

**ASN Sr. Sec. School**  
**Class 11**  
**HOLIDAY HOMEWORK 2019-2020**

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**SCIENCE**

**ENGLISH**

**Collect newspaper cuttings related to given topics and paste it in your language copy)**

- 1. Classified advertisements (Minimum 5 in each category)**
    - \*Sale/Purchase of property and household items
    - \*To-let and Wanted on Rent
    - \*Sale/Purchase of Vehicles - Two wheelers/Four wheelers
    - \*Situation Vacant and Wanted (job required)
    - \*Matrimonials
    - \*Missing Person/Thing/Pet
  - 2. Commercial/Display advertisement (Minimum 2 in each category)**
    - a) Launching of a product
    - b) Off Season Sale
    - c) Opening of Coaching centres/Boutique/Showroom
  - 3. Formal Invitations (marriage/birthday /house warming ceremony etc and school function) – (one in each category)**
  - 4. Posters ( Social issues) – ( Minimum 1 in each category)**

Road Safety, Terrorism, Self Defence, Woman Empowerment, Environment, Consumer Awareness, Awareness about Diseases
- II. Report Writing**  
**Select reports on the following topics from the newspaper and paste it in your language copy :**
- a) School report highlighting any event(workshop, farewell ,investiture, orientation program, annual function etc.
  - b) Reports related to rally, accidents, burglary, protest etc.
  - c) Mention the differences in the drafting of the two.
- 12. Read the autobiography of Dr. APJ Kalam, 'Wings of Fire' and write a critical review of the same in 200 words.**

**BIOLOGY**

**Do the following assignment in your biology notebook**

**THE LIVING WORLD**

- Q.1 What do you mean by biodiversity?
- Q.2 What is taxonomy?
- Q.3 Who is father of taxonomy?
- Q.4 What is systematics?
- Q.5 What is taxon?

- Q.6 What is Herbarium?  
 Q.7 Name two botanical gardens.  
 Q.8 Who proposed Binomial nomenclature? What do you understand by it?  
 Q.9 What are the universal rules of nomenclature?  
 Q.10 What are taxonomical aids? Name them.  
 Q.11 What are keys? What is their importance?  
 Q.12 Differentiate between natural and artificial classification?  
 Q.13 What is advantage of giving scientific name to organism?  
 Q.14 Give hierarchical classification of House fly ,Mango and Wheat..

### **BIOLOGICAL CLSSIFICATION**

- Q.1 Who proposed 5 kingdom classification?  
 Q.2 What is heterocyst?  
 Q.3 What is mycoplasma?  
 Q.4 What are saprophytes?  
 Q.5 What is alternation of generation?  
 Q.6 What are Halophiles?  
 Q.7 Name the components of lichen.  
 Q.8 What are organisms which synthesise their own food using chemical energy known as?  
 Q.9 Mark odd one out:  
     Family, class , taxon, phylum  
 Q.10 What are the different forms of protists? Write one feature of each.  
 Q.11 To which group do bacteria belong? How have they been classified according to their shape?  
 Q.12 Briefly write about reproduction in kingdom fungi?  
 Q.13 Write four features of phycomycetes.  
 Q.14 Give short note on Virus.  
 Q.15 Differentiate between Ascomycetes and Basidiomycetes in all respects.  
 Q.16 Give the features on the basis of which five kingdom classification has been based.  
 Q.17 Write about the following:  
     a) Cynobacteria  
     b) Euglenoids  
 Q.18 What is the name of fully formed virus particle?  
 Q.19 What is the chemical nature of capsid?  
 Q.20 Which technical term is given to the process of sexual reproduction in paramecium?

- **COMPLETION OF PRACTICAL FILES**
- **Make a project on any of the given topics**  
     **New discoveries in the field of Medicine, Genetics or Biotechnology**  
     **Various methods to combat environmental issues**  
     **Cancer a deadly disease-The preventive and protective Measures**  
     **Animal Physiology**  
     **Plant Physiology**

## **CHEMISTRY**

### **VERY SHORT ANSWER TYPE QUESTIONS (1 MARK)**

1. Calculate the percentage of nitrogen in NH<sub>3</sub>. (82.3%)

2. Vitamin C is known to contain  $1.29 \times 10^{24}$  hydrogen atoms. Calculate the number of moles of hydrogen atoms  
(2.14 mol)
3. State Law of multiple proportion.
4. How many atoms are present in 1mL of  $\text{NH}_3$  at STP? (1.07x10<sup>20</sup> atoms)
5. Which of these weighs most:  
(i) 32g of oxygen (ii) 0.5 mol of Fe (iii)  $3.01 \times 10^{23}$  atoms of carbon.
6. Calculate the number of moles of NaOH in 27 cm<sup>3</sup> of 0.15M NaOH solution.  
(0.00405)
7. 0.5 mol each of  $\text{H}_2\text{S}$  and  $\text{SO}_2$  are mixed together in a reaction flask and reaction takes place according to the following reaction:  
$$2\text{H}_2\text{S} + \text{SO}_2 \rightarrow 2\text{H}_2\text{O} + 3\text{S}$$
Calculate the number of moles of S formed.  
(0.75 mol)
8. If  $6.023 \times 10^{23}$  molecules of  $\text{N}_2$  react completely with  $\text{H}_2$  according to the equation:  
$$\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$$
then calculate the number of molecules of  $\text{NH}_3$  formed.  
(1.204x10<sup>24</sup>)
9. Calculate the volume of 34g of  $\text{NH}_3$  at STP.  
(44.8L)
10. Calculate the mass of iron (III)oxide that will be obtained from oxidation of 2g of Fe.  
  
