ARMY PUBLIC SCHOOL KANPUR
HOLIDAY HOMEWORK
Class XII

HINDI

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COMPUTER SCIENCE

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CHEMISTRY HOLIDAY HOMEWORK

Roll No.	Title of the Project
01, 27	Effect of Acid rain on Limestone rock
02, 28	To determine the rate of fermentation of various fruit juices
03,29	To measure amount of Acetic acid present in Vinegar
04, 30	Amount of Casein in Milk
05, 31	To study the method of purification of water
06, 32	Determination of Caffeine in the various Tea samples
07, 33	Synthesis of Aspirin
08, 34	Study of the acids and mineral contents of vegetables and fruits
09, 35	Preparation of Potash Alum
10, 36	To study the foaming capacity of soaps and the effect of addition of Sodium carbonate on their foaming capacity
11, 37	To check ions present in toothpaste
12, 38	Analysis of Honey
13, 39	To determine which antacid neutralize stomach acid most
14, 40	Study of pH in different samples of water
15, 41	Rate of evaporation in various liquids
16, 42	Determination of EMF of a cell
17, 43	To study the setting of cement
18, 44	Comparative study and Qualitative analysis of different brands of cold drinks available in Market
19, 45	Study the quantity of casein present in different samples of milk
20	Study of the presence of oxalate ions in guava fruit at different stages of ripening.
21	Preparation of soybean milk and its comparison with natural milk with respect to curd formation, the effect of temperature, etc.
22	Study of the effect of Potassium Bisulphate as a food preservative under various conditions (temperature, concentration, time, etc.)
23	Study of digestion of starch by salivary amylase and effect of pH and temperature on it.
24	Comparative study of the rate of fermentation of the following materials: wheat flour, gram flour, potato juice, carrot juice, etc.

25	**Extraction of essential oils present in Saunf (aniseed), Ajwain (carum), Illaichi (cardamom).**
26	**Study of common food adulterants in fat, oil, butter, sugar, turmeric power, chilli powder and pepper.**

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Dear Students important message regarding CHEMISTRY Projects

Read the message carefully and follow the instruction

1. You all have to prepare your chemistry project file without spiral binding in A4 Size pages.
2. Minimum 20 pages are required
3. Sequence order is Mandatory as per allotted roll number wise

CHAPTER 2
SOLUTIONS
Short Answer Type Question(1 mark)

SECTION -A

Q 1. What is semi permeable membrane. Give an example of a material use for making semipermeable membrane for carrying out reverse osmosis?
Q 2. Solution *A* is obtained by dissolving 1 g of urea in 100 g of water and solution Bis obtained by dissolving 1 g of glucose in 100g of water. Which solution will have a higher boiling point and why?
Q 3. Explain why on addition of 1 mol of NaCl to 1 litre of water, the boiling point of water increases, while addition of 1 mol of methyl alcohol to one litre of water decreases its boiling point?

Q 4. Define an ideal solution and write one of its characteristics?
Q 5. What is meant by reverse osmosis ?
Q6. Explain boiling point elevation constant for a solvent / Define ebullioscopic constant?
Q7 Explain why aquatic species are more comfortable in cold water rather than in warm water?

Q8 Why do gases nearly always tend to be less soluble in liquid as the temperature is raised?

SECTION -B

Q1. How is relative lowering of vapour pressure defined for a solution consisting of volatile solvent and non – volatile solute? How is this function related to the mole fraction of the solvent and of the solute?

Q2. What is meant by abnormal molecular mass of solute? Discuss the factors which bring abnormality in the experimentally determined molecular masses of solutes using colligative properties?

Q3 How is the vapour pressure of a solvent affected when a non volatile solute is dissolved in it?

Q4. The depression in freezing point of water observed for the same molar concentrations of acetic acid, trichloro acetic acid and trifluoroacetic acid increases in the order as stated above. Explain?

Q5. Differentiate between molarity and molality for a solution. How does a change in temperature influence their values?

Q6. What is meant by colligative property. List any four factors on which colligative properties of a solution depend?

