Home Assignment
Class XII Science

English

1. Write a classified advertisement for a professional photographer seeking a high profile job with an ad agency ,a video company or a fashion house. Write in about 50 words.
2. As the Sports' Captain of your school, write a letter to the Principal informing him of the urgent need of repairs to the tennis and basketball courts. Also request to purchase some cricket items. [Word limit 120-150]
3. After class 12, students are apprehensive about choosing the course and the college. The Mission Admission organized by the Times of India is a great platform for college aspirants. It would help them to get knowledge about emerging opportunities in various streams. Write an article in 150-200 words emphasizing the need of career counseling to help students with the admission process.
4. Prepare a speech to be delivered on 'Power of Positive Thinking' in the morning assembly in about 150-200 words.
5. You saw a train accident last week when a train collided with another train while changing the track .Write a report in about 150-200 words.
6. The whole nation and its citizens are witnessing unprecedented time. The threat of COVID-19 has affected all the lives – from a commoner to a billionaire. Amidst this crisis people have found innovative ways to spend their time during lockdown of 21 days. What do you do to spend your time, write a paragraph on your practices during the self isolation.
7. Colors are the essence of life .There are many idioms in English which have colours name in them for instance – Green Thumb means a person fond of gardening , Golden opportunity means a good chance. Find out ten such interesting idioms with their meanings and use them in sentences of your own.
8.Design a poster to sensitize the people regarding the threat of COVID-19.Create your own jingle to make it impactful.
6. "A reader lives a thousand lives before he dies."Here is a list of some classic novels for you to read and enrich yourself. You can read them in summary form on internet .

The Tempest by William Shakespeare
David Copperfield by Charles Dickens
Wuthering Heights by Emily Bronte
Tess of the D'Urbervilles by Thomas Hardy
Silas Marner by George Eliot

Once you read them , write a short note on the novel you liked most and on the character that you found interesting stating the reason for your liking in about 100 words.

Note-All the work should be done meticulously in a separate file or thin notebook .

Physics

ELECTROSTATICS

Chapter at a glance:

Electrostatics is the study of charges at rest.

The intrinsic property of fundamental particle of matter which give rise to electric force between objects is called charge.

Charging a body can be done by friction, induction and conduction.

Properties of charges:

Like charges repel and unlike charges attract.

Charges are additive in nature i.e., $Q=\sum_{i=1}^{n} q_i$

Charges are quantized. i.e., Q= ± ne [n=1,2,3,… & e=1.602 X10-19 C] o Charge on a body is independent of velocity of the body.

Charge is conserved.

The sensitive device which is used to identify whether the body is charged or not is called electroscope

Coulomb's law: The electrostatic force between two point charges is directly proportional to the product of the charges and inversely proportional to the square of the distance between them.

- The charge is said to be one coulomb when it is separated from similar charge by one meter experiences a force of repulsion 9 x 10^9 N.
- The period of revolution of charge q_1 of mass m about charge q_2 along the circular path of radius r is $T = \sqrt{\frac{16\pi^3\epsilon_o m r^3}{q_1 q_2}}$
- Principle of superposition: $\vec{F}_{total} = \sum_{i=1}^{n} \vec{F}_i$[Vector sum of individual forces]

$$= \frac{1}{4\pi\varepsilon_o}\frac{q_1 q_2}{r_{12}^2}\hat{r}_{12} + \frac{1}{4\pi\varepsilon_o}\frac{q_1 q_3}{r_{13}^2}\hat{r}_{13} + \ldots.$$

- Uniform Charge distribution:

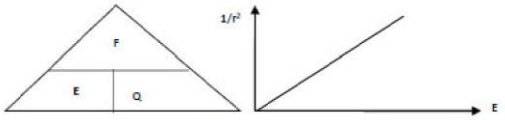
  Linear charge distribution: $\lambda = \frac{\Delta q}{\Delta l}$ [$\lambda \Rightarrow$ linear charge density Unit Cm^{-1}]

  Surface charge distribution: $\sigma = \frac{\Delta q}{\Delta S}$ [$\sigma \Rightarrow$ surface charge density Unit Cm^{-2}]

