

# entropy *[23 marks]*

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1. *[1 mark]*

**Markscheme**

C

2. *[1 mark]*

**Markscheme**

A

3. *[1 mark]*

**Markscheme**

C

4. *[1 mark]*

**Markscheme**

A

5. *[1 mark]*

**Markscheme**

B

6a.

[6 marks]

## Markscheme

(i) 1400 «K»

$$(ii) \frac{3}{2}P\Delta V = \frac{3}{2} \times 4 \times 10^5 \times 3 \times 10^{-3}$$

1800 J

(iii)  $1800 + P\Delta V = 1800 + 4 \times 10^5 \times 3 \times 10^{-3}$  **OR** use of  $\Delta Q = \frac{5}{2}P\Delta V$   
3000 J

(iv) curve starting at A ending on line CB **AND** between B and zero pressure

6b.

[4 marks]

## Markscheme

(i) 0

(ii)

### ALTERNATIVE 1

C has the same volume as B **OR** entropy is related to disorder

higher temperature/pressure means greater disorder

therefore entropy at C is greater «because entropy is related to disorder»

### ALTERNATIVE 2

to change from B to C,  $\Delta Q > 0$ so  $\Delta S > 0$  $\Delta S$  related to disorder

7a.

[3 marks]

## Markscheme

use of area under the curve;

each (1 cm × 1 cm) square has energy of 250 J or each small square has energy of 10 J;

estimate (14 to 16 × 250) = 3500 to 4000 J;

7b.

[3 marks]

## Markscheme

clear use of value on AB; (must see correct values)

use of  $PV = nRT$ ;

0.56 to 0.60 mol;

7c.

[2 marks]

## Markscheme

entropy unchanged;  
gas returned to original state;

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