

### CHEMISTRY

Give poster presentation on any one of the following topics on full size chart:

(5 marks have been allocated as the project work for Half Yearly Practical Examination)

1. Green Chemistry (Fuels)
2. A Miracle Science – Chemistry (chemotherapy, drugs).
3. Chemistry: Blessings Vs Curse (Medicine Vs Nuclear disaster).
4. Career in Chemistry (After 12<sup>th</sup> Class).
5. Chemistry – Interdisciplinary field.
6. Recent development in chemistry (only last two years)
7. Chemistry – Saving our environment (Refer to air, water and soil pollution).
8. Chemistry in medicine.
9. Chemistry in Food and Preservatives.
10. Chemistry of fuel cells.

### Solve the following Questions in chemistry Notebook:

- Q.1. What is the average molecular mass in dry air (a mixture of 78% N<sub>2</sub> and 22% O<sub>2</sub>)?
- Q.2. How much copper can be obtained from 100 g of copper sulphate?
- Q.3. Assuming complete dissociation how many chloride ions are present per mL in a solution obtained by mixing 100mL of 0.5 M BaCl<sub>2</sub>, 100 mL of 0.2 M KCl and 100 mL water.
- Q.4. How many grams of Cl<sub>2</sub> is produced from 15.8g of KMnO<sub>4</sub> and 50mL of 10 M HCl according to the reaction
- $$2 \text{KMnO}_4 + 16 \text{HCl} \rightarrow 2 \text{KCl} + 2 \text{MnCl}_2 + 8 \text{H}_2\text{O} + 5 \text{Cl}_2$$
- Q.5. In order to find the strength of a sample of sulphuric acid, 10 g of it were taken and a piece of marble weighing 7g placed in it. When the reaction is ceased, the marble piece was dried and it was found to weigh 2.2 g. What is percent strength of sulphuric acid?
- Q.6. 1.2 g of Mg was dropped in 100 mL of 0.1 M HCl solution. Calculate the volume of H<sub>2</sub> obtained by STP.
- Q.7. A pure sample of compound is found to contain 2.04 g of sodium,  $2.65 \times 10^{22}$  atoms of carbon and 0.132 mole of oxygen atoms. Determine the empirical formula of the compound.
- Q.8. a) Calculate the mass percent of different elements present in ethyl alcohol.  
b) Commercially available HBr solution contains 48% HBr by mass. What is the molarity of the solution? The density of the solution is  $1.50 \text{ g cm}^{-3}$ .
- Q.9. a) What is the molar mass of gas if 1.00 L of the gas weighs 1.50g at 273 K and 1 atmosphere pressure?  
b) What is the mass of 1 mole of electrons? Mass of 1 electron is  $9.11 \times 10^{-31} \text{ kg}$ .  
c)  $6.02 \times 10^{20}$  molecules of a substance weigh 44 mg. What is the molar mass of the substance?  
d) Find out the number of hydrogen atoms in 3.42 g of sucrose. (C<sub>12</sub>H<sub>22</sub>O<sub>11</sub>)  
e) What mass of carbon is present in 147.2 g of potassium ferrocyanide.
- Q.10. a) 25 cm<sup>3</sup> of 0.2 M solution of metal chloride (MCl<sub>x</sub>) reacted with 150 cm<sup>3</sup> of 0.1 M AgNO<sub>3</sub> completely to form precipitate of AgCl. What is the formula of metal chloride.  
b) How much water should be added to 2.5 L of 5.0 M HNO<sub>3</sub> to make 2.5 M HNO<sub>3</sub>?
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**PHYSICS**

- I. Find the value of 100J on a system which has 20cm, 250g and half minute as fundamental units of length, mass and time.
- II. When white light travels through glass, the refractive index of glass is found to vary with wavelength as  $n = A + \frac{B}{\lambda^2}$ . Using the principle of homogeneity of dimensions, find the S.I. units in which the constants A and B must be expressed.
- III. Find the dimensions of the quantity V in the equation  $V = \frac{\pi p(a^2 - x^2)}{2\eta l}$  where a is the radius and l is the length of the tube in which the fluid of coefficient of viscosity of the liquid is  $\eta$ , x is the distance from the axis of the tube and p is the pressure difference.
- II. Solve the given assignment.