(2.857g)
11. Which of the following have largest number of atoms and by how much?  
(i)1g of Au (ii) 1g of Na (iii) 1g of Li (iv) 1g of  $\text{Cl}_2$
12. How many atoms of calcium are there in 2g of Ca.?  
(3.011x10<sup>22</sup>)
13. Calculate the mass of 112cm<sup>3</sup> of hydrogen gas at STP.  
(0.01g)
14. Calculate the number of atoms present in 1.4g of  $\text{N}_2$  molecule.
15. Calculate the percentage of Cu in a sample of  $\text{CuCl}_2$ .  
(47.21%)
16. What volume of hydrogen gas will be liberated when 32.65g of Zn reacts with HCl?  
(11.35L)
17. Define (i) molality (ii) molarity (iii) limiting reactant (iv) mole fraction
18. How many number of atoms are present in 52 u of He? (13 atoms)
19. Calculate the percentage of nitrogen in  $\text{NH}_3$ . (82.3%)
20. How are 0.50 mol  $\text{Na}_2\text{CO}_3$  and 0.50 M  $\text{Na}_2\text{CO}_3$  different?
21. Calculate the mass of sodium acetate required to make 500mL of 0.375 M aqueous solution. (15.37g)
22. Calculate the mass of (i) an atom of silver (ii) a molecule of  $\text{CO}_2$ . (atomic mass of Ag is 108u)

## SOME BASIC CONCEPTS OF CHEMISTRY

**SHORT ANSWER TYPE QUESTIONS (2 MARKS)**

- A sample of drinking water was found to be severely contaminated with chloroform ( $\text{CHCl}_3$ ), supposed to be carcinogenic in nature. The level of contamination was 15ppm (by mass).
  - Express this in percent by mass.
  - Determine the molality of chloroform in the water sample. ( $1.5 \times 10^{-3}\%$ ,  $1.255 \times 10^{-4}\text{m}$ )
- Calculate the mass of one molecule of benzene. ( $1.3 \times 10^{22}\text{g}$ )
- An organic compound on analysis was found to contain C=64.4%, H=5.5% and iron = 29.9%. Determine its empirical formula. ( $\text{C}_{10}\text{H}_{10}\text{Fe}$ )
- How many grams of  $\text{Cl}_2$  are required to completely react with 0.4g of  $\text{H}_2$  to yield HCl? Also calculate the amount of HCl formed. (14.2g, 14.6g)
- Calculate the volume of  $\text{O}_2$  liberated at STP by heating 12.25g of  $\text{KClO}_3$ . (3.36L)
- 1M solution of  $\text{NaNO}_3$  has density 1.25g/mL. Calculate its molality. (0.858m)
- The density of 3m solution of NaOH is 1.110g/mL. Calculate the molarity of the solution. (2.97M)

**(3 marks)**

- How much grams of  $\text{KClO}_3$  must be decomposed to prepare 3.36L of oxygen at STP? (12.25g)
- Determine how much grams of ammonia would be produced if 100g of  $\text{N}_2$  reacts with  $\text{H}_2$ ? (121.4g)
- If 2.4 mol of oxygen gas is required, then how many grams of  $\text{KClO}_3$  must be decomposed. (196g)
- An organic compound contains 4.07% of H, 24.27% of C and 71.65% of chlorine. If its molar mass is 98.96g. What is the empirical and molecular formula? ( $\text{CH}_2\text{Cl}$ ,  $\text{C}_2\text{H}_4\text{Cl}_2$ )
- Calculate the mass of FeO formed from 2g of VO and 5.75g of  $\text{Fe}_2\text{O}_3$ .  
 $2\text{VO} + 3\text{Fe}_2\text{O}_3 \rightarrow 6\text{FeO} + \text{V}_2\text{O}_5$  (5.714g)
- If 4g of NaOH dissolves in 36g of  $\text{H}_2\text{O}$ , calculate the mole fraction of each component in the solution. Also determine the molarity of the solution. (Density = 1g/cc) (0.047, 0.953, 2.5M)
- In the reaction  $2\text{A} + 4\text{B} \rightarrow 3\text{C} + 4\text{D}$  when 5 mol of A react with 6 moles of B then find the limiting reactant and calculate the amount of C formed. (B, 4.5 mol)
- How many moles and how many grams of sodium chloride ( $\text{NaCl}$ ) are present in  $250\text{cm}^3$  of a 0.5M NaCl solution?
- If 6.3 gram of  $\text{NaHCO}_3$  is added to 15 g of  $\text{CH}_3\text{COOH}$  solution, the residue is found to be 18g. What is the mass of  $\text{CO}_2$  released in the reaction?
- What is the molality of ammonia in a solution containing 0.85g of  $\text{NH}_3$  in  $100\text{cm}^3$  of a liquid of density  $0.85\text{g/cm}^3$ .