  Volume charge distribution: $\rho = \frac{\Delta q}{\Delta V}$ [$\rho \Rightarrow$ Volume charge density Unit Cm^{-3}]
- Force due to continuous charge distribution:

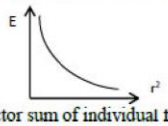
$$\vec{F} = \frac{q_o}{4\pi\epsilon_0}\left[\int_L \frac{\lambda\, dl}{r^2} + \int_S \frac{\sigma\, dS}{r^2} + \int_V \frac{\rho\, dV}{r^2}\right]\hat{r}$$

- The comparison of electrostatic and gravitational forces between electron and proton is $\frac{F_e}{F_g} = \frac{ke^2}{Gm_p m_e} = 2.27 \times 10^{39}$.



Note: *In the above triangle the quantity shown at the vertex, could be arrived by multiplying the quantities shown at the base, i.e. F=E X Q.*
Any one of the quantity shown at the base is given by the ratio of the quantities shown at vertex & the other quantity shown at the base, i.e. E=F/Q or Q= F/E.

- Electric field: Force experienced by a unit positive charge. It is a vector. SI unit is NC^{-1}. $\vec{E} = \underset{q_o \to 0}{Lt} \frac{\vec{F}}{q_o}$
- Field due to a point charge Q at r is $\vec{E} = \frac{kQ}{r^2}\hat{r}$



- Principle of superposition: $\vec{E}_{total} = \sum_{i=1}^{n} \vec{E}_i$[vector sum of individual fields]
- Electric field due to continuous charge distribution:

$$\vec{E} = \frac{1}{4\pi\epsilon_0}\left[\int_L \frac{\lambda\, dl}{r^2} + \int_S \frac{\sigma\, dS}{r^2} + \int_V \frac{\rho\, dV}{r^2}\right]\hat{r}$$

Dipole : Two equal and opposite charges separated by a small distance.

Dipole moment: Product of magnitude of either charge and distance of separation between them. It is a vector. SI unit: Cm, direction of $\vec{p}$ is from negative charge to positive charge along the straight line joining both the charges. $\vec{p} = (Q)\,2a\,\hat{i}$

Dipole in a uniform electric field experiences no net translating force but experiences a torque.

$\vec{\tau} = \vec{p} \times \vec{E} \Rightarrow \vec{\tau} = |\vec{p}||\vec{E}| \sin\theta\, \hat{n}$

If $\theta = 0° \Rightarrow$ stable equilibrium; If $\theta = 180° \Rightarrow$ unstable equilibrium.

- at a point on the axial line: $E_{axial} = \frac{2kp}{r^3}$ along the direction of dipole moment
- At a point on the equatorial line: $E_{eq} = \frac{kp}{r^3}$ opposite to the direction of dipole moment.

• Electric field due to a short dipole

♦ Properties of electric field lines:

✓ Arbitrarily starts from +ve charge and end at –ve charge

✓ Continuous, without any breaks, never form closed loops

✓ Never intersect

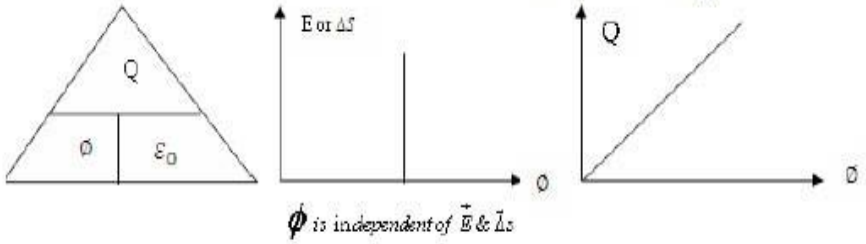
✓ Relative closeness of the field lines represents the magnitude of the fieldstrength.

✓ For a set of two like charges – lateral pressure in between

✓ For a set of two unlike charges – longitudinal contraction in between.

