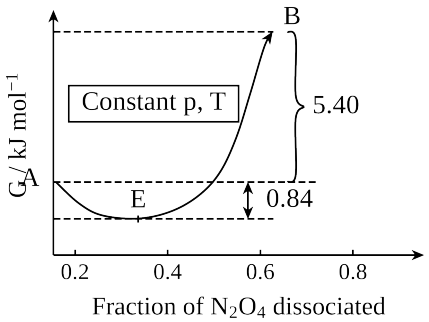
PYQSide PYQSide.com — free PYQs with solutions Powered by PrepBlink

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

Max. Marks: 16 **Questions:** 4

Section A (MCQ) — 1 question

Q.1 For the reaction, $N_2O_4 \rightleftharpoons 2NO_2$, graph is plotted as shown below. Identify correct statements.



A. Standard free energy change for the reaction is -5.40 kJ mol^{-1}.
B. As $\Delta G^{\ominus}$ in graph is positive, N_2O_4 will not dissociate into NO_2 at all.
C. Reverse reaction will go to completion.
D. When 1 mole of N_2O_4 changes into equilibrium mixture, value of $\Delta G^{\ominus} = -0.84$ kJ mol^{-1}.
E. When 2 moles of NO_2 change into equilibrium mixture, $\Delta G^{\ominus}$ for equilibrium mixture is -6.24 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 $X_2Y_4(g)$ attains equilibrium as given below :

$X_2Y_4(g) \rightleftharpoons 2XY_2(g)$

At equilibrium, 75% $X_2Y_4(g)$ was dissociated and the total pressure is 1 atm. The magnitude of $\Delta_rG^{\ominus}$ (in kJ mol^{-1}) at this temperature is _____. (Nearest Integer)

(Given : R = 8.3 J mol^{-1} 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]

Scan or tap for the full solution

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

$2N_2O_5(g) \rightleftharpoons 2N_2O_4(g) + O_2(g)$

N_2O_5 is 50% dissociated.

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

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

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

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

Scan or tap for the full solution

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.

$A_2(g) \rightleftharpoons 2A(g)$

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

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

The degree of dissociation of $A_2(g)$ is given by $(x \times 10^{-2})^{1/2}$ where x = _____. (Nearest integer).

[**Given :** R = 8 J mol^{-1} 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]

Scan or tap for the full solution

ANSWER KEY

Section A (MCQ) — 1 question

Ques.	1										
Ans.	2										

Section B (Numerical) — 3 questions

Ques.	2	3	4				
Ans.	8	2474	33				