YAKEEN NEET 2.0

2026

Chemical Equilibrium

Physical Chemistry | Lecture -07

By- Amit Mahajan Sir

Topics to be covered

1. MEDICS TEST, Revision of Last Class
2. Lechartilier Principle
3. Home work Modules

Rules to Attend Class

1. Always sit in a peaceful environment with headphone and be ready with your copy and pen.
2. Never ever attend a class from in between or don't join a live class in the middle of the chapter.
3. Make sure to revise the last class before attending the next class & always complete your Magarmach Practice Questions.
4. Never ever engage in chat whether live or recorded on the topic which is not being discussed in current class as by doing so u can be blocked by the admin team or your subscription can be cancelled.

Rules to Attend Class

5. Try to make maximum notes during the class if something is left then u can use the notes pdf after the class to complete the remaining class.
6. Always ask your doubts in doubt section to get answer from faculty. Before asking any doubt please check whether same doubt has been asked by someone or not.


There is one big flaw in your Preparation that's name is Backlog ? What do we say to Backlog ?
NOT TODAY !!!

MEDICS

Mastery
Checks your grasp over NEET-level concepts

Evaluation
Judging both knowledge and test-smartness

Decision Making
Testing your speed + accuracy under pressure

Intuition
Some answers need gut + logic – can you spot the trick?

Concepts
It's all about strong basics – no shortcuts here

Strategy
The MEDICS test – built for those who heal, hustle, and hope.

Q| A → dec. in free energy causes spontaneous rⁿ. ✓

R → Spontaneous rⁿ are invariably exothermic. ✗

(A) Both A & R are true & R is correct explanation of A

(B) ~~Both A & R are true & R is correct explanation of A~~ Not

(C) A true, R incorrect

(D) A incorrect, R Correct

$\Delta G = (-)ve$

Q2

A → many endothermic rⁿs are non-spon. at room temp. & spon. at high temp.

R → S inc. with inc. in Temp.

$$\Delta G = \Delta H - T\Delta S$$

$$= +300 - 100 \times 20$$

$$S \propto T \quad \downarrow \Delta S = \frac{q}{T}$$

Q3 ✓A → exothermic rxn non-spon High Temp. & may b' com spon. at low temp.

✓R → as T ↓ S ↓.

$$\Delta G = \Delta H - T\Delta S$$

$$= -300 - 100 \times -20 = (+)ve$$

$$= -300 - 10 \times -20 = (-)ve$$

Q4 A → n^n which is spon & accompanied by dec. of entropy
↓ ΔS = (-)ve.
must be exothermic.

X R → All exothermic n^n are dec. by randomness

ΔG = (-)ve = ΔH − $T\Delta S$

(-)ve = ΔH + $T\Delta S$

Q5 A → ΔH = (+)ve → are favoured at low temp ✗ $\Delta G = +300 - 10X + 20$

& ΔH = (−)ve → ~~~~~ high temp.

R → when system in eq., disturbed by changing temp. it will tend to adjust itself so as to overcome the effect of Change.

Revision of Last Class

D.O.A. :- $nA(g) \rightleftharpoons 1An(g)$

$$\alpha = \frac{M_t - M_0}{M_0\left(\frac{1}{n} - 1\right)} = \frac{D - d}{d\left(\frac{1}{n} - 1\right)}$$

$$\Delta G^\circ = -RT \ln K$$

Le–Chartilier Principle

eg. shift → forward ↑ → [R] ↓ [P] ↑

→ backward ↑ → [R] ↑ [P] ↓

Effect of Pressure or Volume.

#MIT

P ↑ or V ↓ ⇒ eq. shift towards lesser no. of gaseous moles.

or

P ↓ or V ↑ ⇒ greater

$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

	1	0	0
	$1-x$	x	x
	$\frac{1-x}{V}$	$\frac{x}{V}$	$\frac{x}{V}$

P ↑ V ↓

P ↑ eq. shift towards backward n°.

$$K_c = \frac{\left(\frac{x}{V}\right)^2 \times V}{\left(\frac{1-x}{V}\right)} = \frac{x^2}{V(1-x)} = \frac{100}{20} = 5$$

$$K_c = \frac{x^2}{(V-\Delta V)(1-x')} = \frac{50}{10} = 5$$

$1N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

$P\uparrow T\cdot \Rightarrow$ eq. shift forward n^{η}.

$1H_2(g) + 1I_2(g) \rightleftharpoons 2HI(g)$

$P\uparrow T\cdot$ or $P\downarrow$ no effect of Pressure.

Effect of Addition of Inert Gases

(18th grp. or any gas which do not react with or mix.)

at Constt. Volume

↓

No effect on eq.

at Constt. Pressure

$V \uparrow$ ∴ eq. shift greater no. of gaseous moles

$2A(g) + 3B(g) \rightleftharpoons 7D(g)$

Inert gas add → Constt. Vol. → No effect

→ Constt. Pressure → eq. shift forward or.