# SOME BASIC CONCEPTS OF CHEMISTRY

CLASS- XI

ASSIGNMENT-3

Q1. Account for the following:

- In the combustion of methane in air, methane is limiting reagent.
- Molality is preferred over molarity in expressing the concentration of a solution.
- It is necessary to balance a chemical equation.
- Air is sometime considered as a heterogenous mixture.

Q2. 3.0 g of  $H_2$  react with 29.0 g of  $O_2$  to form  $H_2O$

- Which is the limiting reactant?
- Calculate the maximum amount of  $H_2O$  that can be formed.
- Calculate the amount of the reactant left unreacted.

Q3. (i) A compound (molecular mass=246g/mol) contains following elements:

Element	% composition	Relative no. of atoms
A	9.76	0.406
B	13.01	0.406
C	26.01	1.625
D	51.22	2.846

From the data find out :

Atomic masses of the element A,B,C and D.

Simple atomic ratio of each element.

Empirical formula.

Molecular formula of the compound.

Q4. In the reaction  $2A + B \rightarrow 3C + 4D$  when 5 mole of A react with 6 mol of B then

(i) which is the limiting reactant (ii) calculate the amount of C formed.

Q5. The density of 3 molal solution of NaOH is 1.110 g/mL. Calculate the molarity of the solution.

(2.97M)

Q6. Calculate the mass percent of calcium phosphorus and oxygen in calcium phosphate.

Q7. If 0.30 mol of Zn is added to 0.52 mol of HCl, then how many moles of  $H_2$  is produced.

Q8. If 20 g of  $CaCO_3$  is treated with 20 g of HCl, how many grams of  $CO_2$  will be produced.

Q9. Calculate the molality of a 1M solution of sodium nitrate. The density of the solution is  $1.25\text{g/cm}^3$ .

Q10. Calculate the volume of oxygen at STP obtained by decomposing 12.26g of  $\text{KClO}_3$ .

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The Periodic table of Chemical Elements is one of the most significant achievements in science, capturing the essence not only of chemistry, but also of physics and biology.

1869 is considered as the year of discovery of the Periodic System by Dmitri Mendeleev. 2019 will be the 150<sup>th</sup> anniversary of the Periodic Table of Chemical Elements and has therefore been marked as the “International Year of the Periodic Table of Chemical Elements (IYPT2019)” by the United Nations General Assembly and UNESCO.

So let's join the celebrations!

Few activities have been planned as holiday homework. Each student will perform individually and submit it within one week of school reopening.

1. Scroll making – Take any five elements from the periodic table and write all information related to it. Like symbol, discovery, atomic mass, atomic number, isotopes, and any other interesting facts etc.
2. PPT presentation- Make a ppt presentation of approximately 10 slides. It should include the making of periodic table, its achievements, its drawbacks etc.
3. Poster making- Draw a poster in A-3 size sheet showing the usefulness of elements in our everyday life.
4. Booklet making- Make a booklet containing all the information about five recently discovered elements.
5. Model making – Make a working model on current research topics like energy saving, environment pollution, water pollution, etc. which can be presented in the forthcoming competition. A group of only two students is permitted.

## PHYSICS

Do complete

(i) Working model of investigatory project, report of project (printed file)

(ii) Experiments in experiment file for which observations have been taken in lab before vacation.

(iii) All the assignments given till date and questions of unit 1 of NCERT

Part -1.

- Dimensions of charge are
  - $M^0 L^0 T^{-1} A^{-1}$
  - $MLTA^{-1}$
  - $T^{-1}A$
  - $TA$
- According to Newton, the viscous force acting between liquid layers of area  $A$  and velocity gradient  $\Delta v/\Delta z$  is given by  $F = -\eta A \frac{\Delta v}{\Delta z}$  where  $\eta$  is constant called coefficient of viscosity. The dimension of  $\eta$  are
  - $[ML^2 T^{-2}]$
  - $[ML^{-1} T^{-1}]$
  - $[ML^{-2} T^{-2}]$
  - $[M^0 L^0 T^0]$
- Identify the pair whose dimensions are equal
  - Torque and work
  - Stress and energy
  - Force and stress
  - Force and work
- The dimensions of pressure is equal to
  - Force per unit volume
  - Energy per unit volume
  - Force
  - Energy
- Which of the two have same dimensions
  - Force and strain
  - Force and stress
  - Angular velocity and frequency
  - Energy and strain
- An object is moving through the liquid. The viscous damping force acting on it is proportional to the velocity. Then dimension of constant of proportionality is
  - $ML^{-1} T^{-1}$
  - $MLT^{-1}$
  - $M^0 L T^{-1}$
  - $ML^0 T^{-1}$
- The dimensions of potential difference in MKS is
  - $ML^{-1} T^{-2} Q^{-2}$
  - $ML^2 T^{-2} Q^{-2}$
  - $MLT^{-2} Q^{-1}$
  - $ML^2 T^{-2} Q^{-1}$
- Which of the following quantities is dimensionless
  - Gravitational constant
  - Planck's constant
  - Power of a convex lens
  - None
- The dimensional formula for Boltzmann's constant ( $k_b$ ) in K.E. =  $\frac{1}{2} k_b T$  is
  - $M^1 L^0 T^{-2}$
  - $M^0 L^1 T^{-1}$
  - $M^1 L^1 T^{-2}$
  - $M^1 L^0 T^{-1}$
- The physical quantities not having same dimensions are
  - Speed and  $(\mu_0 \epsilon_0)^{-1/2}$
  - Torque and work
  - Momentum and Planck's constant
  - Stress and Young's modulus
- Dimension of  $R$  is

