DREAMLAND SCHOOL
CLASS XII
ENGLISH LANGUAGE
HOME ASSIGNMENT 3
ACADEMIC YEAR- 2020-21
Dt-23rd April 2020

I. Transformation of Sentences

In each of the following items, sentence A is complete, but sentence B is not. Complete sentence B, making it as similar in meaning to sentence A.

1. (A) The job was completed, and so he asked to be remunerated.

(B) After……

2. (A) Save for Ronnie's courage, the battalion would have perished.

(B) Were……

3. (A) No sooner did Arti see the thief she went into action.

(B) Hardly……

4. (A) Undeterred by ob-4acles, he persevered in his efforts.

(B) Without……

5. (A) Though the man was suffering from cancer, he bore it with a smile.

(B) In spite……

6. (A) The show was spectacular and earned laudable commendations.

(B) The show, which……..

7. (A) All was stunned beyond belief that a healthy man had died.

(B) All were so…….

8. (A) He symapthised with me over my sad loss, and this was some comfort.

(B) His……

9. (A) The Captain said "It gives me great pleasure to be here this evening."

(B) The Captain said that……

10. (A) To escape punishment you must confess your fault.

(B) Either…….

II. Write a review of a popular biopic which you have seen recently. While writing the review please refer to the following point-

Title, sub-title, direction, production, cast, genre, plot and sub-plot

COMPUTER SCIENCE

CLASS – 12

Boolean Algebra

Continuation…..

Canonical Form – In Boolean algebra, Boolean function can be expressed as Canonical Disjunctive Normal Form known as minterm and some are expressed as Canonical Conjunctive Normal Form known as maxterm .

Sum of Product (Minterm):

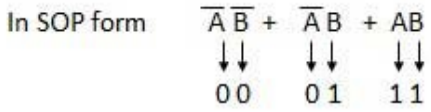
The Sum of Product means that the products of the variables that are separated by a plus sign. The variables can be complemented or uncomplemented,

For example,

AB + AB’ +A’ B +A’B’ + ABC’ + AB’C + AB’C

In SOP form, 0 represents a bar and 1 represents an unbar. SOP form is represented by Σ.

Given below is an example of SOP



Product of sum (Maxterm):

The Product of Sum means that the sum of variables that are separated by a multiplication sign.

For example,

(A +B’+C)(A +B’ + C’) (A’ +B’ + C)

In POS form, 0 represents an unbar and 1 represents a bar. POS form is represented by Π.

Given below is an example of POS.

Variable			Minterm		Maxterm	
x	y	z	Term	Designation	Term	Designation
0	0	0	x'y'z'	m_0	x+y+z	M_0
0	0	1	x'y'z	m_1	x+y+z'	M_1
0	1	0	x'yz'	m_2	x+y'+z	M_2
0	1	1	x'yz	m_3	x+y'+z'	M_3
1	0	0	xy'z'	m_4	x'+y+z	M_4
1	0	1	xy'z	m_5	x'+y+z'	M_5
1	1	0	xyz'	m_6	x'+y'+z	M_6
1	1	1	xyz	m_7	x'+y'+z'	M_7

In POS form $(B + C)(A + \overline{B})(\overline{B} + C)$

0 1 1 1 1 0

Truth Table (Three variables)

ASSIGNMENT III (PART- 3)

I. Find the sum-of-products and product of sums equations from the given truth Table

A	B	C	OUTPUT
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

II. Define maxterm and minterm.

III. Find the maxterm and minterm when
P = 0, Q = 1, R = 1 and S = 0

IV. Express F = A + ABC in minterms or SOP form.

Economics for class 12

Ch-3 demand and laws of demand:

Answer the following question after listening to the following explanation:

Q1: What is a law of demand?

Q2: What is a demand schedule?

Q3: What is an individual demand schedule?

Q4: What is a market demand schedule?

Q5: What is a demand curve?

Class 12 Pol.Sci (Class:thursday)

Chapter :3 (Parliamentary & Presidential form of government)

In Presedential form of government there is seperation of powers between the legislature & the executive and the latter is not responsible to the former.In this form of government the Head of the State is also Head of the Government.The features of this governance are as follows:

-Fixed tenure of legislature & executive.

-Single unified execitive.

-Responsibility of the ministers to the President.

-There is separation of powers between legislature & executive.

-Political homogenity of the Cabinet is not required.

-The Cabinet acts as the advisory body to the President.

This form of government has its own merits like it is a stable form of governance,having a strong executive,there is continuity in government executive policies & execitive is free from agressive party politics.It is to be noted that this government has also its demerits.As for example: Executive is irresponsible & can be easily changed.President can use his power in despotic way.

Questions:

a) Define-Presidential form of government.

b) What do you understand by Cabinet acting as an advisory body?

c) Discuss any three features of Presidential form of government.