Q7. An aqueous solution of sodium chloride freezes below 273K. Explain the lowering in freezing point of water with the help of a suitable diagram?

SECTION -C

Q1. A solution prepared by dissolving 1.25g of oil of winter green (methyl salicylate) in 99.0 g of benzene has a boiling point of 80.31^0C. Determine the molar mass of this compound (BP of pure benzene = 80.31^0C & K_B for benzene = $2.53\ \text{mol}^{-1}$)

Q2. A sample of drinking water was found to be severely contaminated with chloroform $CHCl_3$, supposed to be carcinogen. The level of contamination was 15ppm (by mass)?

- **(i) Express this in percent by mass.**
- **(ii) Determine the molality of $CHCl_3$ in water sample.**

Q3 Some ethylene glycol is added to your car's cooling system along with 5kg of water. If the freezing point of water-glycol solution is -15^0c, what is the boiling point of the solution?

Q4 Assuming complete dissociation. Calculate the expected freezing point of a solution prepared by dissolving 6g of Glauber's salt, $Na_2SO_4.10\ H_2O$ in 0.1 Kg mol^{-1} of water. K_f of water = 1.86 K Kg mol^{-1}.

Q5. Calculate the mass of a nonvolatile solute (molar mass 40g mol^{-1}) which should be dissolved in 114 g octane to reduce its vapour its pressure to 80%?

Q6 19.5g of CH_2FCOOH is dissolved in 500g of water. The depression in freezing point observed is 1^oc. Calculate the Van't Hoff factor and dissociation constant of fluoroacetic acid . K_f for water is1.86 K $Kgmol^{-1}$.

Q7. Non ideal solutions exhibit either positive or negative deviations from Raoult's law. What are these deviations and why are they caused? Explain with one example for each type?

SECTION -D

Q1 2 g of benzoic acid (C_6H_5COOH) dissolved in 25g of benzene shows a depression in freezing point equal to 1.62 K. Molal depression constant for benzene is 4.9 K kg mol^{-1}. What is the percentage association of acid if it forms dimer in solution?

Q2. (i) What is Van't Hoff factor? What types of values can it have if in forming the solution the solute molecules undergo

- **(a) Dissociation?**

(b) Association?

Q3. (i) The molecular masses of polymers are determined by osmotic pressure method and not by measuring other colligative properties. Give two reasons?

(ii) At 300k, 36g of glucose $C_6H_{12}O_6$ present per litre in its solution has a pressure pf 4.98 bar. If the osmotic pressure of another glucose solution is 1.52 bar at the same temperature, calculate the concentration of the other solution?

Q 4 (i) Define the terms osmosis and osmotic pressure?

(ii) An aqueous solution containing 12.48g of barium chloride in 1.0 kg of water boils at 373.0832 k. Calculate the degree of dissociation of barium chloride?

(Given K_b for H_2O = 0.52 Km^{-1} molar mass of Ba Cl_2 = 208.34 $gmol^{-1}$)

Q5. (a) What type of deviation is shown by a mixture of ethanol and acetone? Give reason.

(b) What do you expect to happen when RBC's are placed in

(i) 1% NaCl solution (ii) 0.5 % NaCl solution

(c) Calculate the molarity of 68% (w/w) solution of nitric acid , if the density of the solution is 1.504 g ml^{-1}

Q 6. Concentrated aqueous sulphuric acid is 98% by mass and has a density of 1.80 g mL^{-1}. Volume of acid required to make one litre of 0.1 M H_2SO_4 solution is

Q 7. To neutralize completely 20 mL of 0.1 M aqueous solution of phosphorous acid (H_3PO_3), the value of 0.1 M aqueous KOH solution required is :

Q 8. On mixing, heptane and octane form an ideal solution. At 373 K, the vapour pressures of the two liquid components (heptane and octane) are 105 kPa and 45 kPa respectively. Vapour pressure of the solution obtained by mixing 25.0g of heptane and 35 g of octane will be (molar mass of heptane = 100 g mol^{-1} and of octane = 114 g mol^{-1})

(a) 144.5kPa (b) **72.0 kPa** (c) 36.1 kPa (d) 96.2 kPa

Q 9. Ethylene glycol is used as antifreeze in a cold climate. Mass of ethylene glycol which should be added to 4 kg of water to prevent it from freezing at -6^0C will be : (K_f for water = 1.86 K kg mol^{-1}; molar mass of ethylene glycol = 62 g mol^{-1})

(a) 804.32 g (b) 204.30 g (c) 400.00 (d) 304.60g

CHAPTER 3

ELECTRO CHEMISTRY

SECTION -A

Short Answer Type Question (1 Mark each)

Q1. Under what condition is E_{cell} = 0 or $_rG^o$ = 0 ?

