones
B) rods are more receptive in bright light and cones are more receptive in dim light
C) both cones and rods are equally receptive
D) cones are more receptive to light than are rods
E) none of the preceding
- 18) What creature has the largest eye size? 18) _____
A) the giraffe
B) the elephant
C) the giant squid
D) the whale
E) none of the preceding

- 19) What is the name of the colored part of the eye? 19) _____
A) the iris
B) the fovea
C) the cornea
D) the pupil
E) none of the preceding
- 20) Maxwell's equations enabled him to calculate what fundamental constant? 20) _____
A) Planck's constant
B) The mass of a photon
C) The velocity of an electron
D) The velocity of light through a vacuum
E) Maxwell's constant
- 21) The lowest frequency of light that the human eye can perceive appears in what region of the visible spectrum? 21) _____
A) green B) violet C) red D) yellow E) blue
- 22) What part of the eye changes size in response to emotional signals? 22) _____
A) the pupil
B) the fovea
C) the cornea
D) the retina
E) the lens
- 23) Which of the following statements is false? 23) _____
A) Radio waves have a low frequency
B) Radio waves are at the least energetic end of the electromagnetic spectrum
C) Radio waves can travel in a complete vacuum
D) Sound is transmitted by radio waves
E) Radio waves have been detected with frequencies of 0.01 Hz
- 24) Gamma radiation 24) _____
A) is caused by vibrations of electrons in atoms.
B) is less energetic than x-radiation.
C) has the highest frequency of all electromagnetic radiation.
D) results from primary x-ray emission..
E) None of the preceding statements is true.
- 25) The area of the eye having the most distinct vision is the 25) _____
A) retina
B) lens
C) cornea
D) fovea
E) iris