Class 12 History(Decolonisation in Asia & Africa)

CHINA:(class-thursday)

China kept itself aloof from the rest of the world till the early part of the 19th century.However in the mid of the 19th century China saw the coming of the Europeans for trade activities.The Opium War forced China to handover Hongkong to Britain .1850-64 had been the Taiping Rebellion & the Boxer rising happen at about 1898-1900.The Boxer uprising had been a genuine attempt to save the integrity of China.In 1911 the supporters of Sun-Yat-Sen revolted against the Manchus & by 1912 the Manchus had left the throne & China became a republic.After Sun-Yat-Sen Yuan-Shi-Kai became the president but he acted as a military dictator.Finally with the passage of time the destiny of China came in the hands of the Kuomintang Party.Sun-Yat-Sen wanted to reorganise the party with Russian help & his main motto had been democracy, nationalism & people livelihood.After his death Chiang -Kai-Shek became the leader but he was not communist,although he was having a close relationship with Russia.By 1927 the Communist became popular inside the KMT Party & slowly it formed a parallel government at Hankow.Chiang now decided to get rid of the Communists.

Questions:

a) Name the founder of the Kuomintang Party.

b) Who is Chiang Kai Shek?

c) Discuss the role of Yuan Shi Kai.

Class XII

মুকুট

রবীন্দ্রনাথ ঠাকুর

(নাটক)

প্র। 'আমাদের জন্যে তিনি যে ইহার্ঘ্য আছেন'—

ক) বক্তা কে?

খ) নির্দিষ্ট ব্যক্তিটি কেন আসেন নি—তা নিয়ে সকলের মধ্যে যে আক্ষেপের সৃষ্টি হয়েছিল তার পরিচয় দাও।

গ) আগে কি ওই ব্যক্তির সম্বন্ধে আক্ষেপ শোনা গিয়েছিল?

ঘ) কি ভাবে আক্ষেপ মিটেছিল?

উত্তর

ক) রবীন্দ্রনাথ ঠাকুরের লেখা 'মুকুট' নাটকে বক্তা যুবরাজের সেনাদলের তৃতীয় সৈনিক।

খ) যুবরাজের কোনো খবর পাওয়া যাচ্ছে না। কেবল একটি ঘোড়া এসে আমাদের জন্য তিনি আহত হয়ে পড়েছেন। তার অনুচর তার হাতে নিয়ে যুবরাজের সঙ্গে পালিয়েছিল, কিন্তু তার অনুচর সেই সময় মারা গেছে। তাহলে যুবরাজ হয়তো ঠিক সেই খোঁজ পাওয়া যায় তা ঠিক বলতে পারছে না। যুবরাজের এই নির্দেশের অভাব না পেয়ে সৈন্যরাও নিরাশ, তারা তাদের ঘিরে যুবরাজের জন্য কিংকর্তব্যবিমূঢ়, যে কারণে ভোর পর্যন্ত এই প্রশ্নটাই তাই উঠছে।

গ) যুবরাজের নির্দেশ ছাড়াও সৈন্যরা কিংকর্তব্যবিমূঢ়। তারা বলে যুবরাজ তার ঘোড়া থেকে পড়েছেন। তাদের উপর ইন্দ্রকুমার বলে যদি তার খোঁজ না পাওয়া যায় তবে যুবরাজকে সৈন্যদের জন্য যা যা করতে পারে তবে যুবরাজকে তাড়াতাড়ি খুঁজে পাওয়া যাবে। কিন্তু যেকোনো হাতের জন্য কোনো ক্রটি রাখবেন না। তিনি যদি জানতে পারেন, আর তা কোনো খবর নেই। তিনি যুবরাজকে উদ্ধার করবেন। যুবরাজের অনুগত তারা নিশ্চই যুবরাজকে উদ্ধার করবেন। যুবরাজের অনুপস্থিতিতে সৈন্যদের মনোবল ভেঙে পড়ে। তারা যুবরাজের অনুপস্থিতিতে সৈন্যদের প্রাণ দিতেও প্রস্তুত। কারণ যুবরাজের প্রতি তাদের গভীর শ্রদ্ধা রয়েছে।

ঘ) আর একটু কর্ণফুলির তীরে এক ক্যাসেলের একটি মাঠের ওপারে যুবরাজকে পাওয়া গেল, তার ঘোড়ার দুটি পা হয়ে গেছে। কর্ণফুলির স্রোতের কুলকুলু শব্দ শুনে হাতেও ভোর হলো খেতেও পারছিলেন না। সেই সময় সেখানে ইন্দ্রকুমার উপস্থিত হয়ে যুবরাজকে তাই স্নান করে সেখানে উপস্থিত হয়ে যুবরাজকে ঘোড়ায় করে নিয়ে আসেন।

H.W. সোনার কেল্লা : আত্ম ও প্রতিবাদ (রচনা)

Accountancy Class XII

Valuation of Goodwill - Revision

Illustration 1.

