

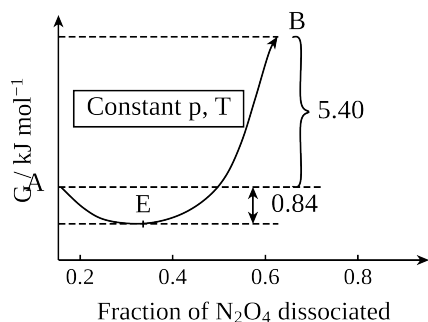
JEE MAIN EQUILIBRIUM — K, ΔG° AND SPONTANEITY — PYQS

Max. Marks: 16

Questions: 4

Section A (MCQ) — 1 question

Q.1 For the reaction, $\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2$, graph is plotted as shown below. Identify correct statements.



- Standard free energy change for the reaction is $-5.40 \text{ kJ mol}^{-1}$.
- As $\Delta G^\ominus$ in graph is positive, N_2O_4 will not dissociate into NO_2 at all.
- Reverse reaction will go to completion.
- When 1 mole of N_2O_4 changes into equilibrium mixture, value of $\Delta G^\ominus = -0.84 \text{ kJ mol}^{-1}$.
- When 2 moles of NO_2 change into equilibrium mixture, $\Delta G^\ominus$ for equilibrium mixture is $-6.24 \text{ kJ mol}^{-1}$.

Choose the correct answer from the options given below :

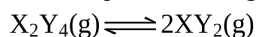
[JEE Main 2026 (Online) 21st January Morning Shift]

- | | |
|------------------|------------------|
| (1) C and E only | (2) D and E only |
| (3) A and D only | (4) B and C only |

Scan or tap for the full solution 

Section B (Numerical) — 3 questions

Q.2 In a closed flask at 600 K, one mole of $\text{X}_2\text{Y}_4(\text{g})$ attains equilibrium as given below :



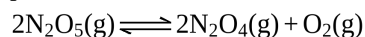
At equilibrium, 75% $\text{X}_2\text{Y}_4(\text{g})$ was dissociated and the total pressure is 1 atm. The magnitude of $\Delta_r G^\ominus$ (in kJ mol^{-1}) at this temperature is _____. (Nearest Integer)

(Given : $R = 8.3 \text{ J mol}^{-1} \text{ K}^{-1}$; $\ln 10 = 2.3$, $\log 2 = 0.3$, $\log 3 = 0.48$, $\log 5 = 0.69$, $\log 7 = 0.84$)

[JEE Main 2026 (Online) 6th April Evening Shift]

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Q.3 For the following reaction at 50°C and at 2 atm pressure,



N_2O_5 is 50% dissociated.

The magnitude of standard free energy change at this temperature is x.

$x = \text{_____ J mol}^{-1}$ [Nearest integer].

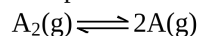
Given : $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$, $\log 2 = 0.30$, $\log 3 = 0.48$, $\ln 10 = 2.303$, $^\circ\text{C} + 273 = \text{K}$

[JEE Main 2026 (Online) 4th April Evening Shift]

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Q.4 Dissociation of a gas A_2 takes place according to the following chemical reaction. At equilibrium, the total pressure is 1 bar at 300 K.



The standard Gibbs energy of formation of the involved substances has been provided below:

Substance	$\Delta G_f^\ominus / \text{kJ mol}^{-1}$
A_2	-100.00
A	-50.832

The degree of dissociation of $\text{A}_2(\text{g})$ is given by $(x \times 10^{-2})^{1/2}$ where $x = \text{_____}$. (Nearest integer).

[Given : $R = 8 \text{ J mol}^{-1} \text{ K}^{-1}$, $\log 2 = 0.3010$, $\log 3 = 0.48$]

Assume degree of dissociation is not negligible.

[JEE Main 2026 (Online) 22nd January Morning Shift]

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ANSWER KEY

Section A (MCQ) — 1 question

Ques.	1								
Ans.	2								

Section B (Numerical) — 3 questions

Ques.	2	3	4				
Ans.	8	2474	33				