- (a)  $ML^2T^{-1}$  (b)  $ML^2T^{-3}A^{-2}$   
 (c)  $ML^{-1}T^{-2}$  (d) None of these
13. The dimensional formula of relative density is  
 (a)  $ML^{-3}$  (b)  $LT^{-1}$   
 (c)  $MLT^{-2}$  (d) Dimensionless
14. The dimensional formula for young's modulus is  
 (a)  $ML^{-1}T^{-2}$  (b)  $M^0LT^{-2}$   
 (c)  $MLT^{-2}$  (d)  $ML^2T^{-2}$
15. Frequency is the function of density ( $\rho$ ), length ( $a$ ) and surface tension ( $T$ ). Then its value is  
 (a)  $k\rho^{1/2}a^{3/2}/\sqrt{T}$  (b)  $k\rho^{3/2}a^{3/2}/\sqrt{T}$   
 (c)  $k\rho^{1/2}a^{3/2}/T^{3/4}$  (d)  $k\rho^{1/2}a^{1/2}/T^{3/2}$
16. The dimensions of electric potential are  
 (a)  $[ML^2T^{-2}Q^{-1}]$  (b)  $[MLT^{-2}Q^{-1}]$   
 (c)  $[ML^2T^{-1}Q]$  (d)  $[ML^2T^{-2}Q]$
17. Dimensions of potential energy are  
 (a)  $MLT^{-1}$  (b)  $ML^2T^{-2}$   
 (c)  $ML^{-1}T^{-2}$  (d)  $ML^{-1}T^{-1}$
18. The dimension of E/h are  
 (a)  $T^2$  (b)  $T$   
 (c)  $T^{-1}$  (d)  $T^{-2}$
19. The dimensions of shear modulus are  
 (a)  $MLT^{-1}$  (b)  $ML^2T^{-2}$   
 (c)  $ML^{-1}T^{-2}$  (d)  $MLT^{-2}$
20. Pressure gradient has the same dimension as that of  
 (a) Velocity gradient (b) Potential gradient  
 (c) Energy gradient (d) None of these
21. If force ( $F$ ), length ( $L$ ) and time ( $T$ ) are assumed to be fundamental units, then the dimensional formula of the mass will be  
 (a)  $FL^{-1}T^2$  (b)  $FL^{-1}T^{-2}$   
 (c)  $FL^{-1}T^{-1}$  (d)  $FL^2T^2$
22. The dimensions of universal gas constant is  
 (a)  $[ML^2T^{-2}\theta^{-1}]$  (b)  $[M^2LT^{-2}\theta]$   
 (c)  $[ML^3T^{-1}\theta^{-1}]$  (d) None of these
23. In the relation  $y = a \cos(\omega t - kx)$ , the dimensional formula for  $k$  is  
 (a)  $[M^0L^{-1}T^{-1}]$  (b)  $[M^0LT^{-1}]$   
 (c)  $[M^0L^{-1}T^0]$  (d)  $[M^0LT]$
24. Position of a body with acceleration 'a' is given by  $x = Ka^m t^n$ , here  $t$  is time. Find dimension of  $m$  and  $n$ .  
 (a)  $m = 1, n = 1$  (b)  $m = 1, n = 2$   
 (c)  $m = 2, n = 1$  (d)  $m = 2, n = 2$
25. "Pascal-Second" has dimension of  
 (a) Force (b) Energy  
 (c) Pressure (d) Coefficient of viscosity
26. In a system of units if force ( $F$ ), acceleration ( $A$ ) and time ( $T$ ) are taken as fundamental units then the dimensional formula of energy is  
 (a)  $FA^2T$  (b)  $FAT^2$

