Student Review
Physics Semester B 2009

Test Description

Length: 2 hours

Points: 51 SR (25.5 points) 3 BCRs (12 points) Problem (1.5 points) Total Points = 39

Unit	Approximate Number of Selected Response Items	Approximate Number of Constructed Response items
Skills and Processes	8	1
Thermal Energy	3	1
Electrostatics	6	
Circuits	8	
Magnetism	7	
Waves & Optics	15	1
Modern	4	
Totals	**51**	**3**

Some Vocabulary for the Examination

The vocabulary includes words that students may encounter when reading examination items.

Skills and processes

accuracy
balance
calorimeter
data
degrees
dependant variable
frequency
gamma-rays
grams
hypothesis
independent variable
joules
kilograms
meter stick
milliliters
nanometer
pigment
procedure
range
scientific notation
thermometer
volume

Thermodynamics

conduction
convection
entrophy
heat
heat energy
heat transfer
joules
kinetic energy
radiation
specific heat
temperature
thermal equilibrium

Waves and Optics

amplitude
angle of incidence
angle of reflection
angle of refraction
bell jar
concave lens/mirror
constructive
convex lens/mirror
destructive
doppler effect
electromagnetic wave
energy
focus
frequency
hertz
real image
image size
incident
index of refraction
intensity
interference
inverted
law of reflection
law of superposition
lens
longitudinal wave
medium
mirror
note
orientation
period
ray diagram
real
reflection
refraction
Snell's Law
speed
speed of light/sound
transverse wave
tuning fork
ultraviolet

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Waves and Optics
(continued)
upright
vacuum
vibration
virtual image
wave front
wavelength

Electrostatics

charge
charge distribution
charged particle
electric field
electric field strength
electric potential
electrostatic force
magnitude
vectors

Magnetism

coil
electromagnet
electromagnetic
energy transformation
generator
induction
magnet
magnetic field
magnetic field intensity
magnetic forces
motor
north/south pole
Tesla

Current Electricity

ammeter & its symbol
battery & its symbol
circuit
combination circuit
current
dissipate
electrical
equivalent resistance
induced
mechanical
lamp and its symbol
ohm
parallel plates
parallel circuit
potential difference
power
resistor and its symbol
series circuit
solar
voltage drop
voltmeter and its symbol
watts

Modern Physics

alpha decay
atomic mass
beta decay
fission
fusion
gamma ray emission
half-life
positron emission
photoelectric effect
radioactive decay
radioactive material
transmutation
wave-particle duality

Physics Skills & Processes

- Formulate a working hypothesis.
- Identify appropriate methods for conducting an investigation.
- Select appropriate units to describe quantities.
- Select appropriate instruments and materials to conduct an investigation.
- Express small and large quantities using scientific notation.
- Read and interpret a technical selection.
- Analyze data to make predictions or draw conclusions.

Physics Concepts

- Given the specific heat of a substance, its temperature, and its heat energy, determine its mass.
- Distinguish between the methods of energy transfer.
- Describe the measure of the temperature of an object.
- Describe the relationship of thermal equilibrium between two substances.
- Given the speed of sound and frequency, determine the wavelength of a sound wave.
- Determine the relationship between frequency, speed, and wavelength.
- Describe the movement of the medium of both transverse and longitudinal waves.

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- Describe the need of a medium for both transverse and longitudinal waves.
- Compare the period and frequency of a wave.
- Given the wavelength and speed, determine a wave's frequency.
- Given the location of an observer, describe the perceived frequency of a moving sound source.
- Describe the Doppler Effect.
- Given the distance between two charged objects, determine the electrostatic force.
- Describe the relationship between distance and electrostatic force.
- Describe the types of electric charges.
- Describe the effect that similar and different charged objects have on each other.
- Given the amount of work needed to move a charged object in an electric field, determine the electric potential difference.
- Describe the magnitude and direction of electric field vectors.
- Given the electric field strength due to two charges, determine the magnitude of the force on one of the charges.
- Describe the magnetic field intensity on a current carrying wire.
- Determine the relationship between distance and magnetic field intensity.
- Given the current and resistance, determine the power dissipated by the resistor.
- Given the current and resistance, determine the voltage drop across a resistor.
- Identify the symbols for ammeter, battery, lamp, resistor, and voltmeter.
- Calculate power for a series, parallel or combination circuit.
- Calculate the equivalent resistance for a series, parallel or combination circuit.
- Determine the current through a resistor in a series, parallel or combination circuit.
- Given the distance between two parallel plates, the potential difference and the size of the charge, determine the kinetic energy of the charge.
- Solve problems using Ohm's law or Snell's Law.
- Describe the charge distribution on an object when brought near a positively or negatively charged object.
- Compare the frequency and the energy of an electromagnetic wave.
- Given the object distance, describe image size, orientation and type of image found in a convex versus concave lens and a convex versus concave mirror.
- Describe the bending of waves as they enter optically different medium.
- Distinguish between real and virtual images.
- Solve problems using the index of refraction or the law of reflection.
- Determine the location of the image formed by a lens using both a ray diagram and the lens equation.
- Describe the relationship between the frequency of light and the photoelectric effect.
- Solve problems using the law of superposition.
- Compare constructive and destructive interference.
- Describe the relationship between the strength of an electromagnet and the number of times a wire is wrapped around its coil.
- Describe the effects of the poles of a magnet on other magnets.
- Describe the shape of a magnetic field around a magnet.
- Describe the relationship between magnetic force, magnetic field and charge.

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- Calculate the magnitude of the magnetic force on a current carrying wire.
- Describe the properties of a magnet
- Describe how forces on electrons make a motor work.
- Determine the half-life of a material given the initial and final mass.
- Explain the energy transformations that may result from electromagnetic induction.
- Describe wave-particle duality.
- Explain entropy and the irreversibility of heat energy transformations.

Useful Websites:

This review can be found online at:
http://www.montgomeryschoolsmd.org/curriculum/science/classroom/assessment/

The format of the MCPS semester examination mirrors the Public Release Version of the Biology High School Assessment. The PRV items can be viewed at:
http://www.mdk12.org/assessments/high_school/look_like/biology/intro.html

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Physics Formula Sheet
Semester B

WAVES

$V = f\lambda$

$T = 1/f$

MAGNETISM

$F = qvB$

$F = BIL$

$B = M_0 I/2\pi r$

$M_0 = 4\pi \times 10^{-7} Tm/A$

OPTICS

$1/f = 1/d_o + 1/d_i$

$n = c/v$

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

THERMODYNAMICS

$Q = mc\Delta T$

STATIC ELECTRICITY

$F = kq_1q_2/r^2$

$k = 9 \times 10^9 Nm^2/C^2$

$V = PE/q = W/q$

$P.E. = qEd$

$E = F/q$

$E = kq/r^2$

$V = Ed$

CURRENT ELECTRICITY

$P = I^2R$ $\quad R = R_1 + R_2 + R_3\ldots$

$V = IR$

$P = V^2/R$ $\quad 1/R = 1/R_1 + 1/R_2 + 1/R_3\ldots$

$I = q/t$

$P = W/t$

$P = IV$

$Energy = Pt$