

I. Choose the best answer: 5x1=5

- A train was moving at the rate of 54 kmh^{-1} when brakes were applied. It came to rest within a distance of 225m. Calculate the retardation produced in the train?
 - 0.5 ms^{-2}
 - 0.5 ms^{-1}
 - 0.7 ms^{-2}
 - 0.8 ms^{-2}
- A rigid body rotates with an angular momentum L. If its kinetic energy is halved, the angular momentum becomes, _____.
 - L
 - $\frac{L}{2}$
 - 2L
 - $\frac{L}{\sqrt{2}}$
- Which among the following has the largest speed?
 - V_{mp}
 - V_{rms}
 - V
 - none
- The average translational kinetic energy of gas molecules depends on _____.
 - number of moles and T
 - only on T
 - P and T
 - P only
- If S_p and S_v denote the specific heats of nitrogen gas per unit mass at constant pressure and constant volume respectively, then _____.
 - $S_p - S_v = 28R$
 - $S_p - S_v = \frac{R}{28}$
 - $S_p - S_v = \frac{R}{14}$
 - $S_p - S_v = R$

II. Answer any 5 of the following: 5x2=10

- Why moon has no atmosphere?
- State the law of equipartition of energy.
- Write a short note on factors affecting Brownian motion.
- Define radius of gyration.
- Define couple.
- Define vector product.

III. Answer any 5 of the following: 5x3=15

- An oxygen molecule is travelling in air at 300K and 1atm, and the diameter of oxygen molecule is $1.2 \times 10^{-10} \text{ m}$. Calculate the mean free path of oxygen molecule.
 - What is the relation between average kinetic energy and pressure?
 - Write down any 6 postulates of kinetic theory of gases.
 - Derive an expressive for moment of Inertia of a uniform ring.
 - Write down any 5 properties of vector product.
 - A force of $(4\hat{i} - 3\hat{j} + 5\hat{k}) \text{ N}$ is applied at a point whose position vector is $(7\hat{i} + 4\hat{j} - 2\hat{k}) \text{ m}$. Find the torque of force about the origin.
- IV. Answer any 2 of the following: 2x5=10
- Describe the total degrees of freedom for monoatomic molecule, diatomic molecule and triatomic molecule.
 - State parallel axis theorem and derive the expression for the same.
 - Discuss rolling on inclined plane and arrive at the expression for the acceleration.

- The inventor of input-output analysis is _____.
 a) Sir Francis Galton b) Fisher
 c) Prof. Wassily. W. Leontief d) Arthur Caylay
 - If A is a square matrix of order 3 and $|A|=3$ then $|\text{adj } A| =$ _____.
 a) 81 b) 27 c) 3 d) 9
 - The member of Hawkins-Simon conditions for the viability of an input-output analysis is _____.
 a) 1 b) 3 c) 4 d) 2
 - If any three rows or columns of a determinant are identical then the value of the determinant is _____.
 a) 0 b) 2 c) 1 d) 3
 - In a square matrix in which all the elements other than the main diagonal elements are zero is called the _____ matrix.
 a) scalar matrix b) diagonal matrix
 c) unit matrix d) null matrix
 - If $u(x, y)$ is a continuous function of x and y then $U_{xx} =$ _____.
 a) U_{xy} b) U_{yx} c) U_{xx} d) 0
 - Relationship among MR, AR and η is _____.
 a) $\eta_d = \frac{AR}{AR-MR}$ b) $\eta_d = AR-MR$ c) $MR=AR=\eta_d$ d) $AR = \frac{MR}{\eta_d}$
 - If $u = e^{x^2}$ then $\frac{\partial u}{\partial x} =$ _____.
 a) $2xe^{x^2}$ b) e^{x^2} c) $2e^{x^2}$ d) 0
 - Instantaneous rate of change of $y=2x^2+5x$ with respect to x at $x=2$ is _____.
 a) 4 b) 5 c) 13 d) 9
 - The demand function is always _____.
 a) an increasing function b) Decreasing function
 c) Non-Decreasing function d) Undefined function
- II. Answer any 3 of the following: 3x2=6
- Find λ if the matrix $\begin{pmatrix} 1 & 1 & 3 \\ 2 & \lambda & 4 \\ 9 & 7 & 11 \end{pmatrix}$ has no inverse.
 - Solve by using matrix inversion method: $2x+5y=1$; $3x+2y=7$

- Find the marginal productivities of capital (K) and labour (L) if $P=10L+0.1L^2+5K-0.3K^2+4KL$ when $K=L=10$.
- The cost function of a firm is $C=\frac{1}{3}x^3-3x^2+9x$. Find the level of output when average is minimum.

