MATHEMATICS + PHYSICS / GRADES 11-12

//S.T.E.M. ONLINE

Exceptional results, Unmatchable selection

S.T.E.M.Online Diagnostic Test

Can you justify every step?

STUDENT EDITION

Independent reasoning. Explicit assumptions. Direct verification.
Core questions plus selected extension modules.

BEFORE THE FIRST ATTEMPT

Choose a fair route

Assign modules by prior study. Use more than one sitting when needed.

Route / module	Questions	Marks	Suggested time
Short first visit	Q1, Q2, Q5, Q6	/32	30 min
Mathematics core	Q1-Q4	/32	40 min
Physics core	Q5-Q8	/32	40 min
Mathematics extension	M1-M4	/32	60-80 min
Calculus	C1-C2	/16	35-40 min
Physics extension	P1-P3	/24	45-60 min

Both core sections total /64. All Mathematics totals /80; all Physics totals /56. The full packet is /136, about 220-260 minutes. These times are suggestions, not validated speed thresholds. Report each assigned module separately; unlike routes are not comparable.

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Independent attempt
No AI, search, worked solutions or outside coaching. A basic scientific calculator is allowed. State domains, assumptions and units; justify your steps and verify against the original problem. Valid alternative methods earn full credit.

Exposure and access
Agree the assigned questions before starting. Use N = not yet taught, T = time ended, U = unsure how to begin. Record usual accommodations, breaks and help. N is not a weakness label; T and U on assigned, taught content remain part of its score.

Student code / preferred name: _____ Grade: _____

Courses studied / current: _____

Assigned questions: _____ Date: _____

Time, breaks, accommodations / help: _____

WHAT EARNS CREDIT

The reasoning matters as much as the result

Every question is worth 8 marks. Part marks are printed beside each task.

Marks follow the mathematical or physical evidence requested in each part. Setup, valid argument, execution and requested checks earn separate credit in the tutor key. A bare answer earns only the result credit specifically allocated; it does not earn unshown proof or modelling credit.

Dimension	What strong evidence looks like	Typical gap
Visualize	A useful diagram, graph, branch split or representation with relevant labels.	The picture replaces proof, or key quantities are unlabelled.
Model	A valid governing relation; stated domains, cases, axioms or physical assumptions.	A formula is used outside its domain or without justification.
Execute	A complete logical chain; correct algebra, cases, units and conclusions.	A correct calculation is attached to an invalid argument.
Verify	Substitution, boundary case, counterexample, unit or energy check, as appropriate.	A plausible answer is accepted without checking the original conditions.

Reasoning profile: 0-3 in each dimension
0 = no valid evidence on an eliciting task; 1 = partial or inconsistent; 2 = mostly valid with a material omission; 3 = complete and independently justified. Use “not observed” if the chosen tasks do not test a dimension. These ratings do not add extra marks to the test.

Partial credit and fair follow-through
A local arithmetic error loses its allocated accuracy credit. Later sound reasoning can still earn credit using that value, unless it creates an invalid case. The same error is not deducted twice. Original work and later coached corrections are recorded separately.

The diagnostic samples reasoning in selected topics. It is an educational placement tool, not a standardized ranking or an official AP, IB, provincial or admissions assessment. The grade bands are coaching rules, not validated predictions of exam performance.

TURN A SCORE INTO A TEACHING DECISION

What happens after marking?

Apply a band to each assigned module, then inspect the actual error patterns.

Module percentage = 100 × marks earned ÷ marks available on the questions assigned and taught before the attempt. Use the unrounded percentage to choose the band. An assigned blank / U / T earns 0; an agreed N is excluded and listed as unassessed. Do not remove an attempted low score merely because the question was hard.

Module score	Interpretation	Immediate coaching action
90-100%	Advanced reasoning	Assign one harder transfer task and a short oral defence. Continue with proof-led enrichment if both are secure.
80-<90%	Strong; targeted gaps	Choose the weakest reasoning dimension. Practise two contrasting cases and one unfamiliar transfer problem.
70-<80%	Developing independence	Use worked-example fading: explain a model, finish a partial solution, then solve a fresh problem independently.
60-<70%	Fragile foundations	Rebuild the two most costly prerequisites with concrete examples, error analysis and short checks before timed work.
Below 60%	Foundation rebuild	Interview the student, separate missing exposure from misconceptions, and teach one prerequisite chain at a time.