- (c)  $F^2AT$  (d)  $FAT$
27. Out of the following pair, which one does not have identical dimensions
- (a) Moment of inertia and moment of force  
 (b) Work and torque  
 (c) Angular momentum and Planck's constant  
 (d) Impulse and momentum
28. The ratio of the dimension of Planck's constant and that of moment of inertia is the dimension of
- (a) Frequency (b) Velocity  
 (c) Angular momentum (d) Time
29. Which of the following group have different dimension
- (a) Potential difference, EMF, voltage  
 (b) Pressure, stress, young's modulus  
 (c) Heat, energy, work-done  
 (d) Dipole moment, electric flux, electric field
30. Out of following four dimensional quantities, which one quantity is to be called a dimensional constant
- (a) Acceleration due to gravity  
 (b) Surface tension of water  
 (c) Weight of a standard kilogram mass  
 (d) The velocity of light in vacuum
31. Density of a liquid in CGS system is  $0.625 \text{ g/cm}^3$ . What is its magnitude in SI system
- (a) 0.625 (b) 0.0625  
 (c) 0.00625 (d) 625
32. If the acceleration due to gravity is  $10 \text{ ms}^{-2}$  and the units of length and time are changed in kilometer and hour respectively, the numerical value of the acceleration is
- (a) 360000 (b) 72,000  
 (c) 36,000 (d) 129600
33. The velocity of a particle depends upon as  $v = a + bt + ct^2$ ; if the velocity is in  $\text{m/sec}$ , the unit of  $a$  will be
- (a)  $\text{m/sec}$  (b)  $\text{m/sec}^2$   
 (c)  $\text{m}^2/\text{sec}$  (d)  $\text{m/sec}^3$
34. Number of particles is given by  $n = -D \frac{n_2 - n_1}{x_2 - x_1}$  crossing a unit area perpendicular to X-axis in unit time, where  $n_1$  and  $n_2$  are number of particles per unit volume for the value of  $x$  meant to  $x_2$  and  $x_1$ . Find dimensions of  $D$  called as diffusion constant
- (a)  $M^0 L T^2$  (b)  $M^0 L^2 T^{-4}$   
 (c)  $M^0 L T^{-3}$  (d)  $M^0 L^2 T^{-1}$
35. With the usual notations, the following equation  $S_t = u + \frac{1}{2} a(2t - 1)$  is
- (a) Only numerically correct  
 (b) Only dimensionally correct  
 (c) Both numerically and dimensionally correct  
 (d) Neither numerically nor dimensionally correct
36. If the dimensions of length are expressed as  $G^x c^y h^z$ ; where  $G, c$  and  $h$  are the universal gravitational constant, speed of light and Planck's constant respectively, then determine  $x, y$  and  $z$ .
37. One million electron volt ( $1 \text{ MeV}$ ) is equal to
- (a)  $10^5 \text{ eV}$  (b)  $10^6 \text{ eV}$

- (c)  $10^4 \text{ eV}$                       (d)  $10^7 \text{ eV}$
38.  $\text{Erg} - \text{m}^{-1}$  can be the unit of measure for [DCE 1993]  
 (a) Force                              (b) Momentum  
 (c) Power                              (d) Acceleration
39. The unit of potential energy is  
 (a)  $\text{g}(\text{cm}/\text{sec}^2)$                       (b)  $\text{g}(\text{cm}/\text{sec})^2$   
 (c)  $\text{g}(\text{cm}^2/\text{sec})$                       (d)  $\text{g}(\text{cm}/\text{sec})$
40. Which of the following represents a volt  
 (a) *Joule/second*                      (b) *Watt/Ampere*  
 (c) *Watt/Coulomb*                      (d) *Coulomb/Joule*
41. *Kilowatt-hour* is a unit of  
 (a) Electrical charge                      (b) Energy  
 (c) Power                              (d) Force
42. One yard in SI units is equal  
 (a) 1.9144 *metre*                      (b) 0.9144 *metre*  
 (c) 0.09144 *kilometre*                      (d) 1.0936 *kilometre*
43. Which of the following is smallest unit  
 (a) *Millimetre*                      (b) *Angstrom*  
 (c) *Fermi*                              (d) *Metre*
44. Which relation is wrong  
 (a) 1 *Calorie* = 4.18 *Joules*  
 (b)  $1 \text{ \AA} = 10^{-10} \text{ m}$   
 (c) 1 *MeV* =  $1.6 \times 10^{-13}$  *Joules*  
 (d) 1 *Newton* =  $10^{-5}$  *Dynes*
45. If  $x = at + bt^2$ , where  $x$  is the distance travelled by the body in kilometres while  $t$  is the time in seconds, then the units of  $b$  are  
 (a) *km/s*                              (b) *km-s*  
 (c) *km/s<sup>2</sup>*                              (d) *km-s<sup>2</sup>*
46. The equation  $\left(P + \frac{a}{V^2}\right)(V - b)$  constant. The units of  $a$  are  
 (a) *Dyne  $\times$  cm<sup>5</sup>*                      (b) *Dyne  $\times$  cm<sup>4</sup>*  
 (c) *Dyne/cm<sup>3</sup>*                      (d) *Dyne/cm<sup>2</sup>*
47. Which of the following quantity is expressed as force per unit area  
 (a) Work                              (b) Pressure  
 (c) Volume                              (d) Area
48. Match List-I with List-II and select the correct answer by using the codes given below the lists
- |                                      |                |
|--------------------------------------|----------------|
| List-I                               | List-II        |
| (a) Distance between earth and stars | 1. Microns     |
| (b) Inter-atomic distance in a solid | 2. Angstroms   |
| (c) Size of the nucleus              | 3. Light years |
| (d) Wavelength of infrared laser     | 4. Fermi       |
|                                      | 5. Kilometres  |
- Codes
- |       |   |   |   |       |   |   |   |
|-------|---|---|---|-------|---|---|---|
| a     | b | c | d | a     | b | c | d |
| (a) 5 | 4 | 2 | 1 | (b) 3 | 2 | 4 | 1 |
| (c) 5 | 2 | 4 | 3 | (d) 3 | 4 | 1 | 2 |