X and Y are partners sharing profits in the ratio of 3 : 2. They agree to admit Z into partnership for 1/5th share. Goodwill of the firm for this purpose is to be valued at three years' purchase of the weighted average profit of the past 4 years.

1. The appropriate weights to be used and profits are:

Year	Weight	Profit (₹)
2014–15	1	15,30,000
2015–16	2	20,30,000
2016–17	3	25,30,000
2017–18	4	30,30,000

2. In 2015–16, a machine having a book value of ₹ 10,000 was sold for ₹ 11,000 but the proceeds were wrongly credited to Profit and Loss Account (No effect has been given to rectify the same). Depreciation is charged on machine @ 10% on Diminishing Balance Method.
3. Interest on non-trade investments is ₹ 10,000 in each year.
4. Closing Inventories were undervalued by ₹ 10,000 in 2015–16, by ₹ 9,100 in 2016–17, by ₹ 8,290 in 2017–18.
5. On 1st October, 2016, a major repair was carried out on plant incurring ₹ 80,000 which amount was charged to revenue. The said sum is agreed to be capitalised for computation of goodwill subject to depreciation @ 10% p.a. on Diminishing Balance Method.
6. It is also agreed that ₹ 20,000 be charged on annual basis as management expenses which have not been charged earlier.

Calculate the value of goodwill.

Solution: CALCULATION OF ADJUSTED PROFITS

Particulars	2014–15	2015–16	2016–17	2017–18
Given Profit	15,30,000	20,30,000	25,30,000	30,30,000
Less: Interest on Non-Trade Investments	10,000	10,000	10,000	10,000
	15,20,000	20,20,000	25,20,000	30,20,000
Less: Sale proceeds of machinery wrongly credited	...	11,000	...	...
	15,20,000	20,09,000	25,20,000	30,20,000
Add: Depreciation on above machinery (Note 1)	...	1,000	900	810
	15,20,000	20,10,000	25,20,900	30,20,810
Add: Under valuation of closing inventories (Note 3)	...	10,000	9,100	8,290
	15,20,000	20,20,000	25,30,000	30,29,100
Less: Under valuation of Opening Inventories (Note 3)	...	...	10,000	9,100
	15,20,000	20,20,000	25,20,000	30,20,000
Add: Repair Expenses debited to Profit and Loss A/c	...	...	80,000	...
	15,20,000	20,20,000	26,00,000	30,20,000
Less: Depreciation (Note 2)	...	...	4,000	7,600
	15,20,000	20,20,000	25,96,000	30,12,400
Less: Management Expenses	20,000	20,000	20,000	20,000
Adjusted Profit	15,00,000	20,00,000	25,76,000	29,92,400

CALCULATION OF WEIGHTED AVERAGE PROFIT

Year	Profits (₹)	Weights	Product (₹)
2014–15	15,00,000	1	15,00,000
2015–16	20,00,000	2	40,00,000
2016–17	25,76,000	3	77,28,000
2017–18	29,92,400	4	1,19,69,600
Total		10	2,51,97,600

$$\text{Weighted Average Profit} = \frac{₹\ 2,51,97,60}{10} = ₹\ 25,19,760$$

Goodwill = Weighted Average Profit × No. of Years' Purchase

= ₹ 25,19,760 × 3 = ₹ 75,59,280.

Notes:

1. Due to wrong entry passed initially, the Machinery Account was overvalued by ₹ 10,000. Depreciation for the said amount of ₹ 10,000 was wrongly charged during the period 2015–2018, which is now added back to Profit and Loss Account.
2. Depreciation for 2016–17 = ₹ 80,000 × 10/100 × 6/12 = ₹ 4,000

   Depreciation for 2017–18 = (₹ 80,000 – ₹ 4,000) × 10/100 = ₹ 7,600.

Illustration 2.

From the following information, calculate the value of goodwill of M/s. Puneet and Gaurav:

(*i*) At three years' purchase of Average Profit.
(*ii*) At three years' purchase of Super Profit.
(*iii*) On the basis of Capitalisation of Super Profit.
(*iv*) On the basis of Capitalisation of Average Profit.

Information:

(*a*) Average capital employed in the business—₹ 25,00,000.

(*b*) Trading profits:

Year	Profit/Loss	₹
2016–17	Profit	7,50,000.
2017–18	Loss	6,25,000.
2018–19	Profit	21,25,000.

(*c*) Rate of interest expected from capital having regard to the risk involved—15%.

(*d*) Remuneration to each partner for his service (to be charged against profit)—₹ 12,500 per month.

(*e*) Assets (excluding goodwill)—₹ 30,00,000; Liabilities—₹ 2,50,000.