Q2. A galvanic cell has electrical potential of 1.1V.If an opposing potential of 1.1 V is applied to this cell, what will happen to the cell reaction and the current flowing through the cell?

Q3. Why does the conductivity of a solution decrease with dilution?

Q4 What does the negative sign the expression E^0Zn^{2+} / Zn = -0.76 V mean?

Q5 State Kohlrausch laws of independent migration of ions?

Q6 Write two advantages of H_2O_2 fuel cell over ordinary cell?

Q7 Express the relation among the conductivity of a solution in the cell, the cell constant and the resistance of solution in the cell?

Q8 What is electrode potential?

Q9 Is it safe to stir $AgNO_3$ solution with a copper spoon? Why or Why not ?

Given :- E^o Ag+/Ag = 0.8 volt and E^o cu^{2+} /Cu = 0.34 volt

Q10 What is the role of $ZnCl_2$ in a dry cell?

Q11 State faraday's first law of electrolysis ?

SECTION -B

Q1. What is corrosion? Describe the role of zinc in cathodic protection of iron. Can we use tin in place of zinc for this purpose? Give reason.

Q2. Calculate the potential of hydrogen electrode in contact with a solution whose pH is 10.

Q3. Mention the reactions occurring at (i) Anode (ii) Cathode, during the working of a mercury cell. Why does the voltage of a mercury cell remain constant during its operation?

Q4. Explain why electrolysis of aqueous solution of NaCl gives H_2 at cathode & Cl_2 at anode? Write overall reaction?

Q5. Calculate ΔG for the reaction, Mg (s) + Cu^{2+} (aq) $\longrightarrow$ Mg^{2+} (aq) + Cu (s)
Given E^o cell = + 2.71V 1F = 96500 ($Cmol^{-1}$)

Q6. Calculate the degree of dissociation of acetic acid at 298K given that

λ_m^o (CH_3COOH) = 11.7 Scm^2 mol^{-1}

λ_m^o (CH_3COO^-) = 40.9 Scm^2 mol^{-1}

λ_m^o (H^+) = 349.1 Scm^2 mol^{-1}

Q7. A solution of $Ni(NO_3)_2$ is electrolyzed between platinum electrodes using a current of 5 A for 20 min. What mass of nickel will be deposited at the cathode?

Given : Atomic mass of Ni = 58.7 $gmol^{-1}$ 1F = 96,500 (mol^{-1})

Q8. (a) Define electrochemical series .

(b) Given that the standard electrode potentials (E^o) metals are :-

K^+/K = -2.93V, Ag^+/Ag = 0.8V, Cu^{2+}/Cu = 0.34V, Mg^{2+}/Mg = -2.37V,
Cr^{3+}/Cr = - 0.74, Fe^{2+}/Fe = -0.44V.

SECTION -C

Arrange these metals in an increasing order of their reducing power.

Q1. (i) Following reactions occur at cathode during the electrolysis of aqueous silver chloride solution :

Ag^+ (aq) + e^- $\longrightarrow$ Ag (s): E^o = +0.80 V

H^+ (aq) + e^- $\rightarrow$ $\frac{1}{2}H_2$ (g): E^o = 0.00 V

On the basis of their standard reduction electrode potential E^o values, which reaction is feasible at the cathode and why?

(ii) Define limiting molar conductivity. Why conductivity of an electrolyte solution decreases with the decrease , in concentration?