## MATHEMATICS

### LINEAR INEQUALITIES

#### 1 mark questions

Q1. Solve the following linear inequation  $\frac{7x-8}{8x+3} > 4$

Q2. Solve the inequation  $2x-3 \geq x + \frac{1-x}{3} > \frac{2}{5}x$

Q3. Find the solution set of  $(x-1)(3-x)(x-2)^2 \leq 0$

Q4. Solve the inequation  $|4-x| > x-4$

Q5. Find the solution set of  $|3x+2| > 14$

Q6. If  $X < 5$ , then

- a)  $-x < -5$       b)  $-x \leq -5$       c)  $-x > -5$       d)  $-x \geq -5$

Q7. Given that  $x, y$  and  $b$  are real numbers and  $x < y$ ,  $b < 0$ , then

- a)  $x/b < y/b$       b)  $x/b \leq y/b$       c)  $x/b > y/b$       d)  $x/b \geq y/b$

Q8. If  $-3x + 17 < -13$

- a)  $x \in (10, \infty)$       b)  $x \in [10, \infty)$       c)  $x \in (-\infty, 10]$       d)  $x \in [-10, 10)$

Q9. If  $x$  is a real number and  $|x| < 3$ , then

- a)  $x \geq 3$       b)  $-3 < x < 3$       c)  $x \leq -3$       d)  $-3 \leq x \leq 3$

Q10. If  $|x - 1| > 5$ , then

- a)  $x \in (-4, 6)$       b)  $x \in [10, \infty)$       c)  $x \in (-\infty, 10]$       d)  $x \in [-10, 10)$

#### 4 marks questions

Q11. A company manufactures cassettes and its cost equation for a week is  $C = 300 + 1.5x$  and its revenue equation is  $R = 2x$ , where  $x$  is the number of cassettes sold in a week. How many cassettes must be sold for the company to realize a profit?

Q12. The water acidity in a pool is considered normal when the average pH reading of three daily measurement is between 7.2 and 7.8. if the first two pH readings are 7.48 and 7.85 find the range of pH value for third reading that will result in the actual level being normal.

Q13. Find all pairs of consecutive odd natural numbers both of which are larger than 10 and are such that their sum is smaller than 40.

#### 6 marks questions

Q14. Show that the following system of linear inequalities has no solution :

$$X + 2y \leq 3, \quad 3x + 4y \geq 12, \quad x \geq 0, \quad y \geq 1$$

Q15. A solution of 8% boric acid is to be diluted by adding 2% boric acid solution to it. The resulting mixture is to be more than 4% but less than 6% boric acid. If we have 640 litres of the 8% solution, how many litres of the 2% solution will have to be added?

Q16.  $m$  litres of acid solution contains  $m\%$  acid. How many litres of acid may be added to it so that the resulting solution may have the acid content lying between  $2m\%$  and  $3m\%$ ?

### SEQUENCES AND SERIES

#### 1 mark questions

Q1. How many terms of the series  $54, 51, 48, \dots$  be taken so that their sum is 513?

Q2. Find the arithmetic mean between  $(x - y)$  and  $(x + y)$ ?

Q3. Insert three A.M. between 3 and 19.

Q4. Which term of the G.P.  $2, 1, \frac{1}{2}, \frac{1}{4}, \dots$  is 128?

Q5. How many terms of the G.P.  $1 + 4 + 16 + 64 + \dots$  will make the sum 5461?

Q6. Solve :  $1 + 6 + 11 + 16 + \dots + x = 148$

Q7. How many terms of the G.P.  $3, 3/2, 3/4, \dots$  are needed to give the sum  $3069/512$ ?