Solution:

(*i*) *Goodwill at 3 years' Purchase of Average Profit:*

$$\text{Average Profit} = \frac{₹\ 7,50,000 - ₹\ 6,25,000 + ₹\ 21,25,000}{3} = ₹\ 7,50,000$$

Average Profit for Goodwill = ₹ 7,50,000 – Remuneration of Partners

= ₹ 7,50,000 – (₹ 12,500 × 2 × 12)

= ₹ 7,50,000 – ₹ 3,00,000 = ₹ 4,50,000

Goodwill = Average Profit × No. of Years' Purchase

= ₹ 4,50,000 × 3 = ₹ 13,50,000.

(ii) *Value of Goodwill at 3 years' Purchase of Super Profit:*

$$\text{Normal Profit} = \text{Average Capital Employed} \times \text{Normal Rate of Return}$$

$$= ₹\ 25,00,000 \times \frac{15}{100} = ₹\ 3,75,000$$

$$\text{Super Profit} = \text{Average Profit} - \text{Normal Profit}$$

$$= ₹\ 4,50,000 - ₹\ 3,75,000 = ₹\ 75,000$$

$$\text{Goodwill} = \text{Super Profit} \times \text{No. of years' Purchase}$$

$$= ₹\ 75,000 \times 3 = ₹\ 2,25,000.$$

(iii) *Goodwill under Capitalisation of Super Profit:*

$$\text{Goodwill} = \text{Super Profit} \times \frac{100}{\text{Normal Rate of Return}}$$

$$= ₹\ 75,000 \times \frac{100}{15} = ₹\ 5,00,000.$$

(iv) *Goodwill under Capitalisation of Average Profit:*

$$\text{Total Capitalised Value of the Firm} = \frac{\text{Average Profit}}{\text{Normal Rate of Return}} \times 100$$

$$= \frac{₹\ 4,50,000}{15} \times 100 = ₹\ 30,00,000$$

$$\text{Net Assets} = \text{Total Assets (excluding Goodwill)} - \text{Outsiders' Liabilities}$$

$$= ₹\ 30,00,000 - ₹\ 2,50,000 = ₹\ 27,50,000$$

$$\text{Goodwill} = \text{Total Capitalised Value of the Firm} - \text{Net Assets}$$

$$= ₹\ 30,00,000 - ₹\ 27,50,000 = ₹\ 2,50,000.$$

Master Question

Illustration 3.

Calculate Goodwill of the firm on the basis of:

(a) Three year's purchase of the Weighted Average Profit of the last four years.

(b) Three year's purchase of Average Profit.

(c) Three years' purchase of Super Profit.

(d) Capitalisation of Super Profit.

(e) Capitalisation of Average Profit.

The weights assigned and profit of each year are:

Year	31st March, 2017	31st March, 2018	31st Mach, 2019	31st March, 2020
Profit (₹)	2,02,000	2,48,000	2,00,000	2,80,000
Weight	1	2	3	4

On scrutiny of the accounts, following matters are revealed:

(i) On 1st December, 2018 major repair was carried out in respect of the Plant incurring ₹ 60,000 which enhanced the capacity of the machine and it was charged to revenue. Depreciation on Machinery is charged @ 10% p.a. on written down value method.

(ii) Closing stock as at 31st March, 2018 was overvalued by ₹ 24,000.

(iii) To cover management cost, an annual charge of ₹ 48,000 should be made for the purpose of goodwill valuation.

(iv) On 1st October, 2017, a machine having book value of ₹ 20,000 was sold for 22,000 but the proceeds were wrongly credited to Profit and Loss Account. No effect has been given to rectify the same. Depreciation is charged on machine @ 10% p.a. on written down value method.

(v) Following is the Balance Sheet as on 31st March, 2020:

Liabilities	₹	Assets	₹
Creditors	50,000	Cash	20,000
Capital	3,00,000	Debtors	80,000
		Plant and Machinery	1,60,000
		Stock	40,000
		Bills Receivable	50,000
	3,50,000		3,50,000

(vi) Normal Rate of Return in similar business is 10%.