**Part (a)**

**Problem 1.** A suitable unit for gravitational constant is

- (a)  $kg \text{ metre sec}^{-1}$       (b)  $Newton \text{ metre}^{-1} \text{ sec}$       (c)  $Newton \text{ metre}^2 \text{ kg}^{-2}$       (d)  $kg \text{ metre sec}^{-1}$

**Problem 2.** A particle moves along a straight line in such a way that its acceleration is increasing at the rate of  $2 \text{ m/s}^3$ . Its initial acceleration and velocity were 0, the distance covered by it in  $t = 3$  second is.

- (a) 27 m      (b) 9 m      (c) 3 m      (d) 1 m

**Problem 3.** A force F is given by  $F = at + bt^2$ , where t is time. What are the dimensions of a and b

- (a)  $MLT^{-3}$  and  $ML^2T^{-4}$       (b)  $MLT^{-3}$  and  $MLT^{-4}$       (c)  $MLT^{-1}$  and  $MLT^0$       (d)  $MLT^{-4}$  and  $MLT^1$

**Problem 4.** The position of a particle at time t is given by the relation  $x(t) = \left(\frac{v_0}{\alpha}\right)(1 - e^{-\alpha t})$ ,

where  $v_0$  is a constant and  $\alpha > 0$ . The dimensions of  $v_0$  and  $\alpha$  are respectively

- (a)  $M^0L^1T^{-1}$  and  $T^{-1}$       (b)  $M^0L^1T^0$  and  $T^{-1}$       (c)  $M^0L^1T^{-1}$  and  $LT^{-2}$       (d)  $M^0L^1T^{-1}$  and T

**Problem 5.** E, m, l and G denote energy, mass, angular momentum and gravitational constant respectively, then the dimension of  $\frac{El^2}{m^5 G^2}$  are

- (a) Angle      (b) Length      (c) Mass      (d) Time

**Problem 6.** The potential energy of a particle varies with distance x from a fixed origin as  $U = \frac{A\sqrt{x}}{x^2 + B}$ ,

where A and B are dimensional constants then dimensional formula for AB is

- (a)  $ML^{7/2}T^{-2}$       (b)  $ML^{11/2}T^{-2}$       (c)  $M^2L^{9/2}T^{-2}$       (d)  $ML^{13/2}T^{-3}$

**Problem 7.** In C.G.S system the magnitude of the force is 100 dynes. In another system where the fundamental physical quantities are kilogram, metre and minute, the magnitude of the force is

- (a) 0.036      (b) 0.36      (c) 3.6      (d) 36

**Problem 8.** If the velocity of light (c), gravitational constant (G) and Planck's constant (h) are chosen as fundamental units, then the dimensions of mass in new system is

- (a)  $c^{1/2}G^{3/2}h^{1/2}$       (b)  $c^{1/2}G^{1/2}h^{-1/2}$       (c)  $c^{1/2}G^{-1/2}h^{1/2}$       (d)  $c^{-1/2}G^{1/2}h^{1/2}$

- Problem 9.** The pressure on a square plate is measured by  $P = \frac{F}{A}$ , where  $F$  is the force applied on the plate and the length of the sides of the plate. If the maximum error in the measurement of force and length are respectively 4% and 2%, The maximum error in the measurement of pressure is
- (a) 1%                                      (b) 2%                                      (c) 6%                                      (d) 8%

