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Courses » Introduction to Chemical Thermodynamics and Kinetics

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## Unit 8 - Week 6

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### Course outline

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Phase

### Assignment 6

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2019-03-13, 23:59 IST.**

1) The vapour pressure of dichloromethane at 20.0°C is 58.0 kPa **1 point** and its enthalpy of vaporization is 32.7 kJ mol<sup>-1</sup>. Estimate the temperature at which its vapour pressure is 66.0 kPa

- 23°C
- 91.25°C
- 300.25°C
- 100.25°C

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

**23°C**

2) The molar volume of a certain solid is 142.0 cm<sup>3</sup> mol<sup>-1</sup> at 1.00 atm and 427.15 K, its melting temperature. The molar volume of the liquid at this temperature and pressure is 152.6 cm<sup>3</sup> mol<sup>-1</sup>. At 1.2 MPa the melting temperature changes to 429.26 K. Calculate the entropy and enthalpy of fusion of the solid **1 point**

- 50.23 kJ K<sup>-1</sup> mol<sup>-1</sup>, 16 kJ mol<sup>-1</sup>
- 100.23 J K<sup>-1</sup> mol<sup>-1</sup>, 43 kJ mol<sup>-1</sup>
- 5.5 J K<sup>-1</sup> mol<sup>-1</sup>, 2.4 kJ mol<sup>-1</sup>
- 500.23 J K<sup>-1</sup> mol<sup>-1</sup>, 16 kJ mol<sup>-1</sup>

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

**5.5 J K<sup>-1</sup> mol<sup>-1</sup>, 2.4 kJ mol<sup>-1</sup>**

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Quiz :  
Assignment 6

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: Introduction to  
Chemical  
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Assignment 6  
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- 94.08 J mol<sup>-1</sup> , 50.5 K  
 840.08 kJ mol<sup>-1</sup> , 300.5 K

No, the answer is incorrect.

Score: 0

Accepted Answers:

31.11 kJ mol<sup>-1</sup> , 276.9 K

4) When a certain liquid freezes at -3.65°C its density changes from 0.789 g cm<sup>-3</sup> to 0.801 g cm<sup>-3</sup>. Its enthalpy of fusion is 8.68 kJ mol<sup>-1</sup>. Estimate the freezing point of benzene at 100 MPa 1 point

(given molar mass of benzene=46.07g/mol)

- 272 K  
 500.8 K  
 100 K  
 150.8 K

No, the answer is incorrect.

Score: 0

Accepted Answers:

272 K

5) Which of the following statements is correct for first/second-order phase transitions? 1 point

- For a first order transition, the chemical potential is a continuous function of temperature  
 For a first order transition, the first derivatives of chemical potential are continuous  
 For a second order transition, the first derivative of chemical potential is a discontinuous function of temperature  
 For a second order transition, the first derivatives of chemical potential are a continuous function of temperature

No, the answer is incorrect.

Score: 0

Accepted Answers:

For a first order transition, the chemical potential is a continuous function of temperature

6) What fraction of the enthalpy of vaporization of ethanol (1 mol) is spent on expanding the water vapour (assuming ideal behavior)? 1 point

(given  $\Delta H_{\text{vap}} = 43.5 \text{ kJ mol}^{-1}$ )

- 0.067  
 0.16  
 0.36  
 0.026

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.067

7) The specific volume of monoclinic sulphur which is stable above the transition temperature is greater than that of rhombic sulphur by  $0.056 \text{ cm}^3 \text{ g}^{-1}$ . The transition point at one atm pressure is 350 K and it increases at the rate of  $0.035 \text{ K atm}^{-1}$ . Calculate the molar enthalpy of transition 1 point

(given molar mass of Sulphur = 32 g/mol)

- 1815.65 J mol<sup>-1</sup>
- 30.3 J mol<sup>-1</sup>
- 430.3 J mol<sup>-1</sup>
- 1000.3 J mol<sup>-1</sup>

No, the answer is incorrect.

Score: 0

Accepted Answers:

1815.65 J mol<sup>-1</sup>

8) Calculate the melting point of ice under a pressure of 100 bar. 1 point  
Assume that the density of ice under these conditions is approximately  $0.92 \text{ g cm}^{-3}$  and that of liquid water is  $1.00 \text{ g cm}^{-3}$

(given enthalpy of fusion =  $6 \text{ kJ mol}^{-1}$  and molar mass of water = 18 g/mol)

- 572.80 K
- 872.80 K
- 200 K
- 272.44 K

No, the answer is incorrect.

Score: 0

Accepted Answers:

272.44 K

9) Naphthalene,  $\text{C}_{10}\text{H}_8$ , melts at  $80.2^\circ\text{C}$ . If the vapour pressure of the liquid is 1.3 kPa at  $85.8^\circ\text{C}$  and 5.3 kPa at  $119.3^\circ\text{C}$ , use the Clausius–Clapeyron equation to calculate the normal boiling point 1 point

- $115^\circ\text{C}$
- $100^\circ\text{C}$
- $415^\circ\text{C}$
- $215^\circ\text{C}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$215^\circ\text{C}$

10) The temperature dependence of the vapour pressure of solid X can be approximately represented by the relation  $\log(p/\text{Torr}) = 10 - 1871/(T/\text{K})$  and that of liquid X by  $\log(p/\text{Torr}) = 8 - 1425/(T/\text{K})$ . Estimate the temperature and pressure of the triple point of X 1 point

- 296 K, 11.1 Torr
- 223 K, 40.71 Torr
- 896 K, 111 Torr

● 596 K, 111 Torr

No, the answer is incorrect.

Score: 0

Accepted Answers:

223 K, 40.71 Torr

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