Solution: CALCULATION OF ADJUSTED PROFIT

Particulars	31st March, 2017 (₹)	31st March, 2018 (₹)	31st March, 2019 (₹)	31st March, 2020 (₹)
Given Profits	2,02,000	2,48,000	2,00,000	2,80,000
Less: Annual Management Cost	(48,000)	(48,000)	(48,000)	(48,000)
Add: Capital Expenditure on Plant	...	...	60,000	...
	1,54,000	2,00,000	2,12,000	2,32,000
Less: Unprovided Depreciation on Plant	...	...	(2,000)	(5,800)
	1,54,000	2,00,000	2,10,000	2,26,200
Less: Overvaluation of Closing Stock	...	(24,000)	...	...
Add: Overvaluation of Opening Stock	...	...	24,000	...
	1,54,000	1,76,000	2,34,000	2,26,200
Less: Proceeds from Sale of Plant wrongly credited	...	(22,000)	...	...
	1,54,000	1,54,000	2,34,000	2,26,200
Add: Depreciation Wrongly Credited to Profit and Loss	...	1,000	1,900	1,710
Adjusted Profits	1,54,000	1,55,000	2,35,900	2,27,910

CALCULATION OF WEIGHTED AVERAGE PROFIT

Year Ended	Profits (₹)	Weights	Product (₹)
31st March, 2017	1,54,000	1	1,54,000
31st March, 2018	1,55,000	2	3,10,000
31st March, 2019	2,35,900	3	7,07,700
31st March, 2020	2,27,910	4	9,11,640
Total	7,72,810	10	20,83,340

Weighted Average profit = $\frac{₹\ 20,83,340}{10}$ = ₹ 2,08,334.

(*a*) Goodwill = Weighted Average Profit × Number of Years' Purchase
= ₹ 2,08,334 × 3 = ₹ 6,25,002.

Working Notes:

1. ₹ 48,000 deducted as annual charge to cover management cost Or we can deduct one year's cost from Average Profit.
2. ₹ 22,000 was wrongly credited to Profit and Loss Account on proceed from sale of machinery. ₹ 1,000 added back on account of depreciation in the year 2017–18, ₹ 1,900 is added back in the year 2018–19 and ₹ 1,710 is added back in the year 2019–20.
3. Closing stock is overvalued by ₹ 24,000 in Financial year 2017–18 which is deducted and added in financial year 2018–19 because opening stock is overvalued because of which profit is reduced.
4. A major repair of plant costing ₹ 60,000 was wrongly charged to revenue. Depreciation is charged @ 10% p.a. on written down value method.

(*b*) Average Profit = $\frac{₹\ 7,72,810}{4}$ = ₹ 1,93,203.

Goodwill = Average Profit × Number of Years' Purchase
= ₹ 1,93,203 × 3 = ₹ 5,79,609.

(*c*) Super Profit = Average Profit – Normal Profit

$$= ₹\ 1,93,203 - \left(3,00,000 \times \frac{10}{100}\right) = ₹\ 1,63,203.$$

Goodwill = Super Profit × Number of Years' Purchase
= ₹ 1,63,203 × 3 = ₹ 4,89,609.

(*d*) Goodwill = $\frac{\text{Super Profit}}{\text{Normal Rate of Return}} \times 100$

$$= ₹\ 1,63,203 \times \frac{100}{10} = ₹\ 16,32,030.$$

(*e*) Capitlised Value of the Firm = $\frac{\text{Average Profit}}{\text{Normal Rate of Return}} \times 100$

$$= \frac{₹\ 1,93,203 \times 100}{10} = ₹\ 19,32,030$$

Net Assets = ₹ 3,00,000 (Assets – Liabilities)
Goodwill = Capitalised Value of Firm – Net Assets
= ₹ 19,32,030 – 3,00,000 = ₹ 16,32,030.

➢ **Practical problems :**

1. **A and B are partners sharing profits in the ratio of 3:2. They decided to admit C as a partner from 1st April,2020 on the following terms :**
   a. **C will be given 2/5th share of profit.**
   b. **Goodwill of the firm will be valued at two years' purchase of three years' normal average profit of the firm.**

   Profits of the previous three years ended 31st march, were :
   2020 – Profit Rs. 30,000 (after debiting loss of stock by fire Rs. 40,000).
   2019 – Loss Rs. 80,000 (includes VRS paid Rs. 1,10,000).
   2018 – Profit Rs. 1,10,000 (including a gain of Rs. 30,000 on the sale of fixed assets).
   You are required to value the goodwill.

2. **Calculate the goodwill of a firm on the basis of three years' purchase of the weighted average profit of the last four years. The appropriate weights to be used and profits are :**

Year	2016-17	2017-18	2018-19	2019-20
Profits	1,01,000	1,24,000	1,00,000	1,40,000
Weights	1	2	3	4

On a scrutiny of the accounts, the following matters are revealed :
a. **On 1st December, 2018, a major repair was made in respect of the plant incurring Rs. 30,000 which was charged to revenue. The said sum is agreed to be capitalised for goodwill calculation subject to adjustment of depreciation of 10% p.a. on Reducing Balance Method.**
b. **The closing stock for the year ended 31st March, 2018, was overvalued by Rs. 12,000.**
c. **To cover management cost, an annual charge of Rs. 24,000 should be made for the purpose of goodwill valuation.**
d. **On 1st April, 2017, a machine having a book value of Rs. 10,000 was sold for Rs. 11,000 but the proceeds were wrongly credited to profit and loss account. No effect has been given to rectify the same. Depreciation is charged on machine @ 10% p.a. on Reducing Balance Method.**

3. From the following information, calculate the value of goodwill of M/s Ram & Rahim :
   a. At three years' purchase of Average profit.
   b. At three years' purchase of super Profit.
   c. On the basis of Capitalisation of Super Profit.
   d. On the basis of Capitalisation of Average Profit.

