

Physics 3204

June 2016 Public Exam Outcome Report

This examination follows the specifications, conventions and standards set out in the:
Physics 3204 Provincial Exam Standards

- Units**
- 1 – Force, Motion and Energy
 - 2 – Fields
 - 3 – Matter Energy Interface

PART I: Selected Response—Total Value: 50%

Item	Curriculum Guide Page	Outcome	Cognitive Level	Outcome Description
1	(Unit 1) 28	325-6	L1	Qualitatively analyze the horizontal and vertical components of a projectile.
2	28	325-6	L2	Calculate the flight time for a projectile launched from the ground given the range.
3	28	325-6	L1	Identify the components of the velocity of a projectile at a point on its path.
4	28	325-6	L3	Calculate the vertical component of the velocity of a projectile using information from a height versus time graph.
5	30	325-6	L2	Calculate the flight time for a projectile launched horizontally from a table of given height.
6	32	325-8	L1	Find the applied force necessary to keep an object moving at a constant velocity along a horizontal surface with friction.
7	34	325-8	L1	Calculate the normal force for an object on an inclined plane.
8	34	325-8	L2	Calculate the coefficient of friction for an object sliding down an inclined plane at a constant velocity.
9	32	325-8	L2	Calculate the acceleration of an object pulled with a force at an angle along a horizontal surface with friction.
10	44	ACP-1	L2	Using vector analysis in two dimensions, find the mass of an object in translational equilibrium when given tensions at different angles.
11	34	325-8	L3	Apply Newton's laws of motion in two dimensions to find the tension in a string connecting a system of masses with a pulley at the end of a horizontal frictionless surface.

12	38	325-13	L2	Calculate the maximum speed of an object undergoing uniform circular motion at the top of a hill.
13	38	325-13	L1	Identify the location of maximum tension for an object spinning in a vertical circle.
14	36	325-12	L2	Calculate the centripetal acceleration of an object given the period and radius.
15	42	325-13	L2	Calculate the centripetal force on an object moving in a horizontal circle when given mass, radius, cycles and time.
16	40	325-13	L1	Calculate the radius of a frictionless banked curve.
17	44	ACP-1	L1	Identify the free body diagram for an object in static equilibrium.
18	44	ACP-1	L1	Identify the conditions necessary for static equilibrium.
19	48	ACP-1	L2	Calculate the force exerted by a frictionless wall on a uniform ladder in static equilibrium.
20	46	ACP-1	L2	Calculate the torque generated by an object when a force is applied at an angle.
21	<u>(Unit 2)</u> 56	308-13 308-14 308-15	L1	Qualitatively analyze the response of an electroscope in the presence of a charged object.
22	56	308-13 308-14 308-15	L2	Calculate the charge on a body given its deficit of electrons.
23	60	328-4	L3	Using ratios, compare the force between two charged particles when the separation distance and charge magnitude changes.
24	62	328-1 328-2 328-3	L1	Identify the electric field lines around a charged particle.
25	64	328-1 328-2 328-3	L2	Calculate the charge on an object given the force and the electric field strength.
26	72	ACP-3	L1	Calculate the current given the charge passing through a conductor and time.
27	78	ACP-3	L2	Given circuit diagrams, identify the configuration of resistors that has the greatest equivalent resistance.
28	68	328-1 328-2 328-3	L2	Calculate the work done on a charged particle when it moves through a potential difference.