- Problem 10.** Velocity of particle starting from rest varies with position according to equation  $v = \sqrt{\alpha x}$ . What is distance travelled by particle in  $t$  second from start?
- (a)  $\frac{1}{2}\alpha t^2$                                       (b)  $\frac{1}{4}\alpha t^2$                                       (c)  $\frac{1}{3}\alpha t^3$                                       (d)  $\frac{1}{6}\alpha t^3$

MATHEMATICS

- Write the set  $B = \{3,9,27,81\}$  in set-builder form.
- Which of the following are empty sets? Justify.  
 $A = \{x : x \in \mathbb{N} \text{ and } 3 < x < 4\}$   
 $B = \{x : x \in \mathbb{N} \text{ and } x^2 = x\}$
- Which of the following sets are finite or Infinite? Justify.  
 The set of all the points on the circumference of a circle.  
 $B = \{x : x \in \mathbb{N} \text{ and } x \text{ is an even prime number}\}$
- Are sets  $A = \{-2,2\}$ ,  $B = \{x : x \in \mathbb{Z}, x^2 - 4 = 0\}$  equal? Why?
- Write  $(-5,9]$  in set-builder form
- If  $A = [-3, 5)$ ,  $B = (0, 6]$  then find (i)  $A - B$ , (ii)  $A \cup B$
- Are sets  $A = \{1,2,3,4\}$ ,  $B = \{x : x \in \mathbb{N} \text{ and } 5 \leq x \leq 7\}$  disjoint? Why?
- If  $X$  and  $Y$  are two sets such that  $n(X) = 19$ ,  $n(Y) = 37$  and  $n(X \cap Y) = 12$ , find  $n(X \cup Y)$ .
- If  $\cup = \{1,2,3,4,5,6,7,8,9\}$ ,  $A = \{2,3,5,7,9\}$ ,  $B = \{1,2,4,6\}$ , verify  
 (i)  $(A \cup B)' = A' \cap B'$   
 (ii)  $B - A = B \cap A' = B - (A \cap B)$
- A college awarded 38 medals in football, 15 in basket ball and 20 in cricket. If these medals went to a total of 50 men and only five men got medals in all the three sports, how many received medals in exactly two sports.

11. A survey shows that 84% of the Indians like grapes, whereas 45% like pineapple. What percentage of Indians like both grapes and pineapple?

12. Let  $A = \{\{1,2,3\}, \{4,5\}, \{6,7,8\}\}$

Determine which of the following is true or false :

- (a)  $1 \in A$                       (b)  $\{1, 2, 3\} \subset A$       (c)  $\{6, 7, 8\} \in A$       (d)  $\{\{4, 5\}\} \subset A$   
(e)  $\phi \in A$                       (f)  $\phi \subset A$

13. In a class of 35 students ,15 study Economics, 22 study Business studies and 14 study Accountancy If 11 students study both Economics and Business studies, 8 study both Business studies and Accountancy and 5 study both Economics and Accountancy .5 study none of these subjects. Find the number of students who study

- a) All the three subjects  
b) Exactly 2 of the three subjects      c ) Only one subject.

14. The following information was observed during a survey of 100 television viewers:- 18 watch programme P only, 23 watch programme P but not Q, 8 watch programme P and R, 26 watch programme P,48 watch programme R. 8 watch programme Q and R ,14 watch none of these programmes. Find the number of people who watch

- a) exactly two programmes      b) Only one programme      c) only Q .

