

Permanent magnets (10 points)

Part A. Interaction of magnets (4.5 points)

A.1 (0.6 pt)

(Formula) $F =$

(Value) $F =$

A.2 (0.4 pt)

(Formula) $I =$

(Value) $I =$

A.3 (1.0 pt)

(Formula) $F =$

(Value) $F =$

A.4 (1.0 pt)

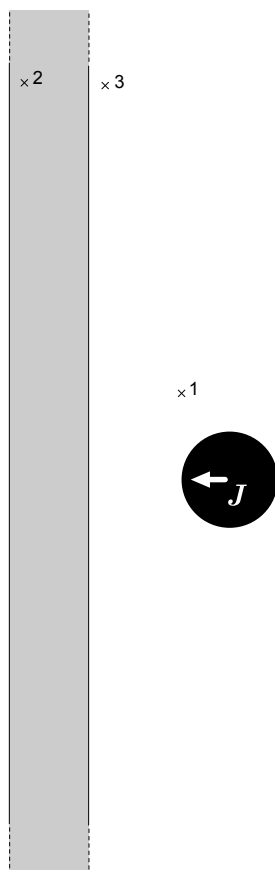
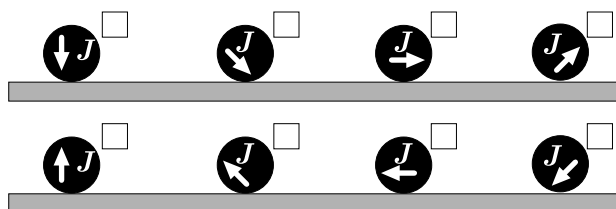
(Formula) $l =$

(Value) $l =$

A.5 (1.5 pt)

(Formula) $B =$

Part B. Interaction with ferromagnets (3.5 points)

B.1 (1.0 pt)

B.2 (1.0 pt)


(Formula) $F =$

(Value) $F =$

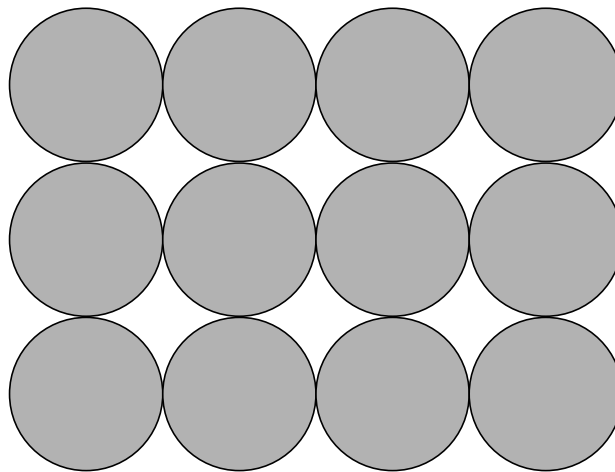
B.3 (1.5 pt)

(Formula) $F =$

(Value) $F =$

Part C. (Anti)ferromagnetic order (2 points)

C.1 (0.8 pt)

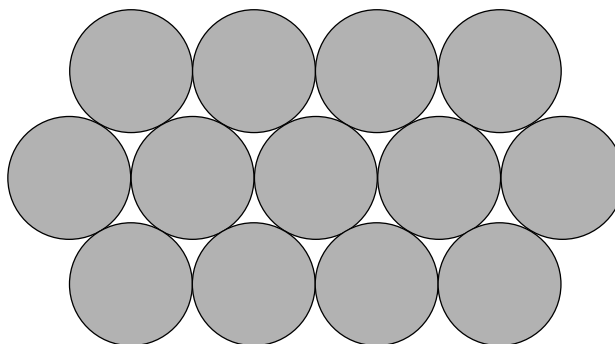


Underline the correct type of order: ferromagnetic order; antiferromagnetic order

(Formula) Energy needed =

(Value) Energy needed =

C.2 (1.2 pt)



Underline the correct type of order: ferromagnetic order; antiferromagnetic order

(Formula) Energy needed =

(Value) Energy needed =