♦ **Area vector: The vector quantity representing the area of a surface whosemagnitude is equal to the magnitude of the area and direction is perpendicular to the surface.**

- Electric flux: $\emptyset=\overrightarrow{\Delta S}.\vec{E}=\left|\vec{E}\right|\left|\overrightarrow{\Delta S}\right|cos\theta$; It is a scalar; SI unit: N m^2C^{-1} or Vm.
- Gauss' theorem in electrostatics: $\emptyset_{total}=\oint_s \vec{E}.\overrightarrow{dS}=\frac{q_{total}}{\epsilon_0}$



ϕ is independent of $\vec{E}$ & $\vec{\Delta s}$

- Applications of Gauss' theorem for uniform charge distribution:

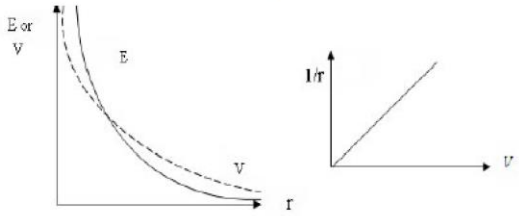
Expression for	Infinite Linear	Infinite plane sheet	Thin spherical shell
Flux Ø	$\frac{\lambda l}{\epsilon_0}$	$\frac{\sigma s}{\epsilon_0}$	$\frac{\sigma 4\pi r^2}{\epsilon_0}$
Magnitude of Field E	$\frac{\lambda}{2\pi r\epsilon_0}$	$\frac{\sigma}{\epsilon_0}$	$\frac{Q}{4\pi r^2\epsilon_0}$ [for points on/outside the shell] ZERO [for points inside the shell]
Charge density	$\lambda=\frac{\Delta q}{\Delta l}$	$\sigma=\frac{\Delta q}{\Delta S}$	$\frac{\sigma}{4\pi r^2}$

- Electrostatic Potential: Work done per unit positive Test charge to move it from infinity to that point in an electric field. It is a scalar. SI unit: J/C or V

$$V = W / q_0$$

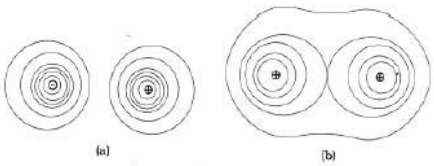
Electric potential for a point charge: $V=\frac{kq}{r}$

- The electrostatic potential at any point in an electric field is said to be one volt when one joule of work is done in bringing one unit charge from infinity to that point.
- The electric field intensity at any point is the negative gradient of potential at that point. $E=-dV/dr$. $V(\vec{r})=-\int_\infty^r \vec{E}.\overrightarrow{dr}$
- As $E=-\frac{dV}{dr}$ If V is constant, $E\propto\frac{1}{r}$ and if E is constant, $V\propto r$



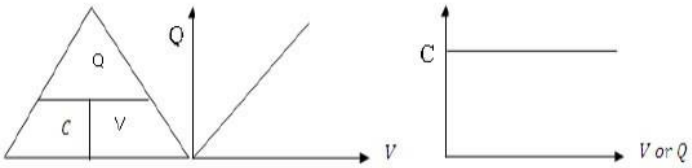
- Electric field is conservative. This means that the work done is independent of the path followed and the total work done in a closed path is zero.
- Potential due to a system of charges: $v_{total}=\sum_{i=1}^{n}\frac{kq_i}{r_i}$
- Potential due to a dipole at a point
  - on its axial line: $V_{axial}=\frac{k|\vec{p}|}{r^2}$ [or] $\frac{k|\vec{p}|}{r^2}cos\theta$
  - on its equatorial line: $V_{eq}=0$
- Potential difference $V_A-V_B=kq\left[\frac{1}{r_A}-\frac{1}{r_B}\right]$
- Potential energy of two charges: $U=\frac{kq_1q_2}{r}$
- Potential energy of a dipole : $U=-\vec{p}.\vec{E}=pE\ [cos\theta_1-cos\theta_2]$
- Equipotential surfaces: The surfaces on which the potential is same everywhere.
  - ✓ Work done in moving a charge over an equipotential surface is zero.

✓ No two equipotential surfaces intersect.
✓ Electric field lines are always perpendicular to the equipotential surfaces.
✓ The relative density of equipotential surface gives intensity of electric field in that region.