No averaging away a serious gap
If the relevant core section is below 70%, or Model / Verify is rated 0-1 on at least two relevant questions, address that gap before using a strong extension score to justify acceleration. Report the stronger result as well; do not erase it.

Progress check
After 2-3 targeted sessions, use a fresh matched mini-test: two 8-mark problems, same prerequisites, new surface features. Move on at 12/16 or higher, with at least 6/8 on each and a valid model plus a relevant check on each. At the advanced band, add an unfamiliar transfer task and oral defence.

These are provisional instructional thresholds. Adjust the pace to exposure, access needs and the student's demonstrated reasoning. A low score identifies the next teaching step; it is not a statement about ability or potential.

Q1 | 8 MARKS

When does squaring preserve the answer?

Algebra, domains and implication

Work over the real numbers.

(a) [2] For real x, state when $\sqrt{(x + 6)}$ is defined. Then state the additional sign condition any solution of $\sqrt{(x + 6)} = x$ must satisfy.

(b) [2] A student writes: $\sqrt{(x + 6)} = x \Rightarrow x + 6 = x^2 \Rightarrow (x - 3)(x + 2) = 0$, so $x = 3$ or $x = -2$. Identify where equivalence is lost. Is the forward implication from the original equation to its square valid?

(c) [2] Find the complete solution set of the original equation and verify each candidate in that equation.

(d) [2] Now solve $\sqrt{(x + 6)} = -x$. Explain why the squared equation is unchanged but the solution set changes.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

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Exceptional results, Unmatchable selection

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

Q2 | 8 MARKS

The value that division hides

Parameter cases and functions

The parameter k is real.

(a) [4] For every real parameter k, find all real solutions x of $(k - 1)x = k^2 - 1$. State every exceptional case and justify completeness.

(b) [2] Let $f(k) = (k^2 - 1)/(k - 1)$ and $g(k) = k + 1$, each on its natural real domain. Are f and g the same function? State precisely where their values agree.

(c) [2] Repair this claim so that it is true: “For every real k, the equation in part (a) has exactly one real solution.” State what happens in the excluded case.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

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Exceptional results, Unmatchable selection

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

Q3 | 8 MARKS

An optimum needs a feasible set

Geometry, quadratics and constraints

A rectangle has vertices (0, 0), (x, 0), (x, y), (0, y), where $x > 0$, $y > 0$ and its top-right vertex lies on $2x + y = 12$. All lengths are in metres.

(a) [2] Express its area A in terms of x, and state the complete physical domain of x.

(b) [3] Find the greatest possible area and the dimensions that achieve it. Prove it is a global maximum without calculus.

(c) [2] Find every possible width x for which $A \geq 16$ m². Explain whether the boundary widths are included.

(d) [1] Check both boundary rectangles directly in the original constraints and area requirement.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

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Exceptional results, Unmatchable selection

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

Q4 | 8 MARKS

A correct inequality, followed by a wrong conclusion

Proof, reciprocals and range

Let a and b be positive real numbers with a + b = 10. A student reasons: “$(a - b)^2 \geq 0$, so $ab \leq 25$. Therefore $1/a + 1/b \leq 2/5$.”

(a) [2] Justify $ab \leq 25$ and state exactly when equality occurs.

(b) [2] Identify the error in the conclusion, give one numerical counterexample, and write the correct inequality.

(c) [4] Determine the full set of possible values of $S = 1/a + 1/b$. Justify both the bound and why every value in your proposed set can actually occur. A lower bound alone is incomplete.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

//S.T.E.M. ONLINE
Exceptional results, Unmatchable selection

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

M1 | 8 MARKS

A parameter can reverse an inequality

Rational inequalities

The parameter λ is real. Work over the real numbers.

(a) [2] State the domain in x of $(x^2 - 4)/(x - 2) \geq \lambda x$ and simplify the left side on that domain.

(b) [4] Find the complete solution set for every real λ. Treat all cases created by the sign of $1 - \lambda$, and retain any original exclusion.

(c) [2] Write your solution sets explicitly when $\lambda = 2$ and when $\lambda = 3$. Explain why removing $x = 2$ matters in one of these cases but has no effect in the other.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

//S.T.E.M. ONLINE
Exceptional results, Unmatchable selection

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

M2 | 8 MARKS

Count every intersection, including the exceptional cases

Absolute values and parameters

For a real parameter a, consider $|x - 1| = ax$.

