

Quadrant IV – Assessment (Module –wise)

Programme: Bachelor of Science (Second Year)

Subject: Chemistry

Paper Code: CHC103

Paper Title: Physical Chemistry and Organic Chemistry

Unit: 01 (Solutions)

Module Name: Thermodynamics of Ideal Solutions part 1

Module No: 01

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MCQ

1. A Solution formed on mixing of two liquids is ideal if
- | | |
|---|--|
| (a) $\Delta V_{\text{mix}} = 0, \Delta H_{\text{mix}} \neq 0$ | (c) $\Delta V_{\text{mix}} = 0, \Delta H_{\text{mix}} = 0$ |
| (b) $\Delta V_{\text{mix}} \neq 0, \Delta H_{\text{mix}} = 0$ | (d) $\Delta V_{\text{mix}} \neq 0, \Delta H_{\text{mix}} \neq 0$ |

Completion type (fill-in-the-blanks)

1. If ΔV_{mix} and ΔH_{mix} values on mixing two liquids are zero, the solution is _____
2. Free energy change on mixing n_1 moles of a component with activity a_1 , with x_2 moles of another component with activity a_2 is given by:
 $G_{\text{mix}} =$ _____

Short Answer – II (extended – say 50 to 100 words)

1. Derive an expression for Gibbs free energy change on mixing (ΔG_{mix}) for an ideal solution.
2. Show that for an Ideal solution, the volume of mixing (ΔV_{mix}) is zero.

Numerical/Problems to Solve

1. One mole of component A and two moles of component B are mixed at 27°C to form an ideal binary solution. Calculate ΔV_{mix} , ΔH_{mix} , ΔG_{mix} , and ΔS_{mix} . Assume that $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$.