- III. Answer any 3 of the following: 3x3=9
- For the demand function, $P=550-3x-6x^2$ where x is quantity demand and P is unit price. Show that $MR=P\left(1-\frac{1}{\eta_d}\right)$.
 - Find the interval in which the function $f(x)=x^2-4x+6$ is strictly increasing and strictly decreasing.
 - If $A=\begin{pmatrix} 3 & 7 \\ 2 & 5 \end{pmatrix}$ and $B=\begin{pmatrix} 6 & 8 \\ 7 & 9 \end{pmatrix}$ then verify that $(AB)^{-1}=B^{-1}A^{-1}$
 - Evaluate: $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$

- IV. Answer any 3 of the following: 3x5=15
- The cost of 4kg onion, 3kg wheat and 2kg rice is ₹320. The cost of 2kg onion, 4kg wheat and 6kg rice is ₹ 560. The cost of 6kg onion, 2kg wheat and 3kg rice is ₹380. Find the cost of each item per kg by matrix inversion method.
 - Suppose the inter-industry flow of the product of two sectors X and Y are given under

Production Sector	Consumption Sector		Domestic demand	Gross output
	X	Y		
X	15	10	10	35
Y	20	30	15	67

- Find the gross output when the domestic demand changes to 12 for X and 18 for Y.
- The demand for a commodity A is $q=80-P_1^2+5P_2-P_1P_2$. Find the partial elasticities $\frac{Eq}{EP_1}$ and $\frac{Eq}{EP_2}$ when $P_1=2$, $P_2=1$.
 - Let $u = \log\left(\frac{x^4+y^4}{x+y}\right)$ by using Euler's theorem show that $x \cdot \frac{\partial u}{\partial x} + y \cdot \frac{\partial u}{\partial y} = 3$.

I. Choose the correct answer: 5x1=5

- The dimensional formula for gravitational constant G is ____.
 a. $[ML^3T^{-2}]$ b. $[M^{-1}L^3T^{-2}]$ c. $[M^{-1}L^{-3}T^{-2}]$ d. $[ML^{-3}T^2]$
- The dimension of $(\mu_0 \epsilon_0)^{\frac{1}{2}}$ is ____.
 a. length b. time c. velocity d. force
- The efficiency of a heat engine working between the freezing point and boiling point of water is _____.
 a. 6.25% b. 20% c. 26.8% d. 12.5%
- When a cycle tyre suddenly bursts, the air inside the tyre expands. This process is _____.
 a. isothermal b. adiabatic c. isobaric d. isochoric
- When a uniform rod is heated, which of the following quantity of the rod will increase _____.
 a. mass b. weight c. center of mass d. moment of inertia

II. Answer the following: [Any 5] 5x2=10

- Explain the types of physical quantities.
- A physical quantity x is given by $x = \frac{m^2 n^3}{\rho \sqrt{R}}$ if the percentage errors of measurement in m, n, p, R are 4%, 2%, 3% and 5% respectively, then calculate the percentage error in the calculation of x.
- What is Wien's Displacement Law.
- State Clausius form of the Second Law of thermodynamics.
- Define one mole.

11. Define thermal conductivity?

III. Answer the followings: (any 5) 5x3=15

- Derive the work done relation in adiabatic process.
- a. Why does heat flow from hot object to a cold object?
 b. Define Coefficient of performance.
- Discuss various modes of heat transfer.
- Check the correctness of the equation $\frac{mv^2}{r} = F$ using dimensional analysis method.
- Explain various types of error. (any 3 types).
- Write any 5 rules for rounding off.

IV. Answer the followings in detail: 2x5=10

- What do you mean by propagation of errors? Explain the propagation errors in addition and multiplication.

or

Assuming that the frequency of a vibrating string may depend upon i) applied force (F) ii) length(l) iii) mass per unit length

(m), prove that $\gamma \propto \frac{1}{l} \sqrt{\frac{F}{m}}$ using dimensional analysis.

- Derive Mayer's relation of ideal gas.

or

Explain in detail Newton's law of cooling.

03.12.19 Comprehensive Revision Programme-2 Marks:40

Std:XI [A,B] FN

Chemistry (Part-I)

Time:1.15mins

I. Choose the correct answer:

5x1=5

1. Match the List I with List II and select the correct answer using the code given below the lists.

List-I	List-II	Code:
A. Molar Volume	1. Atomic mass/valency	a. 4 3 1 2
B. Avogadro Number	2. 2xvapour density	b. 3 4 1 2
C. Equivalent mass	3. $2.24 \times 10^{-2} \text{m}^3$	c. 3 1 2 4
D. Molecular mass	4. 6.023×10^{23}	d. 2 1 4 3

2. The equivalent mass of a trivalent metal element is 9g eq⁻¹ the Molar mass of its anhydrous oxide is

- a. 102g b. 27g c. 270g d. 78g

3. Assertion (A): Zinc metal when placed in Copper sulphate solution, zinc turns brown.

Reason(R): Due to metal displacement reaction, copper sulphate reacts with zinc, Cu deposited over zinc and so it turns brown.