   Information :
   I. Average capital employed in the business – Rs. 7,50,000.
   II. Net trading results of the firm for the past years: Profit for 2017 – 18 Rs. 2,25,000; Loss for 2018 – 19 Rs. 1,87,500; Profit for 2019 – 20 Rs. 6,37,500.
   III. Rate of interest expected from capital having regard to the risk involved – 15%.
   IV. Remuneration to each partner for his service treated as a charge on profits – Rs. 3,750 per month.
   V. Assets (excluding goodwill) – Rs. 9,00,000; Liabilities – Rs. 75,000.

Class-XII Inverse Trigo Maths.

Home Assignment - 4.

Ex 1. Prove that $\tan^{-1}\frac{1}{4}+\tan^{-1}\frac{2}{9}+\tan^{-1}\frac{1}{5}+\tan^{-1}\frac{1}{8}=\frac{\pi}{4}$.

L.H.S $\left(\tan^{-1}\frac{1}{4}+\tan^{-1}\frac{2}{9}\right)+\left(\tan^{-1}\frac{1}{5}+\tan^{-1}\frac{1}{8}\right)$

$=\tan^{-1}\left(\frac{\frac{1}{4}+\frac{2}{9}}{1-\frac{1}{4}\cdot\frac{2}{9}}\right)+\tan^{-1}\left(\frac{\frac{1}{5}+\frac{1}{8}}{1-\frac{1}{5}\cdot\frac{1}{8}}\right)$

$=\tan^{-1}\left(\frac{17}{36}\times\frac{36}{342}\right)+\tan^{-1}\left(\frac{13}{40}\times\frac{40}{39}\right)$

$=\tan^{-1}\left(\frac{1}{2}\right)+\tan^{-1}\left(\frac{1}{3}\right)$

$=\tan^{-1}\left(\frac{\frac{1}{2}+\frac{1}{3}}{1-\frac{1}{2}\cdot\frac{1}{3}}\right)=\tan^{-1}1=\frac{\pi}{4}$ Proved.

Ex 2. Prove that

$$\tan^{-1}\frac{b-c}{1+bc}+\tan^{-1}\frac{c-a}{1+ca}+\tan^{-1}\frac{a-b}{1+ab}=0.$$

L.H.S $\tan^{-1}b-\tan^{-1}c+\tan^{-1}c-\tan^{-1}a+\tan^{-1}a-\tan^{-1}b$

$=0=$ R.H.S Proved.

Ex 3

V.V.I Prove that

$$\tan^{-1}\left(\frac{1}{\sqrt{3}}\tan\frac{x}{2}\right)=\frac{1}{2}\cos^{-1}\left(\frac{1+2\cos x}{2+\cos x}\right)$$

We know that

$$2\tan^{-1}x=\cos^{-1}\frac{1-x^2}{1+x^2}.$$

Now

$$2\tan^{-1}\left(\frac{1}{\sqrt{3}}\tan\frac{x}{2}\right) = \cos^{-1}\left[\frac{1-\left(\frac{1}{\sqrt{3}}\tan\frac{x}{2}\right)^2}{1+\left(\frac{1}{\sqrt{3}}\tan\frac{x}{2}\right)^2}\right]$$

$$= \cos^{-1}\left[\frac{1-\frac{1}{3}\tan^2\frac{x}{2}}{1+\frac{1}{3}\tan^2\frac{x}{2}}\right]$$

$$= \cos^{-1}\left[\frac{3-\frac{\sin^2\frac{x}{2}}{\cos^2\frac{x}{2}}}{3+\frac{\sin^2\frac{x}{2}}{\cos^2\frac{x}{2}}}\right]$$

$$= \cos^{-1}\left[\frac{3\cos^2\frac{x}{2}-\sin^2\frac{x}{2}}{3\cos^2\frac{x}{2}+\sin^2\frac{x}{2}}\right]$$

$$= \cos^{-1}\left[\frac{\cos^2\frac{x}{2}-\sin^2\frac{x}{2}+2\cos^2\frac{x}{2}}{\cos^2\frac{x}{2}+\sin^2\frac{x}{2}+2\cos^2\frac{x}{2}}\right]$$

$$= \cos^{-1}\left[\frac{\cos x+1+\cos x}{1+1+\cos x}\right]$$

$$= \cos^{-1}\left[\frac{1+2\cos x}{2+\cos x}\right]$$

Then $\tan^{-1}\left(\frac{1}{\sqrt{3}}\tan\frac{x}{2}\right) = \frac{1}{2}\cos^{-1}\left[\frac{1+2\cos x}{2+\cos x}\right]$

Proved.