Q2. Three electrolytic cells A, B,C containing solutions of $ZnSO_4$, $AgNO_3$ and $CuSO_4$ respectively are connected in series . A steady current of 1.5A was passed through them until 1.45 g of Ag were deposited at the cathode of cell B. How long did the current flow? What mass of copper and what mass of zinc were deposited in the concerned cells? (Atomic mass of Ag = 108 , Zn = 65.4 u and Cu = 63.5u)

Q3. What type of battery is lead storage battery? Write the anode and cathode reactions and the overall cell reaction occurring in the operation of a lead storage battery?

Q4. The resistance of 0.01M NaCl solution at 25^{o}c is 200 Ω. The cell constant of the conductivity cell used is unity. Calculate the molar conductivity of the solution.

Q5. A strip of nickel metal is placed in a 1 molar solution of $Ni(NO_3)_2$ and a strip of silver metal is placed in one molar solution of $AgNO_3$. An electrochemical cell is created when the two solutions are connected by a salt bridge and the two strips are connected by wires to a voltameter?

(i) Write the balanced equations for the overall reaction occurring in the cell and calculate the cell potential.

(ii) Calculate the cell potential, E at 25^{o}C for the cell, if the initial concentration of $Ni(NO_3)_2$ is 0.100 molar and initial concentration of $AgNO_3$ is 1.00 molar.

[E^o Ni^{2+}/Ni = - 0.25V, E^o Ag^+/Ag = 0.8V log 10^{-1} = -1]

Q6. Determine the values of equilibrium constant (Kc) and ΔG^0 for the following reaction.

Ni (s) + 2 Ag^+ (aq) $\rightarrow$ Ni^{2+} (aq) + 2Ag (s)

E^o= 1.05V (1F = 96500 $cmol^{-1}$)

Q7. Set up Nernst equation for the standard dry cell. Using this equation show that the voltage of a dry cell has to decrease with use?

Q 8. What is the relationship between Gibbs free energy of the cell reaction in a galvanic cell and emf of the cell. When will the maximum work be obtained from a galvanic cell?

Physical Education

1. Make a practical file on Major Game and Yoga (Helpful in preventing Obesity , Asthma , Diabetes, Hypertension).
2. Do 5 Short type(80 to 90 words), 5 long type Questions (150 to 200 words) from Chapter 1 and 2.
3. ----------

BIOLOGY HOLIDAY HOMEWORK (CLASS XII 2022-23)

I. Suggested Topics for Class XII/AISSCE 2022(Investigatory Project)
Prepare the project as per guidelines discussed in class.

- **Pollination and its types, agencies etc**
- **Pollen-pistil Interaction**
- **Cancer-Diagnosis, Causes and treatment**
- **Medicinal plants / Ayurvedic Medicines and their uses**
- **Biotechnology Applications**
- **Assisted Reproductive Techniques**
- **AIDS -Lifecycle of virus, treatment etc.**
- **Mendelian disorders**
- **Chromosomal disorders**
- **Alternative sources of energy**
- **Healthy Lifestyles and various related Diseases**
- **Drugs- their source and effects on adolescents.**
- **Cancer (Diagnosis, Symptoms, Treatment)**
- **Uses of microorganisms-Commercial and household**
- **Transcription and Translation**
- **Gene Therapy**
- **Ecosystem and its types**
- **PCR Technology**
- **Robotic Surgery**
- **DNA Fingerprinting**
- **Diagnostic Techniques (e.g. CT Scan, MRI, PET etc.)**

Choose one topic from the above list and start collecting literature and relevant material on it, submit the draft report with relevant case studies and other data after the summer vacation.

II. **Draw the following diagrams of Biology in the practical file:**

- **T.S. of Mammalian Ovary & Testis**
- **T.S. of Blastula**
- **Disease causing Pathogen (Ascaris, Ent amoeba, Plasmodium vivax, Ring worm)**

Homologous and analogous organs

Root nodules in leguminous plants

iii. Revise the Chapters and complete the following assignment sheet in your Biology registers.

Assignment sheet

Section A

1 Marks Questions

1. Failure of testes to descend into scrotal sacs leads to sterility. Why?

2. Both vaccine and colostrum produce immunity. Name type of immunity produced by these.

3. How many sperms will be produced from 10 primary spermatocytes and how many eggs will be produced from 10 primary oocytes?