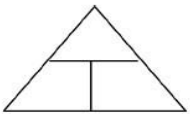


Some equipotential surfaces for (a) a dipole, (b) two identical positive charges.

- **Electrostatics of conductors**
  - (i) Inside a conductor Electrostatic field is zero
  - (ii) On the surface E is always Normal to the surface
  - (iii) No excess charge resides inside the conductor
  - (iv) Charge distribution on the surface is uniform if the surface is smooth
  - (v) Electric field is zero in the cavity of hollow conductor and potential remains constant which is equal to that on the surface.
- Capacitor: An arrangement of two conductors separated by a small distance without any electrical contact between them is called capacitor.



- Capacitance: $C = \frac{Q}{V}$, Ratio of charge and potential difference. Scalar. SI unit: farad [F]. The capacitance is said to be one farad when one coulomb of charge increases the potential difference between the plates by one volt.
- Capacitance of a parallel plate capacitor: $C = \frac{\epsilon_0 A}{d}$
- Capacitance of a parallel plate capacitor with a dielectric medium in between:
  - $C_m = \frac{\epsilon_0 A}{\left(d - t + \frac{t}{k}\right)}$
  - If t=0 $\Rightarrow C_0 = \frac{\epsilon_0 A}{(d)}$
  - If t=d $\Rightarrow C_0 = k\frac{\epsilon_0 A}{(d)} \Rightarrow C_m = k\, C_0$



- Combination of capacitors:
  Capacitors in series: $\frac{1}{c} = \sum_{i=1}^{n} \frac{1}{c_i}$ Capacitors in parallel: $c = \sum_{i=1}^{n} c_i$
- Energy stored in capacitors: $U = \frac{1}{2}CV^2 = \frac{1}{2}QV = \frac{1}{2}\frac{Q^2}{C}$
- Area shaded in the graph = U $= \frac{1}{2}QV$
- Energy density : $U_d = \frac{1}{2}\epsilon_0 E^2 = \frac{\sigma^2}{2\epsilon_0}$

- The total energy in series and parallel combinations of capacitors is additive.
- When two charged conductors are touched mutually and then separated the redistribution of charges on them is in the ratio of their capacitances.
- Introducing dielectric slab between the plates of the charged capacitor with:

Property	Battery connected	Battery disconnected
Charge	K Q_0	Q_0
Potential difference	V_0	V_0/K
Electric field	E_0	E_0/K
Capacitance	KC_0	KC_0
Energy	K times $\frac{1}{2}\epsilon_0 E^2$[Energy is supplied By battery]	1/K times $\frac{1}{2}\epsilon_0 E^2$[Energy used for Polarization]

- On connecting two charged capacitors:
  - Common Potential: $V = \frac{C_1V_1 + C_2V_2}{V_1 + V_2}$
  - Loss of energy: $\Delta U = \frac{1}{2}\frac{C_1 \times C_2}{C_1 + C_2}(V_1 - V_2)^2$

- The dielectric is the substance which is essentially an insulator but behaves like a conductor inelectrostatic situation.
- The dielectric having atom or molecules whose negative charge centre is not coinciding

withpositive charge centre is called polar dielectric. They have permanent dipole moments in the order of 10^{-30} Cm.

- The dielectric having atom or molecules whose negative charge centre is coinciding with positivecharge centre is called non-polar dielectric.
- The dipole moment developed in non-polar dielectric due to external electric field is calledinduced dipole moment.
- The induced dipole moment per unit volume is called Polarisation Vector. The direction ofpolarisation vector is same as that of external electric filed.
- The ratio of electrostatic force in free space to that in medium OR the ratio of electrostatic field infree space to that in medium OR the ratio of absolute permittivity of medium to that of free space is called relative permittivity or dielecric constant of the medium. $\epsilon_o OR\ K$
- The ratio of polarisation to ϵ_o times the electric field intensity is called electric susceptibility. $\chi = \frac{P}{\epsilon_o E}$ he dielectrics with constant χ are called linear dielectrics.
- The maximum external electric field the dielectric can withstand without dielectric beakdown iscalled dielectric strength. SI unit Vm^{-1}
- The capacitance of a spherical conductor of radius R is $C = 4\pi\epsilon_o R$.