(a) [3] Solve on each branch $x \geq 1$ and $x < 1$. For each candidate formula, derive exactly which values of a make it valid.

(b) [3] Classify every real a according to whether there are zero, one or two distinct real solutions. Include the actual solution formulas and justify that there are no others.

(c) [2] Check the boundary values $a = -1, 0, 1$ directly in the original equation. Why must the two branches not count $x = 1$ twice?

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

//S.T.E.M. ONLINE
Exceptional results, Unmatchable selection

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

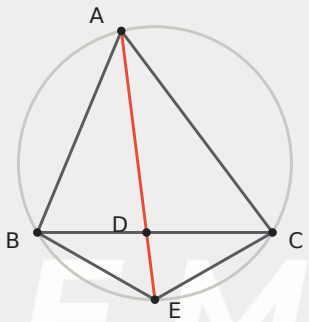
Status: attempted / N / T / U

M3 | 8 MARKS

One angle bisector, three hidden identities

NEW | Grade 11 challenge | Synthetic proof

In a nondegenerate triangle ABC, the internal bisector of ∠BAC meets BC at D and meets the circumcircle of ABC again at E. Thus A, D, E are collinear in that order. A circumcircle is the circle through the three vertices. Use Euclidean angle arguments and similarity; do not use coordinates or trigonometry. You may use the angle-bisector theorem and the theorem on angles subtending the same chord.



A, D, E are collinear.

Diagram is not a proof.

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(a) [2] Prove that EB = EC. Name the equal angles that justify your conclusion.

(b) [2] Find and justify a pair of similar triangles that proves AD × AE = AB × AC.

(c) [2] Using a second similarity argument, prove AD × DE = BD × DC. Do not merely quote the intersecting-chords theorem.

(d) [2] Now let AB = 13 cm, AC = 15 cm and BC = 14 cm. Determine AD exactly, using the two identities you proved. Verify that your value gives a positive DE.

Prior study: Circle-angle theorems; triangle similarity; angle-bisector theorem.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

M4 | 8 MARKS

What can the axioms actually force?

NEW | Grade 11 challenge | Models and independence

An incidence system consists of a finite set of points and a collection of lines; each line is a set of points. “A point lies on a line” means that it is a member of that set. Assume only:
A1. Every two distinct points lie on exactly one line.
A2. Every line contains exactly three distinct points.
A3. There are at least four distinct points.
Do not assume that these are ordinary straight lines in a Euclidean drawing.

(a) [2] Prove from A1 that two distinct lines cannot share two distinct points.

(b) [2] Prove that every system satisfying A1-A3 has at least seven points. Hint: take the three points A, B, C on one line and a point P outside it; examine PA, PB and PC.

(c) [2] Show that A2 does not follow from A1 and A3 alone. Construct an explicit countermodel and verify both retained axioms and the failure of A2.

(d) [2] Consider points {1,2,3,4,5,6,7} and lines {123,145,167,246,257,347,356}, where 123 means {1,2,3}. Verify A1-A3; explain why the number of pairs alone is insufficient without checking repetition. Does this construction, together with part (b), establish a minimum or uniqueness?

Prior study: Elementary sets; logical implication; proof by contradiction. All incidence axioms are supplied.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

C1 | 8 MARKS

A sharp turn hidden inside an absolute value

Differentiation and model validity

A one-dimensional position model is $s(t) = |(1\ \text{m/s}^2)t^2 - 4\ \text{m}|$ for $0 \le t \le 3$ s. This is an ideal mathematical model. Use positive s as the coordinate direction.

(a) [3] Write the position and velocity piecewise on $0 < t < 2$ s and $2\ \text{s} < t < 3$ s. Include units.

(b) [2] Does the velocity exist at $t = 2$ s? Compute the one-sided slopes. Assess the claim: “The position is zero there, so the object is at rest.”

(c) [2] Find displacement and total distance on $0 \le t \le 3$ s without integrating.

