

- 1 (a) Size / magnitude (NOT distance) and direction B1
  - (b) Vectors towards East and North with arrows correct by eye

    Complete triangle or rectangle for candidate's vectors

    Resultant with correct arrow

    Resultant 94 to 96 m/s by scale OR 95 m/s by calculation \*Unit penalty applies

    Angle measured 13.5° 15.5° OR 15° by calculation \*Unit penalty applies

    B1

    [6]

 (a) No resultant/net force OR no resultant force in any direction OR no resultant force in any two perpendicular directions

B1

No resultant/net moment/turning effect/couple/torque
OR (total) clockwise moment = (total) anticlockwise moment

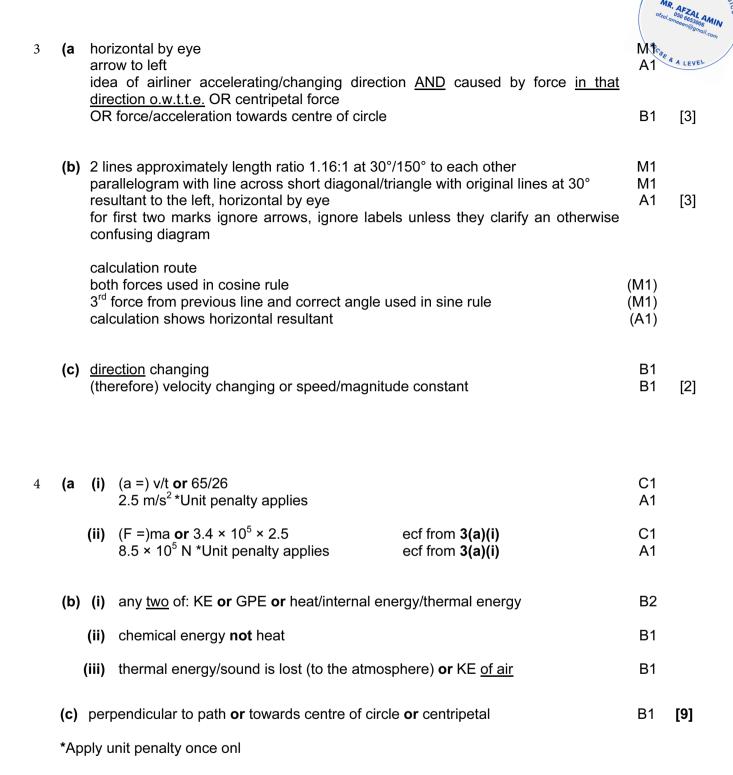
B1

Either order

- (b) (i)  $F \times 120 / F \times 0.12$  C1 =  $20 \times 500$  OR  $20 \times 0.5$  C1 F = 83.3N at least 2 significant figures. Allow  $83^{1}/_{3}$ \*Unit penalty applies
  - (ii) F/A or in words OR 83.3/0.0036 ecf from (b)(i) C1 = 23100 Pa / N/m² OR 2.31 N/cm² OR 23.1 kPa \*Unit penalty applies A1 [7]

<sup>\*</sup>Apply unit penalty once only

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perpendicular distance (of force) from the point. **B1** В1 C1 C1 Α C1 Α1

**B1** 

[9]

(v) make bar / B longer OR move pivot / stone to the left OR increase distance between force and pivot (by moving pivot to left) OR increase mass of the bar / B

(a force AND

(ii) 0.5(0) m / 50 cm

= 63 Nm

(iv)  $F \times 0.2 = 63$ 

downward arrow at centre of bar

(+)  $30 \times 0.5$  0R 15 seen anywhere

(iii) 40 × 1.2 OR 48 seen anywhere

F = 63/0.2 = 315 N

5

(b)