15. Draw a Venn diagram to represent the given sets with elements and shade  $A \cap B - C$  in it.

$$U = \{a, b, c, d, e, f, g, h, i, j, k\}$$

$$A = \{c, e, f, h, i, j\}$$

$$B = \{a, b, d, f, i\}$$

$$C = \{a, c, e, g, h, i\}$$

16. Verify De Morgans laws : -

$$U = \{1,2,3,4,5,6,7,8,9,10\}$$

$$A = \{1,3,4,5,7,9,10\}$$

$$B = \{1,3,4,5,7,8,10\}$$

**BIOLOGY**

**Make a detailed power point presentation on any species of Class Mammalia and any species of phylum Arthropoda.**

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**ENGLISH**

- Q.1. Write a creative and interesting description of the following in about 80-100 words:  
(i) An amusement park (ii) Gadget of the future
- Q.2. Watch the film "Gone with the Wind". Write review.
- Q.3. Write an article on any one of these topics:  
(i) Demonetisation (iii) Terrorism and how to combat it  
(ii) Religious Intolerance (iv) India: A medical tourism hub
- Q.4. Read any one of the books mentioned below and prepare for class discussion on the same.  
(i) 'The War of the Worlds' – H.G. Wells  
(ii) 'The Secret' – Rhonda Byrne  
(iii) 'The Citadel' – A.J. Cronin
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**ECONOMICS**

**Statistics**

- Q.1. How does Statistics facilitate forecasting?
- Q.2. "All statistics must be expressed in terms of numbers but all numbers are not statistics." Explain with the help of examples.
- Q.3. How does statistics help in making comparisons and systematic presentation of facts?
- Q.4. Discuss some of the limitation of statistics.
- Q.5. Distinguish between economic and non economic activities.
- Q.6. Define statistics. Explain its utility in the field of economic planning
- Q.7. Explain briefly 4 definitions of economics in your own words. Which of them is most widely accepted and why?
- Q.8. Mark true or false:  
(i) Statistics is of no use to economics without data.  
(ii) Statistics can only deal with quantitative data.  
(iii) Statistics solves economic problems.  
(iv) Statistics affects everyone and touches life at many points.  
(v) Statistics is indispensable for dealing with social economic problems.  
(vi) Planning without statistics is like a ship without radar.
- Q.9. Write a brief note on the use of statistics in your daily life giving few examples.

**Micro Economics**

- Q.1. Comment on the shape of PPC when resources are fully and equally efficient in production of both goods. Give reason.
- Q.2. Is a situation of unemployment of resources the same as the situation of loss of resources which result in a leftward shift in PPC.
- Q.3. Explain briefly the CENTRAL PROBLEM OF ECONOMY.
- Q.4. State three assumptions of PPC.

- Q.5. What will be the impact on PPC recently launched clean india mission.  
Q.6. State the meaning and properties of PPC.  
Q.7. Explain the law of diminishing marginal utility with the help of diagram.  
Q.8. Explain the crelation between TU and MU.  
Q.9. What changes will make the consumer make in his consumption pattern of good x and good y when  $MU_x$  is more than  $MU_y$ .  
Q.10. What is consumer equilibrium?

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### ACCOUNTANCY

- Q.1. Frame 15 transactions and show accounting equations based on them in the assignment register.**
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### BUSINESS STUDIES

**Prepare a PPT (maximum 20 slides) on any one form of Business Organisation highlighting Social Responsibility the organization assumes.**

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### HISTORY

**Make a project on the first four civilizations of the world i.e. Indus Valley, Mesopotamian, Egyptian and Chinese with special emphasis on the following aspects:**

1. Sources available
  2. Extent of the civilizations.
  3. Important features.
  4. Reasons for their decline
  5. Compare Indus Valley Civilization with that of Mesopotamia on the basis of their 'town planning'.
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### POLITICAL SCIENCE

*"Politics is the art of the possible, the attainable – the art of the next best"*

(Bismark)

Prepare a Power Point Presentation on the topics given below: (Any One)  
Your PPT slide must include:-

1. 8-10 slides
2. It must have one video content
3. Analysis report

**Topics:**

1. Globalization
2. India relation of any one country:
  - (i) RUSSIA
  - (ii) AMERICA
  - (iii) PAKISTAN
  - (iv) CHINA
3. Iraq conditions present and past
4. SAARC and its objectives
5. Amendment and their importance in Indian Constitution.
6. Fundamental Rights
7. India's role in United Nations