

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) Maxwell's equations enabled him to calculate what fundamental constant? 1) _____
A) Maxwell's constant
B) Planck's constant
C) The mass of a photon
D) The velocity of an electron
E) The velocity of light through a vacuum
- 2) What type of electromagnetic radiation has a wavelength slightly shorter than visible light? 2) _____
A) microwave
B) ultraviolet
C) infrared
D) x ray
E) radio
- 3) The lowest frequency of light that the human eye can perceive appears in what region of the visible spectrum? 3) _____
A) red B) yellow C) green D) blue E) violet
- 4) Which of the following statements is false? 4) _____
A) Radio waves have a low frequency
B) Sound is transmitted by radio waves
C) Radio waves are at the least energetic end of the electromagnetic spectrum
D) Radio waves have been detected with frequencies of 0.01 Hz
E) Radio waves can travel in a complete vacuum
- 5) Gamma radiation 5) _____
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.

- 6) The unit of frequency, equal to one wave/second is known by what name? 6) _____
A) Einstein
B) Ampère
C) Hertz
D) Planck
E) Maxwell
- 7) 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 7) _____
A) harmonic motion
B) transparency
C) opacity
D) precession
E) resonance
- 8) What EM waves are responsible for sunburn? 8) _____
A) microwaves
B) infrared radiation
C) ultraviolet radiation
D) x-radiation
E) none of the preceding
- 9) The most energetic of all electromagnetic radiation occurs in what region of the spectrum? 9) _____
A) radio
B) microwave
C) ultraviolet
D) x ray
E) gamma ray
- 10) An electromagnetic wave having a frequency of 10^4 cycles per second would have what wavelength? 10) _____
A) 30 kilometers
B) 300 kilometers
C) 3000 kilometers
D) 30000 kilometers
E) none of the preceding
- 11) Glass is not transparent to which of the following types of radiation? 11) _____
A) x rays
B) long wave ultraviolet
C) short wave ultraviolet
D) radio waves
E) microwaves

- 12) Metals are reflective because 12) _____
A) light cannot penetrate their dense structures.
B) light is absorbed by metal nuclei and reemitted
C) photons of light bounce off nuclear particles
D) light causes free electrons in a metal to vibrate, reemitting the light as a reflection
E) None of the preceding
- 13) 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) 13) _____
A) penumbra
B) umbra
C) translucency
D) opaque region
E) none of the preceding
- 14) In a lunar eclipse 14) _____
A) the moon casts a shadow on the earth
B) the dark side of the moon becomes partially visible
C) the earth casts a shadow on the moon
D) all of the preceding
E) none of the preceding
- 15) The area of the eye having the most distinct vision is the 15) _____
A) fovea
B) retina
C) iris
D) cornea
E) lens
- 16) The receptors in the eye responsible for color vision are know by what name? 16) _____
A) optic fibers
B) optic neurons
C) cones
D) rods
E) none of the preceding
- 17) What is the "blind spot"? 17) _____
A) An area of the retina that has been damaged
B) An area of the retina where there are no nerves
C) A cloudiness in a section of the cornea that prevents light from reaching the retina
D) A point where the optic nerve passes through the retina
E) None of the preceding
- 18) The hottest stars are what color? 18) _____
A) blue
B) yellow
C) orange
D) red
E) all stars are white

- 19) What is the name of the colored part of the eye? 19) _____
A) the pupil
B) the iris
C) the cornea
D) the fovea
E) none of the preceding
- 20) How many types of visual cones are there? 20) _____
A) one B) two C) three D) four E) five
- 21) Outside of primates, only one other type of mammal is known to have full color vision. What is it? 21) _____
A) the dog
B) the cat
C) the octopus
D) the whale
E) a species of ground squirrel
- 22) What part of the eye changes size in response to emotional signals? 22) _____
A) the cornea
B) the fovea
C) the pupil
D) the lens
E) the retina
- 23) What creature has the largest eye size? 23) _____
A) the whale
B) the giant squid
C) the elephant
D) the giraffe
E) none of the preceding
- 24) At the blue end of the spectrum 24) _____
A) rods are more receptive to light than are cones
B) cones are more receptive to light than are rods
C) both cones and rods are equally receptive
D) rods are more receptive in bright light and cones are more receptive in dim light
E) none of the preceding
- 25) What does an oscillating magnetic field induce? 25) _____
A) a magnetic field of opposite polarity
B) an electric current
C) the emission of light
D) the emission of electromagnetic radiation
E) none of the preceding