(d) [1] Explain a physical limitation of using this exact model for a real massive object subject to finite forces.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

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Exceptional results, Unmatchable selection

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

C2 | 8 MARKS

A limit claim that must survive every nearby x

NEW | Grade 12 challenge | Introductory ε-δ proof

The statement lim as $x \to 2$ of $x^2 = 4$ means: for every $\varepsilon > 0$, there exists $\delta > 0$ such that, for every real x, $0 < |x - 2| < \delta$ implies $|x^2 - 4| < \varepsilon$. Think of ε as the permitted output error and δ as the input tolerance. You may use $|u + v| \le |u| + |v|$. Do not use derivatives or a graph as a substitute for proof.

(a) [2] A student sets $\delta = \varepsilon/4$, claiming $|x^2 - 4| = 4|x - 2|$. Identify the false step. When $\varepsilon = 1$, give a specific x satisfying $0 < |x - 2| < 1/4$ but $|x^2 - 4| \ge 1$.

(b) [3] Prove the limit rigorously using $\delta = \min\{1, \varepsilon/5\}$. Explain why the extra restriction $\delta \le 1$ is useful. Begin with an arbitrary $\varepsilon > 0$ and finish with a statement valid for every permitted x.

(c) [3] Challenge: find the largest symmetric radius $\delta^*(\varepsilon)$ that works for an arbitrary $\varepsilon > 0$. Prove your choice works on both sides of 2, and show that every larger radius fails. An exact radical is expected.

Prior study: Factoring; absolute-value inequalities; square roots. The limit definition is supplied.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

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Exceptional results, Unmatchable selection

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

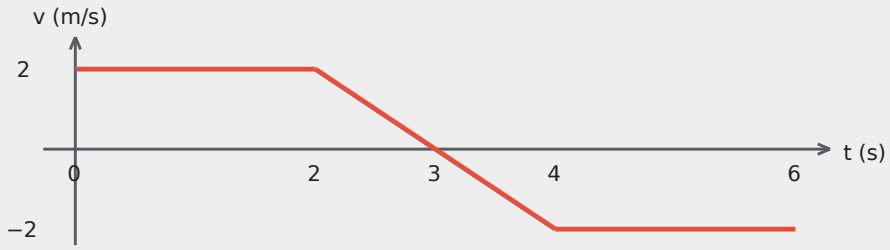
Status: attempted / N / T / U

Q5 | 8 MARKS

At rest is not the same as unaccelerated

Motion graphs and signed quantities

A cart moves on a straight track. Its velocity-time graph joins the points (0, 2), (2, 2), (4, −2), (6, −2) with straight segments. Time is in seconds and velocity in m/s. The graph, including motion between the listed points, is the exact model. Use signed area for displacement, area counted positively for distance, and graph slope for acceleration. Rectangle and triangle areas are sufficient.



(a) [1] At what time is the cart instantaneously at rest?

(b) [2] Find the displacement from t = 0 to t = 6 s. Show the signed areas.

(c) [2] Find the total distance travelled over the same interval. Show where the sign changes matter.

(d) [2] At t = 3 s, find the acceleration and decide whether the cart has returned to its starting position. Explain both answers.

(e) [1] Explain why an area under a velocity-time graph has units of distance.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

Q6 | 8 MARKS

Perfect measurements do not prove a law

Physical models and evidence

Exact position measurements are $x(0) = 0$ m, $x(1\ s) = 0.5$ m, $x(2\ s) = 2$ m, $x(3\ s) = 4.5$ m and $x(4\ s) = 8$ m. Model A is $x(t) = b\,t^2$. A competing model B is $x(t) = (1\ m)[0.5\tau^2 + 0.01\tau(\tau - 1)(\tau - 2)(\tau - 3)(\tau - 4)]$, where $\tau = t/(1\ s)$ is dimensionless. Consider only $0 \le t \le 5$ s.

(a) [2] Find b for Model A, including its units.

(b) [3] Does Model B match every measurement? Justify without expanding the product. Calculate each model's prediction at $t = 5$ s.

(c) [2] A student says: "The exact measurements prove that Model A is the true law for the whole interval." Is this justified? Distinguish consistency with the data from proof.

(d) [1] Choose a new exact measurement that would distinguish A from B, and explain why it does so. This need not establish which model describes every later time.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

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Exceptional results, Unmatchable selection

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

Q7 | 8 MARKS

An algebraic intersection is not always a light path

Coordinate geometry and optics

A plane mirror occupies only the segment $y = 0$, $0 \le x \le 2$. In the same coordinate units, a point source is $A = (-1, 2)$ and a receiver is $B = (7, 2)$. A ray may have exactly one reflection. Use the rule: a valid reflection path $A \to P \to B$ becomes a straight path $A \to P \to B'$ when B is reflected across the mirror's full supporting line. All rays and the mirror are in one plane.