#### 4 marks questions

- Q8. If the roots of  $(b-c)x^2+(c-a)x+(a-b)=0$  are equal, then prove that  $a, b, c$  are in A.P.
- Q9. If  $a+b+c \neq 0$  and  $b+c/a, c+a/b, a+b/c$  are in A.P., prove that  $1/a, 1/b, 1/c$  are also in A.P.
- Q10. If  $S_1$  be the sum of  $(2n+1)$  terms of an A.P. and  $S_2$  be the sum of its odd terms, then prove that  $S_1:S_2=(2n+1):(n+1)$ .
- Q11. If the sum of  $n$  terms of two arithmetic series are in the ratio  $7n+1:4n+27$ , find the ratio of their  $11^{\text{th}}$  terms.
- Q12. The sum of  $n$  terms of three A.P.'s are  $S_1, S_2$  and  $S_3$ . The first term of each is unity and the common difference are 1, 2 and 3 respectively. Prove that  $S_1+S_3=2S_2$ .
- Q13. The sides of a right angled triangle are in A.P. Show that these are in the ratio 3:4:5.
- Q14. How many terms of the G.P.  $3, 3/2, 3/4, \dots$  are needed to give the sum  $3069/512$ ?
- Q15. Find the sum of 50 terms of the sequence  $7, 7.7, 7.77, 7.777, \dots$
- Q16. In an increasing G.P., the sum of the first and the last term is 66. The product of the second and the last but one is 128 and the sum of the terms is 126. How many terms are there in the progression?
- Q17. The first term of a G.P. is 2 and the sum to infinity is 6. Find the common ratio.
- Q18. Prove that  $: 3^{1/2}.3^{1/4}.3^{1/8} \dots = 3$
- Q19. If  $x= 1+a+a^2+\dots$  and  $y= 1+b+b^2+\dots$ , then prove that  $1+ab+a^2b^2+\dots = xy/(x+y-1)$
- Q20. Find two numbers whose arithmetic mean is 34 and geometric mean is 16.
- Q21. One side of an equilateral triangle is 24cm. the mid points of its sides are joined to form another triangle whose mid points, in turn, are joined to form still another triangle. This process continues indefinitely. Find the sum of the perimeters of all the triangles.
- Q22. Find two numbers whose A.M. is 34 and G.M. is 16.
- Q23. Find three numbers in A.P. whose sum is 24 and whose product is 440.
- Q24. Divide 32 into four parts which are in A.P. such that the products of the extremes is to the product of means is 7:15.
- Q25. Find a G.P. the sum of whose first two terms is 4 and the fifth term is four times the third.
- Q26. The sum of first three terms of a G.P. is 16 and the sum of the next three terms is 128. Determine the first term and the common ratio of the G.P.
- Q27. If A.M. and G.M. of two positive numbers  $a$  and  $b$  are 10 and 8 respectively, find the numbers.
- Q28. If reciprocals of  $\frac{x+y}{2}, y, \frac{y+z}{2}$  are in A.P. show that  $x, y, z$  are in G.P.
- Q29. The sum of three numbers in G.P. is 42. If the first two numbers are increased by 2 and third is decreased by 4, the resulting numbers form an A.P. find the numbers of G.P.
- Q30. If  $a$  is the A.M. between  $b$  and  $c$ , and  $b$  is the G.M. between  $a$  and  $c$ , then show that  $\frac{1}{a}, \frac{1}{c}, \frac{1}{b}$  are in A.P.
- Q31. If  $a, b, c$  are in A.P. and  $x, y, z$  are in G.P., then show that  $x^{b-c}.y^{c-a}.z^{a-b}=1$
- 6 marks questions
- Q32. Find the  $n^{\text{th}}$  term of the series  $1+3+7+15+31 \dots$ . Also find the sum to  $n$  terms.
- Q33. Find three numbers which are in A.P. and whose sum is 15. If 1, 4, 19 be added to them respectively, the resulting numbers are in G.P.. Find the numbers.

## TRIGONOMETRY

### 1 mark questions

- Q1. If  $\tan A = k \tan B$ , show that  $\sin(A+B) = \frac{k+1}{k-1} \sin(A-B)$

Q2. Find the angle between the minute hand and hour hands of a clock at 8:30.

Q3. A circular wire of radius 7cm is cut and bent again into an arc of a circle of radius 12cm. Find the angle subtended by the arc at the centre in degrees.

#### 4 mark questions

Solve the following equations

Q7.  $2\cos^2\theta + 3\sin\theta = 0$

Q8.  $\cot^2\theta + \frac{3}{\sin\theta} + 3 = 0$

Q9. Prove that:  $\sqrt{2 + \sqrt{2 + \sqrt{2 + 2\cos 8\theta}}} = 2\cos\theta$

Q10. Prove that :  $\cos 36^\circ = (\sqrt{5} + 1)/4$

Q11. The angles of a triangle are in A.P. The number of degrees in the least is to the number of radians in the greatest is  $60:\pi$ . Find the angles in degrees.  $30^\circ, 60^\circ, 90^\circ$ .