Home work.

If

(1) $\sin^{-1}x + \sin^{-1}y + \sin^{-1}z = \pi$

then prove that

$$x\sqrt{1-x^2} + y\sqrt{1-y^2} + z\sqrt{1-z^2} = 2xyz.$$

prove that

(2) $$\sin^{-1}\frac{2a}{1+a^2} - \cos^{-1}\frac{1-b^2}{1+b^2} = 2\tan^{-1}\frac{a-b}{1+ab}$$

(3) prove that $$2\tan^{-1}\frac{1}{3} + \sin^{-1}\frac{4}{5} = \frac{\pi}{2}$$

(4) If $\tan^{-1}x + \tan^{-1}y + \tan^{-1}z = \pi$

then prove that $x+y+z = xyz$.

(5) Solve :-

$$\tan^{-1}(x+1) + \tan^{-1}(x-1) = \tan^{-1}\frac{8}{31}.$$

(6) Solve :-

$$\sin^{-1}\frac{2a}{1+a^2} + \sin^{-1}\frac{2b}{1+b^2} = 2\tan^{-1}x.$$

(7) Solve :-

$\sin^{-1}x + \sin^{-1}y = \frac{2\pi}{3}$ and.

$\cos^{-1}x - \cos^{-1}y = \frac{\pi}{3}$.

(8) Solve :-

$$\sin^{-1}\cos\sin^{-1}x = \frac{\pi}{3}.$$

DREAMLAND SCHOOL

CHEMISTRY - XII

Chemical Kinetics

Conversion of reactants to products is known as chemical reaction. The direction of a chemical reaction is always to the direction in which free energy of the system decreases. Different chemical reactions have different rates. Generally ionic reactions are very fast and covalent reactions are slow in nature. The branch of chemistry which deals with the study of reaction rates and the mechanism, by which they occur, is called chemical kinetics.

This branch of chemistry deals with the study of rates of chemical reactions and the mechanism by which they occur. While studying reaction, one deals with :
(a) how fast (or slow) the reactants get converted into products
(b) the steps or paths through which the products are formed (reaction mechanism)

Rate of Reaction

The rate of chemical reaction may be defined as the change in concentration of any of the reactants or any of the products per unit time.

Rate of reaction = Change in concentration of a reactant or product/ Time taken for the change

In general, for a reaction: A to B, the behaviour of the concentration of the reactant (A) and product (B) can be stated as follows,

$$\text{Rate} = -\frac{\triangle[\mathbf{A}]}{\triangle t} = \frac{\triangle[\mathbf{B}]}{\triangle t}$$

$$r_{avg} = -\frac{(A_{final} - A_{initial})}{(t_2 - t_1)} = \frac{(B_{final} - B_{initial})}{(t_2 - t_1)}$$

$$r_{inst} = -\lim_{\triangle t \to 0} \frac{\triangle[\mathbf{A}]}{\triangle t} = \frac{\triangle[\mathbf{B}]}{\triangle t}$$

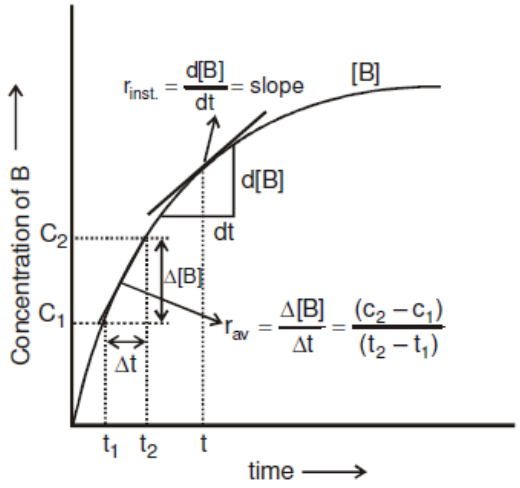
For reaction of type

$$mA + nB \longrightarrow pC + qD$$

The rate of reaction can be expressed as follows :

$$\text{Rate} = -\frac{1}{m}\frac{d[A]}{dt} = -\frac{1}{n}\frac{d[B]}{dt} = +\frac{1}{p}\frac{d[C]}{dt} = +\frac{1}{q}\frac{d[D]}{dt}$$

Unit of the rate of reaction is mol/L or mol $dm^{-3}s^{-1}$



Factors on which rate of reaction depend:

1. **Nature of reactants:**

(a) On the basis of physical states, decreasing order of rate is observed in gaseous state> liquid state> solid state.

(b) Ionic compounds undergo faster rate of reaction than covalent compounds.