BASED QUESTIONS

1.A polythene piece rubbed with wool is found to have negative charge of$3x10^{-7}$ C.

(i)Estimate the number of electrons transferred (from which to which?).

(ii)Is there a transfer of mass from wool to polythene?

2.(i) Calculate the charge carried by $12.5x10^{18}$ electrons.

(ii) What is the basic difference between force between two masses and the force between two charges?

3. Two charges q.1 and q2 separated by a small distance, satisfy the equation q1+q2=0. What does it tell about the charges ?

4. Two identical metallic spheres A and B having charges +4Q and -10Q are kept at a certain distance apart. A third identical uncharged sphere C is first placed in contact with sphere A and then with sphere B. Sphere A and B are then brought in contact and then separated. Find the final charges on the spheres A and B.

5.In Coulomb 's law $F=K\ q1q2/r^2$, state the factors on which the proportionality constant K depends.

6.Is the force acting between two electric charges q1 and q2 kept at some distance apart in air, attractive or repulsive when (i) q1.q2>0(ii) q1.q2< 0.

7. Two point charges having equal charges separated by 1 m distance experience a force of 8 N. What will be the force experienced by them, if they are held in water, at the same distance? Given(Kwater =80)

9. Two point electric charges of unknown magnitude and sign are placed at a distance d apart. The electric field intensity is zero at a point, not between the charges but on the line joining them. Write the essential conditions for this to happen.

10. Calculate the electric field strength required just to balance a water drop of mass 10^{-7} kg and having a charge of $1.6x10^{-19}$ C ($g= 10m/s^2$).

11.A particle of mass m and charge a is released in a uniform electric field E. Calculate the kinetic energy it attains after moving a distance x.

12. Why electric field lines

(i) can never intersect one another?

(ii) can not formed closed loops. (iii)Can not have break in between?

13.Sketch the electric field lines, when a positive charge is kept in the vicinity of an uncharged conducting plate.

14. Ordinary rubber is an insulator , but the special rubber tyres of aircrafts are made slightly conducting why is the necessary?

15. If 10^9electrons move out of a body to another body every second, how much time is required to get a total charge of 1 C on the other body?

16. Explain the role of earthling in house hold wiring

17. What is the difference between charging by induction and charging by friction?

18.Milikan performed an experiment in which the charge on minute oil drops were determined

The charges were always found as some discrete values and not any arbitrary value, why?

19.When a glass rod after rubbing with wool is brought near an ebonite rod, it(i) attract(ii) repels the definite rod. What do you conclude about the charge on the ebonite rod?

20. Two uncharged copper spheres A and B are of exactly equal masses. Sphere A is given the charge +q and sphere B is given the charge -q . Are their masses after charging equal?

21. Draw electric lines of force for an electric dipole.

22. Two charges +25 e and -9e are placed in air at separation of 40 cm. Where should a third charge a be placed so that it may remain in equilibrium.

23. Two similarly equally charged identical metal spheres A and B repel each other with a force of 2.0×10^{-5} N. A third identical uncharged sphere C is touched to A, then replaced at the mid point between A and B. Calculate the net static force on C.

MCQs based on Coulomb's Law and electric field

1. The law of force that governs the force between two electric charges was discovered by
   (a.) Ampere. (b.) Faraday (c.) Ohm (d.) Coulomb
2. The dielectric constant of metal is:
   (a.) 1. (b.) Greater than 1. (c.) Zero (d.) Infinite
3. Electrons remain bound to the nucleus due to which of the following forces:
   (a.) Electrostatics. (b.) Van der waals
   (c.) Gravitation. (d.) Nuclear

4.Four charges +q ,+2q, -2q and +a are placed at thecorners of a square ABCD. The force on the charge kept at the centre O is :

(a.) Zero. (b.) Along the diagonal BD (c.)along the diagonal AC (d.) Perpendicular to AB

5. Charges 4Q ,q and Q are placed along X-axis at positions x=0, x=l/2 and x=l respectively. Fond the value of a so that the force on charge Q is zero.

