

תידון המדע הירושלמי תשס"ח - 2008-2009 Jerusalem Science Contest
Electromagnetic and Ionizing radiation
Exam 12 — Supplementary Handout -Subatomic Particles

Name: _____

Date: _____

Raw Score: _____

Percentage Score: _____ %

Proctor for this Examinaton: _____ Form: _____

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

- 1) Another name for a non-electron-like lepton is a(n)
A) tauon B) axion C) muon D) neutrino E) boson

- 2) The charge of an up quark is
A) 0
B) $-1/3$
C) $2/3$
D) $1/2$
E) none of the preceding

- 3) A baryon is a
A) bosonic hadron
B) meson
C) type of neutrino
D) fermionic hadron
E) none of the preceding

- 4) The only boson predicted to not have a spin of 0 or 1 is the
A) muon
B) axion
C) graviton.
D) gluon
E) all bosons are predicted to have a spin of 0 or 1

- 5) The particle postulated to be a major constituent of the dark matter of the universe is the
A) Higg's boson
B) tauon
C) majoron
D) axion
E) none of the preceding

- 6) Mesons are a combination of which of the following?
- A) two quarks
 - B) three quarks
 - C) two quarks and an antiquark
 - D) four quarks
 - E) a quark and an antiquark
- 7) An elusive, as yet undiscovered particle that would explain how massless particles can cause matter to have mass, is being searched for in experiments conducted at CERN's Large Hadron Collider. What is this particle?
- A) the axion
 - B) the Higg's boson
 - C) the tachyon
 - D) the graviton
 - E) none of the preceding.
- 8) A meson independently discovered in 1974 by Richter at Brookhaven and Ting at Stanford known as the J/psi particle, has which of the following compositions?
- A) up/down/strange
 - B) top/antitop
 - C) up/down/charm
 - D) charm/anticharm
 - E) strange/antistrange
- 9) The first quark "flavors" to be described were
- A) down, top and bottom
 - B) up, down and strange
 - C) up, strange and bottom
 - D) up, down and charm
 - E) up, down and top
- 10) Which of the following is the only lepton which has a mass large enough for it to decay into a hadron?
- A) electron
 - B) muon
 - C) gluon
 - D) tauon
 - E) none of the preceding
- 11) The last quark to be discovered, was found by Leon Lederman in 1995, after 18 years of searching. This was the elusive
- A) none of the preceding
 - B) bottom quark
 - C) strange quark
 - D) charm quark
 - E) top quark
- 12) Composite particles composed of quarks are known as
- A) neutrinos
 - B) fermions
 - C) leptons
 - D) bosons
 - E) hadrons

- 13) The first "second generation" (after proton, neutron and electron) particle to be discovered, fourteen years after it was postulated by Hideki Yukawa in 1933, was the
- A) muon (mu meson)
 - B) boson
 - C) pion (pi meson)
 - D) quark
 - E) none of the preceding
- 14) The force involved in mediating all fermion interactions is the
- A) strong force
 - B) gravitational force
 - C) electromagnetic force
 - D) weak force
 - E) all of the preceding forces are involved in mediating fermionic interactions
- 15) Two force-mediating particles, designated W^+ and W^- , are members of what particle class?
- A) bosons
 - B) leptons
 - C) mesons
 - D) quarks
 - E) none of the preceding.
- 16) The total number of lepton types is
- A) 2
 - B) 8
 - C) 1
 - D) 4
 - E) none of the preceding.
- 17) All nucleons are composed of a combination of which of the following quark types?
- A) charm and strange
 - B) top and bottom
 - C) all of the preceding
 - D) up and down
 - E) none of the preceding.
- 18) A hyperon is a
- A) combination of up and/or down quarks and a top quark
 - B) type of nucleon
 - C) combination of strange and charm quarks
 - D) type of meson
 - E) none of the preceding
- 19) Quantum electrodynamic theory could not explain the strong nuclear force. A new quantum property, "color", was introduced giving rise to a new branch of physics known as
- A) quantum color theory
 - B) quantum fermiodynamics
 - C) quantum hadrodynamics
 - D) quantum chromodynamics
 - E) none of the preceding

20) The particle mediating the weak nuclear force is the

A) majoron

B) axion

C) Z boson

D) gluon

E) W boson