2. **Concentration of reactants:**

The rate of reaction increases with increase in concentration of the reactants

3. **Temperature:**

Rate of reaction generally increases with increase in temperature.

4. **Catalyst:**

Presence of catalyst rate of reaction increases.

There are some other factors (e.g. surface area, pH etc.) on which rate of reaction also depends.

Assignment:

1. For a reaction R to P, the concentration of a reactant changes from 0.03M to 0.02M in 25 mins. Calculate avg rate of the reaction. [Ans: 0.0004 mol/L/min]

2. In the following reaction if the rate of disappearance of A be 0.048mol/L/sec, then what will be the ratio of formation of B & C? [Ans: 1:2]

Chapter 6

तुलसीदास के पद

सारांश

तुलसीदास राम भक्ति शाखा के प्रमुख कवि हैं।तुलसीदास जी विलक्षण प्रतिभा से संपन्न उत्कृष्ट कोटि के कवि माहान लोक नायक और श्री राम के परम भक्त है ।इनका जन्म संवत 1589 की श्रवण शुक्ल सप्तमी को बाँदा जिला के राजा पुर ग्राम में माना जाता है।इनके द्वारा रचित महाकाव्य 'रामचरितमानस' संपूर्ण विश्व साहित्यों के अद्भुत ग्रंथो में से एक है।तुलसीदास ने अवधी और ब्रज दोनों भाषाओं में रचनाये की ।

गोस्वामी तुलसीदास द्वारा रचित तुलसी के पद कवितावली,बालकाण्ड से अवतरित प्रथम पद में राम और सीता के शुभ विवाह का वर्णन है।इस पद में श्री राम दूल्हे और सीता दुल्हन के रूप में दर्शायी गयी है ।राजा जनक के सुन्दर महल में मिथिला की नारियां मिल कर विवाह के मंगल गीत गाती है ।ब्राह्मण समुदाय वेदों का पाठ करते है ।विवाह के समय सीता जी ने हाथ में कंगन पहने हुए है ,उनमे नाग जरे हुए है ।राम की छाया अर्थात उनका प्रतिबिम्ब उस नाग में दिखाई दे रहा है ।सीता अपने कंगन में राम के रूप को निखार रही है इससे वे सारी सुधि बुद्धि

भूल जाती है ।राम की परछाई नग में देखना सीता के लज्जा भाव को प्रदर्शित कर रहा है ।

दूसरा पद कवितावली के अयोध्या कांड से अवतरित है । इसमें गोस्वामी जी ने राम वन गमन का वर्णन किया है । कवि के आधार पर दशरथ नंदन श्री राम राजसीय वस्त्र और आभूषण पहनते है लेकिन वनगमन के समय उन राजसीय वस्त्रों और आभूषणों का त्याग कर दिया।कवी कहते है कि भगवन राम के लिए राजसीय वस्त्र और आभूषण तोते के पंखों के सामान थे,उनको त्यागने पर उनका शरीर ऐसे सुशोभित हुआ जैसे काई हटा देने पर स्वछ जल ।वन जाते समय ,वे आने माता पिता प्रिय लोगों तथा सेज सम्बन्धियों का यथोचित सम्मान और स्नेह किया।श्री राम अपनी पत्नी सीता और लघु भ्राता लक्ष्मण के साथ अपने पिता का राज्य त्याग कर इस प्रकार चल दिए जैसे वे अयोध्या में एक अतिथि के रूप में दो दिनों के लिए आये थे ।इससे इनका त्याग झलकता है ।उन्हें अयोध्या तथा पिता के धन धान्य ,राज्य से किसी प्रकार का मोह नही था।

तीसरा ऐवं अंतिम पद विनयी पत्रिका से संग्रहित है ।इसमें तुलसी दास जी ने प्रभु श्री राम से प्रार्थना की है कि वे उनके चरणों को छोड़कर किस स्थान पे जाये ।इस संसार में

पतितों का उद्धार करने वाला और कौन है ? जो भी दीन दुखी प्रभु के शरणों में आता है उसका उद्धार वे अवश्य करते है।आपने पक्षी (जटायु),मृग(मारीच राक्षस),व्याध(शबरी),पाषाण(अहिल्या),विटप जड़(यमलार्जुन)और जवन(काल यवन)और राक्षसों का भी उद्धार किया है।इस संसार में देवता ,दानव,मुनि,तथा मनुष्य सभी सांसारिक मोह माया के बंधन में फसे हुए है जो स्वयं असहाय व विवश है ,वे दूसरों का बंधन किस प्रकार खोल सकते है। अतः मैं अपने आप को इनलोगों के हाथ किस प्रकार सौप सकता हूँ।अर्थात मैं आपके चरणों को छोड़कर कही नहीं जा सकता ।