29	74	ACP-3	L1	Calculate the voltage drop using Ohm's Law.
30	76	ACP-3	L1	Identify the graph that shows the correct relationship for an ohmic resistor.
31	76	ACP-3	L2	Given the resistivity, radius and resistance of a wire, calculate its length.
32	80	ACP-3	L2	Calculate the power dissipated by a resistor given a series circuit diagram.
33	78	ACP-3	L1	Calculate the current through a resistor given a parallel circuit diagram.
34	82	328-1 328-2	L1	Identify the magnetic field lines around Earth.
35	84	328-6	L1	Identify the magnetic field produced by a current in a straight conductor.
36	84	328-6	L2	Identify the direction a compass needle will point at a point near a solenoid.
37	86	328-5	L2	Use Left Hand Rule #3 to determine the force on a wire.
38	86	328-5	L2	Calculate the length of wire placed in a magnetic field at an angle that experiences a force in the field.
39	88	328-7	L2	Given the direction of the induced current in a coil, use Lenz's Law to determine the polarity of a moving magnet and of the coil.
40	88	328-7	L3	Given the graph of current output of a generator, identify the type of generator and its frequency.
41	<u>(Unit 3)</u> 98	327-10	L1	Identify the definition of work function.
42	96	327-9	L1	Calculate energy using Planck's equation.
43	100	115-3	L1	Calculate the momentum of a photon using Compton's equation.
44	104	329-3	L2	Calculate the energy lost when an electron drops to a different energy level in a hydrogen atom.
45	100	115-3	L2	Find the mass of an object using deBroglie's Wave Equation.
46	108	329-4	L2	Determine the daughter element in an alpha decay reaction.
47	108	329-4	L2	Determine the number of neutrons in an atom.
48	110	329-6	L2	Identify the products for a fission reaction given the equation.

49	108	329-4	L3	Identify the type of radiation when given a diagram of the path of a decay particle in a magnetic field.
50	112	115-5 117-11	L1	Identify a safety feature of the CANDU reactor.

PART II: Constructed Response—Total Value: 50%

Item	Curriculum Guide Page	Outcome	Cognitive Level	Value	Outcome Description
51a	(Unit 1) 28	325-6	L2	4	Calculate the height of an object given the initial velocity and range of a projectile that lands on top of that object.
51b(i)	34	325-8	L2	3	Calculate the acceleration of a system of masses attached by a string and pulley involving a horizontal surface with friction and a frictionless inclined plane.
51b(ii)	34	325-8	L2	3	Calculate the tension in a string connecting a system of masses on a horizontal surface with friction and a frictionless inclined plane. (Scientific Communication mark)
51c	38	325-13	L2	2	Calculate the tension in a rope at the top of a vertical circle for an object undergoing uniform circular motion.
51d	38	325-13	L3	3	An object attached to a string is travelling in a horizontal circle on a frictionless surface. Calculate how far the object travels if the string breaks.
51e	44	ACP-1	L2	2	Find the mass of an object at the end of a diving board given the force at each support and the mass of the diving board.
51f	46	ACP-1	L3	3	A mass is held in static equilibrium by a cable. Determine if the cable will break when the mass is changed by balancing torques.
52a	(Unit 2) 66	328-1 328-2 328-3	L2	4	Calculate the net electric field strength due to the presence of charges on a common straight line.
52b(i)	80	ACP-3	L2	2	Given a combination circuit, calculate the total current.
52b(ii)	80	ACP-3	L2	2	Given a combination circuit, calculate the voltage drop across a parallel resistor.
52b(iii)	80	ACP-3	L2	1	Given a combination circuit, calculate the power dissipated by a series resistor.
52c	86	328-5	L2	5	Calculate the net magnetic field strength between two parallel, current-carrying conductors. (Science Communication)
52d	86	328-5	L3	3	Calculate the magnitude and direction of the current in a wire suspended in a magnetic field.

52e	88	328-7	L3	3	Use Lenz's Law to compare the path of two magnets dropped through two coils made of different materials.
53a(i)	<u>(Unit 3)</u> 98	327-10	L3	1	Graph the data from a photoelectric effect experiment and construct a line of best fit.
53a(ii)	98	327-10	L3	1	Find the threshold frequency from the graph in 53a(i).
53a(iii)	98	327-10	L3	1	Determine what happens to the kinetic energy of electrons when the brightness of incident light changes in the photoelectric effect.
53b(i)	108	329-4	L2	1	Write the decay equation for a natural transmutation showing all the mass numbers and atomic numbers.
53b(ii)	108	329-4	L2	2	Calculate the energy released from the decay in 53b(i) given the masses of each isotope.
53c	110	214-2	L2	4	Calculate the time required for a radioactive isotope to decay to a particular amount given its half-life. (Science Communication)