(a) [2] Find B' and the equation of the straight line through A and B'.

(b) [2] Find the point where that line meets $y = 0$.

(c) [1] Does a ray obeying the stated reflection rule reach B after one reflection from the actual mirror segment? Justify.

(d) [3] Another student chooses the endpoint $P = (2, 0)$. Use slopes or angles to decide whether $A \to P \to B$ obeys the reflection rule. Explain why a boundary point cannot be accepted merely because it lies on the mirror.

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Exceptional results, Unmatchable selection

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

Q8 | 8 MARKS

Average motion does not determine the force

Underdetermination and countermodels

A 2 kg cart moves on a straight track. Only these positions are known: x(0) = 0 m and x(2 s) = 8 m. A student concludes: “Its velocity is 4 m/s throughout, its acceleration is zero, and the net horizontal force is zero.” For any constant-acceleration model you may use $x = x_0 + v_0t + \frac{1}{2}at^2$, $v = v_0 + at$, and $F_{net} = ma$.

(a) [2] What average velocity is determined by the measurements? Include direction relative to the positive x-axis.

(b) [3] Construct two constant-acceleration models fitting both measurements: one with a = 0 and one with a ≠ 0. State x(t), v_0 and a for each, with units.

(c) [2] Find the net horizontal force and the velocity at t = 2 s in each model. Which parts of the student’s conclusion are unsupported by the two measurements?

(d) [1] Give one additional position measurement that would distinguish your two models. Explain the difference in predictions.

//S.T.E.M. ONLINE
Exceptional results, Unmatchable selection

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

P1 | 8 MARKS

Downhill motion with an uphill acceleration

Newton’s laws and friction

A 2 kg block is already sliding down a fixed rough incline with initial speed 2 m/s. For the angle θ, sin θ = 3/5 and cos θ = 4/5. Let g = 10 m/s², μ_k = 1.0 and μ_s = 1.1. There are no other forces. Take downhill as positive. Use N = mg cos θ, kinetic friction magnitude μ_kN, static friction magnitude at most μ_sN, $v = v_0 + at$ and $\Delta s = v_0t + \frac{1}{2}at^2$.

(a) [2] Draw a labelled free-body diagram while the block is moving downhill. Compute N and the kinetic friction force.

(b) [2] Find the signed acceleration while it slides downhill. Does its sign contradict the stated initial motion? Explain.

(c) [2] Find the time and distance to its first stop. State the interval on which your sliding model applies.

(d) [2] At that stop, determine whether the block remains at rest or starts sliding again. Justify using static friction; do not continue the kinetic-friction equation blindly.

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Exceptional results, Unmatchable selection

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

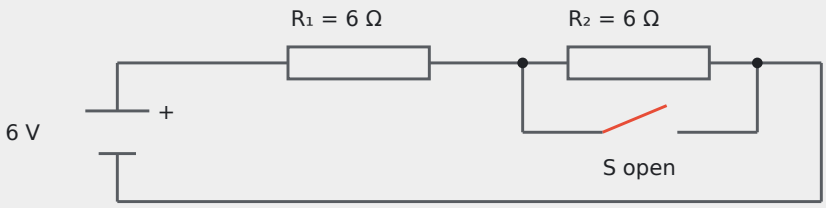
Status: attempted / N / T / U

P2 | 8 MARKS

The switch changes the whole circuit

Circuit topology and power

An ideal 6 V battery supplies two 6 Ω resistors R_1 and R_2 in series. An ideal switch S is connected across R_2 only, so closing S bypasses R_2 but leaves R_1 in the circuit. Wires have zero resistance. Use $V = IR$ and $P = IV = I^2R$ for resistors.



(a) [2] With S open, find the total resistance, battery current and power in R_1.

(b) [3] With S closed, find the battery current and the power in each resistor. Justify the voltage across R_2.

(c) [2] A student says: “The current in R_1 doubles, so its power doubles.” Correct the claim and check energy accounting by comparing total resistor power with battery power in both switch states.