Q12. Prove that:  $\frac{\cos(90+\theta)\sec(-\theta)\tan(180-\theta)}{\sec(360-\theta)\sin(180+\theta)\cot(90-\theta)} = -1$

Q13. Prove that  $\frac{\sec 8A - 1}{\sec 4A - 1} = \frac{\tan 8A}{\tan 2A}$

Q14. Prove that:  $2\cos\frac{\pi}{13}\cos\frac{9\pi}{13} + \cos\frac{3\pi}{13} + \cos\frac{5\pi}{13} = 0$

Q15. Prove that:  $\cos^2 x + \cos^2(x + \frac{2\pi}{3}) + \cos^2(x - \frac{2\pi}{3}) = 3/2$

Q16. Prove that:  $\frac{\cos 8A \cos 5A - \cos 12A \cos 9A}{\sin 8A \cos 5A + \cos 12A \sin 9A} = \tan 4A$

Q17. Prove that:  $\sin A \sin(60^\circ - A) \sin(60^\circ + A) = \frac{1}{4} \sin 3A$

Q18. If  $\tan x = 3/4$ ,  $\pi < x < \frac{3\pi}{2}$  find the values of  $\tan \frac{x}{2}$ ,  $\sin \frac{x}{2}$ ,  $\cos \frac{x}{2}$ .

In any triangle ABC, prove that:

Q19.  $\frac{\sin(B-C)}{\sin(B+C)} = (b^2 - c^2)/a^2$

Q20.  $a\sin(B-C) + b\sin(C-A) + c\sin(A-B) = 0$

Q21.  $a^3\sin(B-C) + b^3\sin(C-A) + c^3\sin(A-B) = 0$

Q22.  $\sin\left(\frac{B-C}{2}\right) = \left(\frac{b-c}{a}\right)\cos\frac{A}{2}$

Q23.  $a\cos\left(\frac{B-C}{2}\right) = (b+c)\sin\frac{A}{2}$

Q24.  $\left(\frac{b-c}{b+c}\right) = \frac{\tan\left(\frac{B-C}{2}\right)}{\tan\left(\frac{B+C}{2}\right)}$

#### 6 marks questions

Q25. Prove that:  $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = 1/16$

Q26. Prove that:  $\sin 10^\circ \sin 30^\circ \sin 50^\circ \sin 70^\circ = 1/16$

Q27. Prove that:  $\cos^2 A + \cos^2\left(A + \frac{2\pi}{3}\right) + \cos^2\left(A - \frac{2\pi}{3}\right) = 3/2$

In any triangle ABC, prove that :

Q28.  $(b-c)\cot\frac{A}{2} + (c-a)\cot\frac{B}{2} + (a-b)\cot\frac{C}{2} = 0$

Q29.  $\left(\frac{b-c}{b+c}\right)\cot\frac{A}{2} = \tan\left(\frac{B-C}{2}\right)$

Q30.  $\tan\left(\frac{A-B}{2}\right) = \left(\frac{a-b}{a+b}\right)\cot\frac{C}{2}$

$$Q31. \tan\left(\frac{C-A}{2}\right) = \left(\frac{c-a}{c+a}\right)\cot\frac{B}{2}$$

$$Q32. (b^2-c^2)\cot A + (c^2-a^2)\cot B + (a^2-b^2)\cot C = 0$$

$$Q33. (b^2-c^2)\sin 2A/a^2 + (c^2-a^2)\sin 2B/b^2 + (a^2-b^2)\sin 2C/c^2 = 0$$

## ECONOMICS

- 1) Prepare a Handwritten Project on any **One** of the following topics:
  - a) Effect on PPC due to various government policies
  - b) Solar Energy, a cost-effective Comparison with conventional Energy Sources
  - c) Globalization and Economics
  - d) Demand and its Determinants (with applications)
  - e) Supply and its Determinants (with applications)
  - f) Any Concept from the syllabus

Project report needs to be prepared in accordance with the guidelines given in class.

- 2) Do the Assignment on Chapter-1(Introduction)of Introductory Microeconomics.

## PSYCHOLOGY

1. Project: Psychology as a discipline emerged as a result of various western developments. It has an interesting history. The students have to trace back the journey to the roots of Psychology as discipline and prepare a project on the topic “Development of Psychological Thought. (Use pictures, article clippings, facts etc in the report)
2. Assignment: Complete the assignment on Chapter 1: What is Psychology (as discussed in the class)

## PHYSICAL EDUCATION

Important Instructions:

Students prepare their practical file on the basis following events.

- 1- Physical Fitness Test- Students will write about Athletics, in which include introduction, lay out of 400 meter track, all running events, jumping events and throwing events, their fundamental skills, terminologies,
- 2- Students will write about one games and sports skills of any one game of choice from the given list  
Athletics, Archery, Badminton, Boxing, Chess, Judo, Shooting, Skating, Swimming, Taekwondo, Tennis, Aerobics, Gymnastics, Yoga, Bocce and Unified Basketball (CWSN).
- 3- Yogic Practices – Students will write about (8) eight yogic asana from the given book with their procedure, Benefits and Contraindications.
- 4- Students will complete their practical file to given above computations:

## **HOME SCIENCE**

1. Prepare a file on any 10 nutritive recipies based on Iron and Calcium content.  
Collect advertisement related to Consumer Protection

## **COMPUTER SCIENCE**

Make a Film/ Documentary on any social/ environment /health related problem of your vicinity with a possible solution proposed

1. Format: .MP4/ .AVI
2. Language Hindi/ English or Bilingual
3. Format SD/ HD
4. The movie/ Documentary should not violate the copyright/intellectual property law.
5. Time :3-5 min