Effect of Catalyst

- By using positive catalyst equilibrium will be achieved quickly i.e., No effect on equilibrium (+ve) catalyst will increase rate of forward reaction and backward reaction equally.

ΔH = (−)ve

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

f = forward rxn

b = backward rxn

$[N_2]\uparrow \rightarrow f$

$[N_2]\downarrow \rightarrow B$

$[NH_3]\uparrow \rightarrow B$

$[NH_3]\downarrow \rightarrow f$

$T\uparrow \rightarrow B$

$T\downarrow \rightarrow f$

$P\uparrow \rightarrow f$

$P\downarrow \rightarrow B$

$V\uparrow \rightarrow B$

$V\downarrow \rightarrow f$

Catalyst → No effect

Inert gas added → Constt. Vol. → No effect

→ Constt. Pressure → B

$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ $\Delta H = +ve$

$[PCl_5]$ $T \rightarrow f$

$[PCl_5]$ $\downarrow \rightarrow B$

$[PCl_3]$ $T \rightarrow B$

$[Cl_2]$ $\downarrow \rightarrow f$

T $T \rightarrow f$

$T\downarrow \rightarrow B$

$PT \rightarrow B$

$P\downarrow \rightarrow f$

$VT \rightarrow f$

$V\downarrow \rightarrow B$

Catalyst → No effect

Constt. V → No effect

energy →) / P

↓

f

$H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ $\Delta H = (-)ve$

$[I_2]\uparrow \rightarrow f$

$[I_2]\downarrow \rightarrow B$

$[HI]\uparrow \rightarrow B$

$[HI]\downarrow \rightarrow f$

$T\uparrow \rightarrow B$

$T\downarrow \rightarrow f$

$P\uparrow \rightarrow$ No effect

$P\downarrow \rightarrow$ "

$V\uparrow \rightarrow$ No effect

$V\downarrow \rightarrow$ No effect

Catalyst $\rightarrow$ No effect

Inert gas $\rightarrow$ Const. $V \rightarrow$ No effect

" $P \rightarrow$ No effect

QUESTION – (AIIMS 2004)

Of the following which change will shift the reaction towards the product?

$$I_2(s) \rightleftharpoons 2I(g),\ \Delta H_r^\circ\ (298\ K) = +\ 150\ kJ$$

(A) Increase in concentration of I_2

(B) Decrease in concentration of I_2

(C) Increase in temperature

(D) Increase in total pressure

QUESTION – (NCERT Exemplar)

On increasing the pressure, in which direction will the gas phase reaction proceed to re-establish equilibrium, is predicted by applying the Le Chatelier's principle. Consider the reaction.

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

Which of the following is correct, if the total pressure at which the equilibrium is established, is increased without changing the temperature?

P T

(A) K will remain same

(B) K will decrease

(C) K will increase

(D) K will increase initially and decrease when pressure is very high

QUESTION

In the manufacture of NH_3 by Haber's process, the condition which would given maximum yield is:

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) + Q\ Kcal; \quad \Delta H = (-)ve$$

Eq. shift forward sn.

A. High temperature, high pressure and high concentrations of the reactants

B. High temperature, low pressure and low concentrations of the reactants

C. Low temperature and high pressure

D. Low temperature, low pressure and low concentration of H_2

QUESTION – (NCERT Exemplar)

In which of the following reactions, the equilibrium remains unaffected on addition of small amount of argon at constant volume?

(A) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

(B) $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

(C) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

(D) The equilibrium will remain unaffected in all the three cases.

QUESTION

One of the following equilibria is not affected by change in volume of the flask

(A) $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

(B) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

(C) $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$

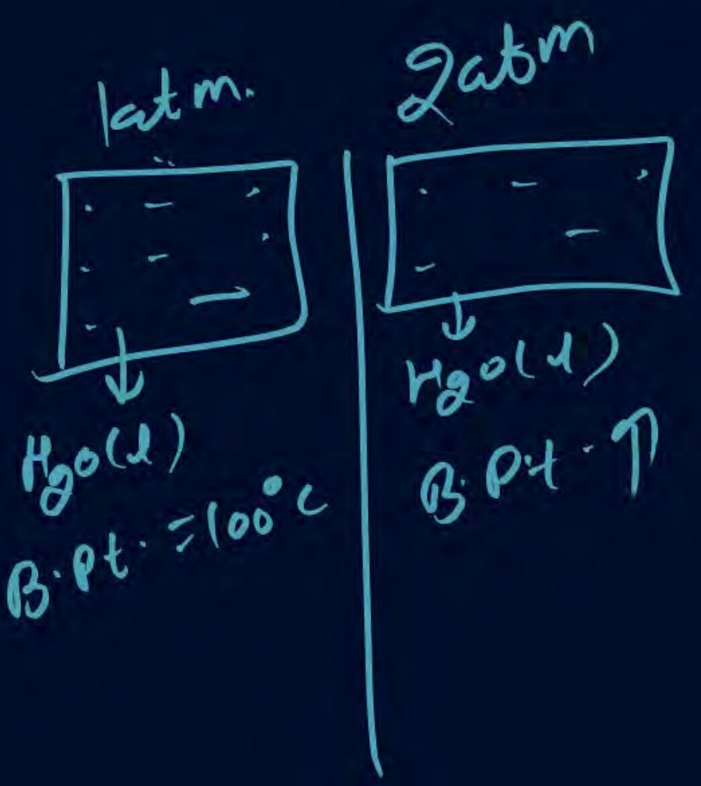
(D) $SO_2Cl_2(g) \rightleftharpoons SO_2(g) + Cl_2(g)$