(d) [1] Identify the ideal-source assumption that permits the battery’s terminal voltage to remain 6 V when the load changes.

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Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

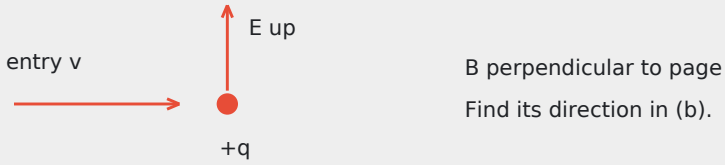
Status: attempted / N / T / U

P3 | 8 MARKS

The particle that passes only at one speed

NEW | Grade 12 challenge | Energy and crossed fields

A positive particle has charge $q = 1.60 \times 10^{-19}$ C and mass $m = 3.20 \times 10^{-27}$ kg. It starts from rest and accelerates through a potential drop of 100 V, gaining kinetic energy $q\Delta V$. It then enters a separate region moving horizontally right (+x). In that region, $E = 2.00 \times 10^{4}$ N/C upward (+y), and a uniform magnetic field is perpendicular to the page. Fields are ideal and uniform in their regions; ignore gravity, edge effects and radiation, and use nonrelativistic mechanics. Use $K = \frac{1}{2}mv^2$, $F_E = qE$ and $F_B = qvB$ when v is perpendicular to B; determine magnetic direction with the right-hand rule.



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(a) [2] Use work and energy to calculate the speed as the particle enters the crossed-field region.

(b) [2] Find the magnetic-field magnitude and direction that allow this particle to continue in a straight horizontal line. Explain the cancellation of forces.

(c) [2] Keep both fields unchanged but increase the accelerator's potential drop to 200 V. Calculate the particle's new entry speed and its initial net force (magnitude and direction) in the crossed-field region. Explain why this initial force does not justify assuming constant acceleration throughout its path.

(d) [2] For the 200 V case, a student says: "The magnetic field removes kinetic energy because the path bends down." Assess the claim. If the particle has moved vertically by $\Delta y < 0$ while still in the uniform fields, express its change in kinetic energy in terms of q, E and Δy, and state its sign.

Prior study: Electric potential energy; kinetic energy; magnetic force; right-hand rule.

Reasoning, diagrams and verification

Continue on labelled paper when needed. Keep your first attempt visible.

Confidence: 0 guessing 1 unsure 2 fairly sure 3 can defend it Rating: ____

Status: attempted / N / T / U

STUDENT RECORD

What did your reasoning reveal?

Add corrections in another colour. Do not replace the independent attempt.

Question	Status: attempt / N / T / U	Confidence 0-3	One thing to check
Q1	_____	_____	_____
Q2	_____	_____	_____
Q3	_____	_____	_____
Q4	_____	_____	_____
M1	_____	_____	_____
M2	_____	_____	_____
M3	_____	_____	_____
M4	_____	_____	_____
C1	_____	_____	_____
C2	_____	_____	_____
Q5	_____	_____	_____
Q6	_____	_____	_____
Q7	_____	_____	_____
Q8	_____	_____	_____
P1	_____	_____	_____
P2	_____	_____	_____
P3	_____	_____	_____

One answer I can defend: _____ My independent check: _____

One assumption I need to revisit: _____

COMPLETE AFTER MARKING

Individual diagnostic report

Record the route and conditions alongside the numbers.

Student code: _____ Date: _____ Tutor: _____

Assigned questions / exclusions (N): _____

Module	Earned / available	Percent	Band
Mathematics core	____ / ____	____ %	_____
Physics core	____ / ____	____ %	_____
Mathematics extension	____ / ____	____ %	_____
Calculus	____ / ____	____ %	_____
Physics extension	____ / ____	____ %	_____

Reasoning profile (0-3 or not observed): Visualize ___ Model ___ Execute ___ Verify ___

Keep this strength
Evidence: question / part _____

Teach this first
Target misconception / prerequisite _____

Next 2-3 sessions
Model → guided example → independent transfer: _____

Check readiness again
Fresh tasks: _____ Date: _____ Target: 12/16, with ≥6/8 on each and valid modelling + verification.

Use a student code if preferred. Do not include a student number, birth date, home address or unrelated personal information. Share labelled work through the method agreed with your teacher or tutor. Diagnostic page: www.stem1online.com/diagnostic