Physics 3204
June 2014 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	28	325-6	(Unit 1) L1	Identify the horizontal velocity of a projectile at three points along its path.
2	28	325-6	L2	Calculate the time for a projectile to travel a specified horizontal distance given its initial velocity.
3	28	325-6	L2	Calculate the initial speed of a projectile launched horizontally from a point above the ground given its range.
4	28	325-6	L1	Identify the magnitude of the final velocity of a projectile that begins and lands at ground level given its initial velocity.
5	28	325-6	L2	Calculate the maximum height of an object given its initial velocity.
6	28	325-6	L2	Calculate the range of a projectile when it is launched horizontally from a given height.

7	34	325-8	L1	Calculate the normal force acting on an object sliding down an incline.
8	34	325-8	L2	Calculate the force of friction acting on an object that is at rest on an incline.
9	34	325-8	L1	Given a diagram, identify the force of friction acting on an object sliding down an incline.
10	44	ACP-1	L2	Calculate the mass of an object in static equilibrium that is supported by two different tensions at different angles.
11	34	325-8	L2	Calculate the acceleration of a system of masses with a pulley at the end of a frictionless horizontal surface.
12	36	325-12	L1	Identify the direction of the centripetal force acting on a car making a turn on a horizontal surface.
13	38	325-13	L2	Calculate the velocity at which a car will lose contact with the road at the top of a circular path.
14	36	325-12	L2	Calculate the centripetal acceleration of an object given its period and the radius of the path.
15	38	325-13	L2	Calculate the mass of an object on the end of a string rotating in a horizontal, circle given its speed, radius of the path and tension in the string.
16	40	325-13	L1	Calculate the radius of a banked curve without friction.
17	38	325-13	L3	Calculate the centripetal force acting on an object at the end of a string that is moving in a horizontal circle given the tension and the angle at which it rotates.
18	44	ACP-1	L1	Identify the description of an object’s center of mass.
19	46	ACP-1	L3	Describe what happens to the force and the torque on a board point as an object moves along the board.

20	46	ACP-1	L1	Given diagrams, identify which situation produces a clockwise torque on a uniform beam.
21	56	308-13,14,15	(Unit 2) L1	Identify what happens to a neutral electroscope when a positively charged object is brought nearby.
22	56	308-13,14,15	L2	Calculate the charge on an object given its excess of electrons.
23	62	328-1,2,3	L1	Given an electric field diagram, identify the charges as positive or negative.
24	64	328-1,2,3	L3	Identify the change in force experienced by a charge in an electric field when the charge doubles.
25	68	328-1,2,3	L2	Calculate the work done on an electron that is raised to a given potential difference.
26	72	ACP-3	L1	Calculate current given charge and time.
27	64	328-1,2,3	L1	Calculate the electric field strength at a given distance from a charge.
28	72	ACP-3	L1	Given circuit diagrams, identify the correct placement of a voltmeter and an ammeter.
29	76	ACP-3	L2	Calculate resistance using a graph of potential difference versus current.
30	76	ACP-3	L1	Calculate resistance of a piece of wire using the defining equation.
31	80	ACP-3	L2	Calculate the current through a resistor in a parallel circuit.
32	80	ACP-3	L2	Calculate the cost to operate an appliance for a year given its power and the price per kW·h.
33	78	ACP-3	L2	Calculate the total resistance in a combination (series-parallel) circuit.

34	80	ACP-3	L3	Calculate the voltage across a resistor in a combination (series-parallel) circuit.
35	82	328-1,2	L1	Given diagrams, identify the direction of a compass needle when placed next to a bar magnet.
36	84	328-6	L1	Identify the direction of the magnetic field around a straight, current carrying wire.
37	86	328-5	L2	Given diagrams, determine which situation creates a given direction of force on a current carrying wire in a magnetic field.
38	84	328-6	L2	Determine which direction a compass needle will point when placed at the end of a current carrying coil of wire.
39	88	328-7	L2	Use Lenz' Law to determine which diagram shows the correct direction of current induced in a coil of wire.
40	86	328-5	L2	Calculate the speed of an electron experiencing a force when projected perpendicularly into a magnetic field.
41	96	327-9	(Unit 3) L1	Identify a blackbody from its definition.
42	98	327-10	L2	Calculate the maximum kinetic energy of an electron emitted in the photoelectric effect given frequency and work function.
43	100	329-1	L2	Calculate the deBroglie wavelength of a photon given its momentum.
44	98	327-10	L1	Convert energy in Joules into electronvolts.
45	102	329-2	L1	Calculate the orbital radius of an electron in a specified energy level of a hydrogen atom.

46	98	327-10	L1	Calculate the energy of a photon given its wavelength.
47	110	214-2	L3	Determine the half-life of a radioactive sample given a graph of its mass versus time.
48	108	329-4	L2	Calculate the energy released in a nuclear reaction given the mass of the reactants and products.
49	108	329-4	L2	Identify the daughter nucleus in a given decay reaction.
50	110	329-6	L1	Identify the definition of nuclear fusion.

PART II: Constructed Response—Total Value: 50%

Item	Curriculum Guide Page	Outcome	Cognitive Level	Value	Outcome Description
51a	28	325-6	(Unit 1) L3	3	Calculate if a projectile will hit a target given the horizontal distance away and its initial velocity. The launch point and target are at the same level.
51b	36	325-12	L2	2	Explain how uniform circular motion is an example of acceleration.
51c(i)*	34	325-8	L2	4	Calculate the acceleration of a system of masses with a pulley on a combination horizontal table and incline with friction on the table. (Science Communication Mark)
51c(ii)	34	325-8	L2	2	Calculate the tension in the connecting string of the system of masses in 51c(i).
51d	38	325-13	L2	2	Calculate the tension in a rope at the top of a vertical circle.
51e	46	ACP-1	L3	3	Calculate how far a person is from one end of a uniform board given the relationship between the two support forces.
51f	48	ACP-1	L2	4	Calculate the frictional force provided by the ground to keep a ladder in place when it leans against a frictionless wall.
52a*	60	328-4	(Unit 2) L2	4	Calculate the net electric force on a charge placed between two other charges. (Science Communication Mark)
52b	64	328-1,2,3	L3	3	Calculate the electric field strength necessary to suspend a charged mass between two parallel charged plates given the excess of electrons on the mass.
52c	86	328-5	L3	3	Calculate the resistance of a conductor in a circuit that experiences a given force when placed in a magnetic field.

52d(i)	80	ACP-3	L2	1	Solve a combination circuit – calculate the total resistance.
52d(ii)	80	ACP-3	L2	2	Solve a combination circuit – calculate the voltage across a parallel resistor.
52d(iii)	80	ACP-3	L2	1	Solve a combination circuit – calculate the power dissipated by a parallel resistor.
52e	86	328-5	L2	3	Calculate the current in a wire, and its direction, when it creates a given magnetic field at a given distance from the wire.
52f	88	328-7	L2	3	Sketch the current output from an AC and DC generator and explain how and why they are different.
53a	98	327-10	(Unit 3) L3	3	Use a graph of maximum kinetic energy versus frequency to determine which metals, when illuminated by the same light as depicted in the graph, will eject electrons given the work function of each metal.
53b	104	329-3	L2	2	Calculate the energy gained when an electron transitions from one energy level to another in a hydrogen atom.
53c	110	214-2	L2	3	Calculate the time for a radioactive sample to decay to a specified amount given its half-life. (Science Communication Mark)
53d	108	329-5	L2	2	Calculate the energy released in a nuclear decay reaction given the masses of the reactants and products.