Effect of Le-Chartilier's Principle on Physical Equilibrium and Allotropic Transformation

Effect of Pressure on Boiling Point

#MIT

Ext. P ↑ B.Pt. ↑



Effect of Pressure on Melting point

#MIT

2 Cases arise :

(a) Vol. inc. on melting or density dec. on allotropic transformation.

Ex : Fe(s), Al(s),

$$Fe(s) \underset{T\downarrow}{\overset{T\uparrow}{\rightleftharpoons}} Fe(l)$$

V_{less} $\quad$ V_{high}

$P\uparrow \therefore M.Pt.\uparrow$

$P\downarrow \therefore M.Pt\downarrow$

$$\frac{dP}{dT} = \frac{\Delta H}{T\Delta V}$$

$\Delta H = (+)ve$

$\Delta V = (+)ve$

$\frac{dP}{dT} = (+)ve \Rightarrow P\uparrow \; T\uparrow$

#MI

⑥ Vol. dec on melting or density inc. on allotropic transformation

↓

for ex:- Ice, quartz, diamond.

$H_2O(s) \underset{T\downarrow}{\overset{T\uparrow}{\rightleftharpoons}} H_2O(l)$

V_{high} V_{low}

$P\uparrow \therefore M.Pt \downarrow$

$P\downarrow \therefore M.Pt \uparrow$

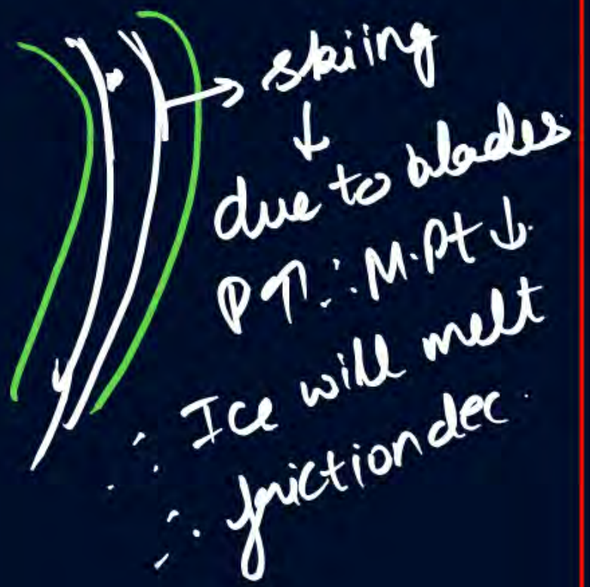
$\frac{dP}{dT} = \frac{\Delta H}{T\Delta V}$

$\Delta H = (+)ve$

$\Delta V = (-)v$

$\frac{dP}{dT} = (-)ve$

$P\uparrow T\downarrow$



QUESTION

When the pressure is applied over system, Ice ⇌ water, what will happen?

(A) More water will form

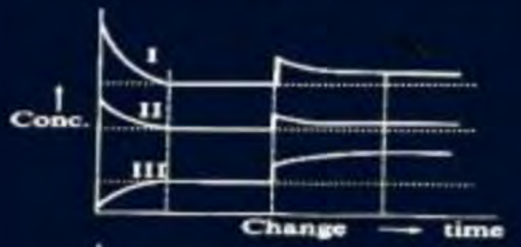
(B) More ice will form

(C) There will be no effect over equilibrium

(D) Water will decompose in H_2 and O_2

QUESTION

For an endothermic reaction: $4A(g) + B_2(g) \rightleftharpoons 2A_2B(g)$

Column I		Column-II
A		(p) Increase in temperature
B		(q) Increase in pressure
C		(r) Addition of A_2B at equilibrium
D		(s) addition of inert gas at constant pressure

Home work from modules

all questions of Prarambh & Prabal

PHYSICS WALLAH

Yakeen Leads, You Achieve

Use Coupon Code

YN10

MRP: ~~₹4499/-~~

and get in **₹4049/-** only

Available on PW STORE

THANK YOU