- a. Both (A) and (R) are correct but (R) is not the correct explanation of (A)
 b. Both (A) and (R) are correct and (R) is the correct explanation of (A)
 c. (A) is correct but (R) is wrong.
 d. (A) is wrong but (R) is correct.

4. The maximum no. of electrons in a sub shell is given by

- a. $2n^2$ b. $2l+1$ c. $4l+2$ d. none of these

5. In the third period, the first ionisation potential is of the order.

- a. Na>Al>Mg>Si>P b. Na<Al<Mg<Si<P
 c. Mg>Na>Si>P>Al d. Na<Al>Mg>P>Si

II. Answer any 5 questions:

5x2=10

6. Second ionisation potential is always higher than the first ionisation potential- Justify your answer.

7. Give the electronic configuration of Mn²⁺ and Cr³⁺.

8. What do you understand by the terms empirical formula and molecular formula?

9. What do you understand by the term Oxidation number?

10. Give any two limitations of Bohr's atom model.

11. Electron gain enthalpy of F is less than Cl. Why?

III. Answer any 5 questions:

5x3=15

12. What is effective nuclear charge?

13. Explain Pauling's method for the determination of ionic radius.

14. How many orbital's are possible in the 4th energy level?

15. State Aufbau Principle.

16. Calculate the number of moles present in 60g of ethane.

17. Calculate the oxidation number of underlined elements.

- a. KMnO₄ b. Cr₂O₇²⁻ c. CO₂

IV. Answer any 2 in detail:

2x5=10

18.(i) Hydrogen peroxide is an Oxidising agent. It oxidises ferrous ion to Ferric ion and reduced itself to water. Write balanced equation. (3m)

(ii) Write the empirical formula of the following:

- a. Fructose (C₆H₁₂O₆) b. Caffeine (C₈H₁₀N₄O₂) (2m)

19. i. Derive de-Broglie equation. (3m)

ii. What is exchange energy? (2 m)

20. Explain the factors influencing ionisation energy.

3.12.19 Comprehensive Revision Programme-2 Marks:40
 Std: XI [F-I] AN Computer Application (Part-II) Time:1.15mins

I. Choose the correct answer: 5x1=5

1. Which of the following is not a branching statement?
 a. Loop b. If-else c. Switch d. For
2. What will be the output for the following snippet?

```
For (var n=0; n<10; n+1)
{
if (n==3)
{
break;
}
document write (n+" <br");
```
3. In which loop the condition is evaluated, before executing a statement?
 a. While b. Do while c. Switch d. If
4. Predefined function are also called as _____.
 a. Library function b. Storage functions
 c. Instructions d. Commander
5. Which one of the following are self-replicating and do not require a computer program to attach themselves?
 a. Virus b. Worms c. Spyware d. Trojans

II. Answer any 5 from the following: 5x2=10

6. What are Warez?
7. What is a Cookie?
8. Write the Syntax of functions?
9. Differentiate between while and do while statement.
10. What is meant by Conditional Statements in Java Script?
11. List out the various branching statement in JavaScript?

III. Answer any 5 from the following: 5x3=15

12. What is a function in Javascript?
13. What is called a loop and what are its types?
14. Write about encryption and decryption.
15. What are ethical issues? Name some.
16. What are the guidelines to be followed by any computer user?
17. Write the syntax for else-if statement?

IV. Detail: [Any 2] 2x5=10

18. Explain for loop with example.
19. Write the different types of cyber attacks?
20. Write a JavaScript program using while statement to display 20 numbers.

03.12.19 Comprehensive Revision Programme-2 Marks:40
 Std:XI [H,I] FN Commerce (Part-II) Time:1.15mins

I. Choose the correct answer: 5x1=5

1. Real estate market's GST rate is from ____ to ____.
 a. 8 to 12% b. 13 to 15% c. 16 to 20% d. 5 to 7%
2. Income tax rate from 2,50,000 to 5,00,000 is _____.
 a. Nil b. 5 % c. 20% d. 30%
3. IMF was established on _____.
 a. 24th December 1945 b. 25th December 1945
 c. 26th December 1945 d. 27th December 1945
4. _____ sell speciality products such as hosiery.
 a. Drop shippers b. hawkers
 c. Rack jobbers d. truck jobbers
5. _____ has a regular schedule of timing.
 a. Airway b. Water way c. Railway d. roadway

II. Answer the following: (any 5) 5x2=10

6. Write a note on SGST and CGST.
7. Define the term 'person'.
8. What do you mean by World Bank?
9. Who is a middle man?
10. Write any two advantages of Water transport?
11. What is income tax?