4. The spermatogonial cell has 46 chromosomes in human male. Give the number of chromosomes in
(a) Primary spermatocyte (b) Spermatid

5. In ovary which structure transforms as corpus luteum and name the hormone secreted by corpus luteum?

6. "Each and every coitus does not results in fertilisation and pregnancy". Justify the statement.

7. Why are male testes located outside the abdominal cavity?

8. State the function of Leydig cells.

9. Where do we find fimbriae?

10. What are constituents of the seminal plasma.

11. Define parturition.

12. Where does fertilization normally takes place in a human female.

13. Name the substance present in the sperm acrosome & which help in sperms entry into egg.

14. Name the layer of cells that forms the outer wall of blastocyst.

15. At what stage is the mammalian embryo implanted in uterus?

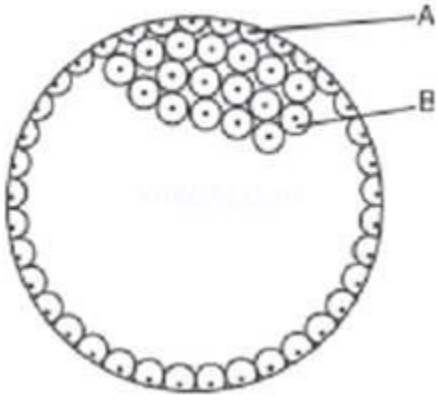
16. Despite the presence of So many sperms in the vicinity of an egg cell, only one sperm enters the ovum. How is polyspermy prevented?

17. How many polar bodies are given out in production of one egg during oogenesis?

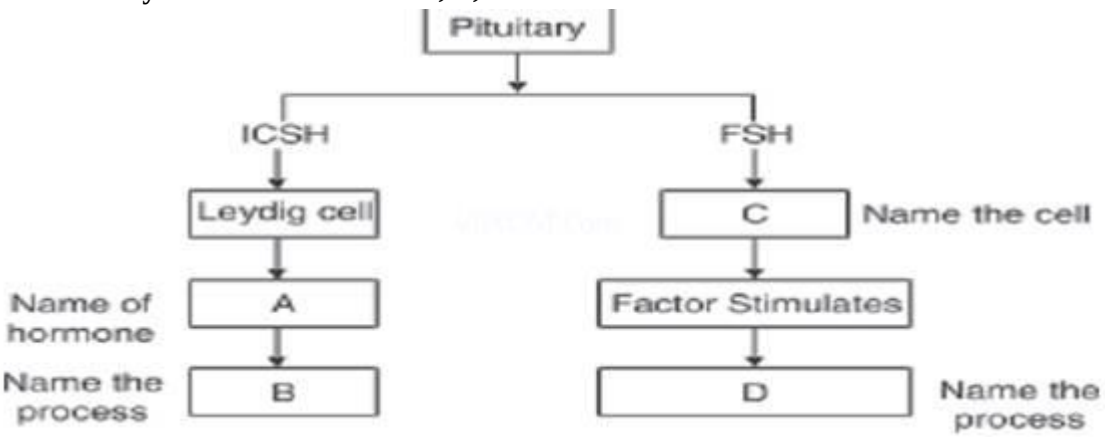
Section B

1. Give the function of
(a) Corpus luteum
(b) Endometrium

2. In the given figure, give the name and functions of parts labeled A and B.



3. Given below is an incomplete flow chart showing influence of hormone on gametogenesis in male, observe the flow chart carefully and fill in the blank A, B, C and D.



4. Give reason for the following :
(a) The first half of the menstrual cycle is called follicular phase as well as proliferative phase.
(b) The second half of the menstrual cycle is called luteal phase as well as secretory phase.

5. What is meant by L.H. Surge? Write the role of L.H.

6. Explain significance of the condition in which the testes remain suspended in scrotum outside the abdomen.
Ans. Human sperm cells cannot develop at body temperature. Spermatogenesis and maintenance of the seminiferous tubules requires a temperature slightly lower than that of the body. This is provided by the scrotum, which lies outside the abdominal cavity.