(a.) Q. (b.) Q/2 (c) -Q/2 (d.) -Q

6. When soap bubble is charged

(a.) It contracts. (b.) It expands (c.) It bursts

(d.) It neither contracts nor expands

7. Five balls numbered 1 to 5 are suspended using separate threads. Pairs (1,2),(2,4),(4,1) show electrostatics attraction, while pairs (2,3)and (4,5) show repulsion. Therefore, ball 1 must be:

(a.) Positively charged (b.) Negatively charged

(c.) Neutral. (d.) Made of metal

8. Which of the following is unit electric charge

(a.) Coulomb (b.) Newton (c.) Volt (d.) Ampere

9. A charge Q is aced at each of the opposite corners of a square. A charge a is placed at each of the other two corners. If the net electrical force on Q is zero, then Q/a equals:

(a.) 1. (b.) -1/under root 2 (c.) -2under root 2 (d.) -1

10. An Infinite number of charges, each of charge 1 micro coulmb are placed on the x-axis with coordinates x=1,2,4,8,16,.....infinity. If a charge of 1 C is kept at the origin, then what is the net force acting on 1 C charge?

(a.) 9000 N (b.) 12000 N (c.) 24000N (d.)3600 N

To make a project report (hand written at least 20 pages) on the given topic :

Roll no. 1 to 3

Gauss's law and its application

Roll no.4 to 6

Moving coil galvanometer

Roll no. 7 to 9

Cyclotron and its application.

Roll no. 10 to 12

AC generator and its application.

Roll no.13 to 15

Nuclear reactor and its application.

Roll no. 16 to 18

Velocity filter and its application.

Roll no.19 to 21

Transformer and its application.

Chemistry

1. **Define following term:**
   a) Molarity b) Molality c) mole fraction
2. **Define following term:**
   a) Mass percentage b) mass by volume percentage
3. Calculate the mass percentage of Benzene. If 22 g of Benzene is dissolved in 122 g of Carbon tetra chloride.
4. Calculate the mole fraction of ethylene glycol ($C_2H_6O_2$) in aqueous solution containing 20% $C_2H_6O_2$ by mass.
5. Calculate the molality of 2.5 g of ethanoic acid in 75 g of Benzene.
6. Calculate a) molality b) molarity c) mole fraction of KI if the density of 20% (w/w) aqueous KI is 1.202 g / ml.
7. A solution of glucose in water is labelled as 10% w/w. What would be the molality and mole fraction of each component in he solution ? If the density of solution is 1.2 g / ml , then what she'll be the molarity of the solution?
8. How many milliliters' of 0.1 M HCl are required to react completely with 1g mixture of Na_2CO_3 and $NaHCO_3$ containing equimolaramounts of both?
9. How will you convert following:
   a) Propene to propane – 1 – ol d) Benzene to diphenyl
   b) Choro ethane to n- butane e)ethanol to but – 1 - yne
   c) Toluene to benzyl alcohol f) 1- bromo propane to 2- bromo propane
10. **Complete the following equations:**
    a) $(CH_3)_3 C Br + KOH \rightarrow ?$ (Alcoholic) d) $C_6H_5CH_3 + Cl_2 / hv \rightarrow ?$
    b) $CH_3 CH_2 CH = CH_2 + HBr \rightarrow ?$ e) $CH_3CH_2Cl + KOH \rightarrow ?$ (aq.)
    c) $C_6H_5OH + Zn \rightarrow ?$
11. **Identify the A, B, C, D and E in the following:**

H2O Mg alc. KOH. HBr Na

E <------ D ←---------- CH3-CH(CH3) CH2- Br ----------→**A** ---------→**B** --→**C**

Dry ether. Dry ether

Biology

Answer the following question in biology notebook.

