B4 · Extra practice

Original diploma-style practice | Items 1-2

Extra practice for this lesson. Original questions, not released diploma items. Select one option for multiple choice; other tasks state the required response.

Use $k = 8.99 \times 10^9$ N·m²/C² and $g = 9.81$ m/s² where needed (Alberta Physics 30 data sheets, Constants). For numerical responses, use the stated unit or coefficient and precision. Work in degrees.

B4-D01 · Multiple choice

A fixed-source field at P points north. Which statement is correct for a small negative test charge at P?

A. Its force points south; the source field still points north.
B. Its force points north; the source field points south.
C. Both force and field point south.
D. No force acts because the test charge is negative.

Response: _____

B4-D02 · Multiple choice

At the midpoint between equal opposite source charges, with positive on the left and negative on the right, the net field is:

A. zero because the charges sum to zero.
B. left because the negative source is on the right.
C. right because both field contributions point right.
D. up because two sources are present.

Response: _____

B4 · Extra practice

Original diploma-style practice | Items 3-4

B4-D03 · Multiple choice

Parallel equally spaced field arrows point down between large horizontal plates. Which statement is correct?

A. Upper negative; electron force down.
B. Upper positive; electron force down.
C. Upper negative; electron force up.
D. Upper positive; electron force up.

Response: _____

B4-D04 · Multiple choice

A point source’s charge is fixed. If source-to-point distance triples, what is the new field strength?

A. 3E
B. E/9
C. E/3
D. 9E

Response: _____

B4 · Extra practice

Original diploma-style practice | Items 5-6

B4-D05 · Numerical response

A +3.00 μC test charge feels 0.0600 N right. What is field strength, expressed as a × 10^4 N/C? Record a to three significant figures.

Response: _____

B4-D06 · Numerical response

A point source +2.00 μC is 0.400 m from P. Use k = 8.99 × 10^9 N·m^2/C^2. What is field strength at P, expressed as a × 10^5 N/C? Record a to three significant figures.

Response: _____

B4 · Extra practice

Original diploma-style practice | Items 7-8

B4-D07 · Numerical response

A −4.00 nC test charge is in a field of 3.00×10^{4} N/C east. What is force magnitude, expressed as a $\times 10^{-4}$ N? Record a to three significant figures.

Response: _____

B4-D08 · Numerical response

A +1.00 µC source lies 0.200 m left of P and a −1.00 µC source lies 0.200 m right of P. Use $k = 8.99 \times 10^{9}$ N·m²/C². What is net field strength, expressed as a $\times 10^{5}$ N/C? Record a to three significant figures.

Response: _____

B4 · Extra practice

Original diploma-style practice | Items 9-10

B4-D09 · Select all that apply

For the field of a point source, choose every true statement: A. A negative test charge’s force opposes E. B. The source field exists with no test charge. C. Doubling a small test charge doubles E. D. Electric field is a vector.

Response: _____

B4-D10 · Matching

Match each source or region to its field drawing. 1 = arrows straight out; 2 = arrows straight in; 3 = parallel equally spaced arrows. Cases: (a) negative point source; (b) uniform field between plates; (c) positive point source. Record a-b-c codes.

Response: _____

B4 · Extra practice

Original diploma-style practice | Items 11-12

B4-D11 · Ranking

The same source creates field E at distance r. Points A, B and C are at distances r, 2r and r/2. Rank their field strengths largest to smallest. Does the sign of the source change this ranking?

Response: _____

B4-D12 · Source-based reasoning

A field map gives 8.00×10^4 N/C at 0.100 m and 2.00×10^4 N/C at 0.200 m from one fixed source. What relationship fits these values? Would these two values alone prove the law? Explain.

Response: _____