III. Answer the following: (any 5) 5x3=15

12. What are the objectives of GST?
13. Write a note on agricultural income.
14. What are the criticisms of WTO?
15. Explain any three characteristics of wholesalers.
16. What do you understand by channels of distribution?
17. What is a bill of lading?

IV. Answer the following: (any 2) 2x5=10

18. What are the functions of retailers?
19. Highlight the functions of IBRD.
20. Discuss the various kinds of assesses.

03.12.19 Comprehensive Revision Programme-2 Marks:40

Std:XI [C,D] AN Chemistry (Part-II) Time:1.15 mins

I. Choose the correct answer: 5x1=5

1. Among the alkaline earth metals, which is radioactive in nature?

- a) Beryllium b) Barium c) Radium d) Calcium

2. Match List I with List II and choose the correct answer code given below the lists.

List-I	List-II	Code:
A. Boyle's law	1. $P=P_1+P_2+P_3$	a. 3 1 4 2
B. Charle's law	2. $\frac{r_1}{r_2} = \sqrt{\frac{M_2}{M_1}}$	b. 3 4 2 1
C. Graham's law	3. $PV=\text{constant}$	c. 4 2 1 3
D. Dalton's law	4. $\frac{V}{T}=\text{constant}$	d. 2 4 3 1

3. The suspension of slaked lime in water is known as _____.

- a) lime water b) quick lime c) milk of lime
d) aqueous solution of slaked lime

4. Heat of combustion is always

- a) positive b) negative c) zero d) either positive or negative

5. The final temperature of an engine whose initial temperature is 400K and having efficiency 25%

- a) 200 K b) 300 K c) 400 K d) 450 K

II. Answer the following: [Any 5] 5x2=10

6. What is meant by Joule-Thomson effect?

7. Explain the structure of BeCl_2 .

8. What is diagonal relationship?

9. Define calorific value of food. What is the unit of calorific value?

10. Define Hess's law of constant heat summation.

11. Would it be easier to drink water with a straw on the top of Mount Everest?

III. Answer the following in brief: [Any 5] 5x3=15

12. Calculate the maximum %efficiency of thermal engine operating between 110°C and 25°C .

13. What are spontaneous reactions? Give the conditions for the spontaneity of a process.

14. Distinguish between diffusion and effusion.

15. What are the consequences of Boyle's law?

16. Explain Solvay process of preparation of Na_2CO_3 .

17. What is dead burnt plaster?

IV. Answer any two in detail: 2x5=10

18. Explain the biological importance of Na and K.

19. i) Derive ideal gas equation. (3 M)

ii) State Gay Lussac's law. (2 M)

20. i) Explain the various statements of second law of thermodynamics. (3M)

ii) Give any four characteristics of internal energy. (2M)

- I. Choose the correct answer: $5 \times 1 = 5$
- Humidity controlled warehouses are a type of ____ warehouse.
a. refrigerated warehouse b. special commodity warehouse
c. bonded warehouse d. climate controlled warehouse
 - Wangs kitchen needs an approximate investment of ____.
a. Rs.20-35 Lakh b. Rs.50-65 Lakh
c. Rs.70-80 Lakh d. Rs.40-50 Lakh
 - Importer has to fill in ____ form.
a. ANF 2A b. e-LEC c. SE-01 d. FA 205
 - Economic transactions are recorded according to ____.
a. double entry principle of book keeping
b. single entry system of book keeping
c. either a or b
d. both a and b
 - Contract is of _____ nature.
a. impersonal b. equitable c. revocable d. Uncertain
- II. Answer the following: [Any 5] $5 \times 2 = 10$
- What is Quantum object?
 - What do you mean by Balance of payments?
 - Write a short note on mate's receipt?
 - Who is a factor?
 - List the various types of warehouses.
 - Give any three functions of warehouses.
- III. Answer the following: [Any 5] $5 \times 3 = 15$
- Differentiate warehouse warrant from warehouse receipt.
 - What is the impact of e-commerce on buyers?
 - What is letter of credit?
 - State the components of capital account.
 - Define discharge by performance.
 - What are the different modes of discharge by implied consent?
- IV. Answer the following: [Any 2] $2 \times 5 = 10$
- Explain the various functions of export trading houses.
 - Discuss the different types of damages awarded to injured party.
 - Explain the various types of warehouses.