1. What is clone?

2. What are vegetable propagules?

3. What are vegetable propagules in eichhornic, potato, onion, ginger, penicillium, sponge?

4. Name the plant which flowers once in 12 years.

5. Explain embryogenesis in plants.

6. Explain embryogenesis in animals.

7. Disadvantages of external fertilizers.

8. What is sporulation?

9. Explain why meiosis and embryogenesis are interlinked.

10. Difference Zoospore and Zygote.

11. What do you mean by the term uniparental?

12. A moss plant produces a large no. of antherozoids but a few egg cells. Why?

13. What is parthenogenesis? Give few examples for animals.

14. Amoeba immortal. Explain.

15. What is fruit, seeds and embryo?

16. The number of chromosomes in the shoot tip cells of maize plant is 20. What will be the number of chromosomes in the gametes and microspore mother cells of the same plant?

17. Explain the events of sexual reproduction?

18. What do you mean by sessional breeders.

19. Name 2 plant groups with diploid plant body.

20. Mention a characteristics features and function of Zoospores in some algae.

21. Mention the site where syngamy takes place in amphibians and reptiles respectively.

22. List 2 main pre-fertilization events.

23. Technical term to denote unisexual condition.

24. Differentiate parthenogenesis and parthenocarpy.

25. Name 2 plant groups having haploid body.

Make a project report on genetically modified organisms including their use and abuse.

Mathematics

Q.1. Find the sum of the series $5^3 + 6^3 + \ldots\ldots 10^3$

Q. 2 Find the number of all one-one functions from set A = {1, 2, 3} to itself.

Q. 3 Show that if f : Ao B and g : B o C are one-one, then gof : Ao C is also one-one.

Q.4 Show that the relation R on the set Z of all integers, given byR = [(a, b) : 2 divides (a – b)] is an equivalence relation

Q.5 : If roots of the equation $(a – b)x^2 + (c – a)x + (b – c) = 0$ are equal, then a, b, c are in

(i) A.P. (ii) H.P. (iii) G.P. (iv) none of these

Q. 6 A committee of two members is selected from two men and two women. What is the probability that the committee will have one man.

Q.7 Given that P (3, 2, –4), Q (5, 4, –6) and R (9, 8, –10) are collinear. Find the ratio in which Q divides PR.

Q. 8 Given that the events A and B are such that P(A) = 1/2, P (A ∪ B) = 3/5, and P(B) = p. Find p if they are

(i) mutually exclusive

(ii) independent

Q.9 Determine the principal value of $\cos^{-1}(-1/2)$

Q.10 There are twenty students in a class. If 8 of them are girls and a team of 2 boys and 2 girls is to be selected from the class for its anniversary, in how many ways it can be done.

Q.11 If 15 men or 24 women or 36 boys can do a piece of work in 12 days, working 8 hours a day, how many men must be associated with 12 women and 6 boys to do another piece of work $2\frac{1}{2}$ times as great in 3o days working 6 hrs a day?

Q.12 Find the equation of the lines through the point of intersection of the lines $x - y + 1 = 0$ and $2x - 3y + 5 = 0$ and whose distance from the point (3,2) is 7/5 .

Q.13 Find the equation of one of the sides of an isosceles right angled triangle whose hypotenuse is given by $3x + 4y = 4$ and the opposite vertex of the hypotenuse is (2,2) .

Q.14 Evaluate $\lim_{x\to\pi/4} \frac{tanx^3 - tanx}{\cos(x+\frac{\pi}{4})}$

Q.15 Project (i) Project on history of Mathematicians: It may include history of Indian mathematicians such as Aryabhata, Brahmgupta, Varahamihir, Sridhara, Bhaskaracharya, Ramanujan etc., and history of foreign mathematicians such as Cantor, Pythagoras, Thales, Euclid, Appollonius, Descartes, Fermat, Leibnitz, Euler, Fibonac, Gauss, Newton, etc.

(ii) Prepare a project based on the Fibonacci sequence, their properties and similar pattern found in nature.

Physical Education

Project file of any one1 games and sports:- Basketball, Volleyball, Handball, Kabaddi, Kho Kho, Football
Contents:-
1 history
2 fundamental skill
3 field and measurement
4 terminology
5 common sports injuries
6 Important personality
7 Tournaments
8 Equipments
9 Essential nutritional for players