7. Describe the structure of a sperm with a diagram.
8. Enlist any two functions of a female placenta.

9. What is the number of chromosomes in the following cells? Primary oocyte, secondary oocyte, ootid and follicle.

10.Draw a pollen grain and label its parts neatly. Write the function of each part.

11. Where are leydig cells located? What do they secrete?

12. Draw well labeled diagram of T.S. of ovary?

13. Why testes of human males are considered extra abdominal? What is the significance of this condition?

14. Draw a diagram of the T.S. of seminiferous tubule of testis of an adult human male & label any four parts in it. Write down the function of each part.
15. What is colostrum? What is its significance to new born baby?

PHYSICS

Q.1 why can one ignore quantization of charge when dealing with macroscopic charges?

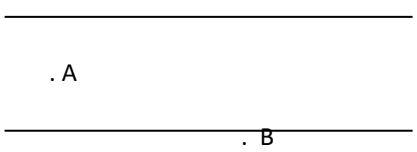
Q.2 what orientation of an electric dipole in a uniform electric field corresponds to stable equilibrium?

Q.3 Name the physical quantity whose SI unit is JC^{-1}.Is it a scalar or a vector quantity?

Q.4 what is the amount of work done in moving 100 μC charge between two points 5 cm apart on an equipotential surface?

Q.5 The distance of the field point on the axis of a small electric dipole is doubled. By what factor will the electric field due to the dipole change?

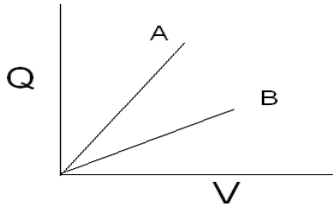
Q.6 In a parallel plate capacitor the potential difference of 10^2 V is maintained between the plates.What will be electric field at points A and B.?



Q.7.A Gaussian surface encloses an electric dipole within it. What is the total flux across sphere?

Q.8 What is the angle between the directions of electric field at any (i) axial point and(ii)equatorial point due to an electric dipole?

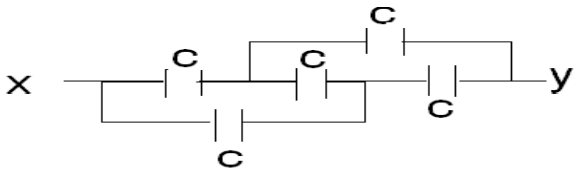
Q9. The given graph shows that the variation of charge versus potential difference V for the two capacitors C1 & C2. The two capacitors have same plate separation but the plate area of C2 is doubled than that of C1. Which of the line in the graph corresponds to C1 &C2 and why?



Q10. A point charge q is placed at O as shown in the figure.

Is V_P-V_Q +ve or –ve when (i) q>0, (ii) q<0? Justify your answer.

Q11. Why does the electric field inside a dielectric decrease when it is placed in an external electric field?
Q12. A charged particle is free to move in an electric field. Will it always move along an electric line of force?
Q13. If V (=q/4πεor) is the potential at a distance r due to a point charge q, then determine the electric field due to a point charge q, at a distance r.
Q14. Draw an arrangement of three point charges separated by finite distances, that has zero electric Potential energy.
Q15. Charge of 2C is placed at the centre of a cube of volume 8 cm^3. What is the electric flux passing through one face? Three charges, each equal to +2C are placed at the corners of an equilateral triangle. If the force between any two charges be F, then what will be the net force on either Charge?
Q16. A charged particle q is shot towards another charged particle Q which is fixed, with a speed v. It approaches Q up to a closest distance r and then returns. If q were given a speed 2v,then find the closest distance of approach.
Q17. Two capacitors of capacitance 6mF and 12mF are connected in series with the battery .The voltage across the 6mF capacitor is 2 volt .Compute the total battery voltage.
Q18. Five identical capacitors, each of capacitance C are connected between points X and Y as shown in the figure. If the equivalent capacitance of the combination between X and Y is 5mF.
Calculate the capacitance of each capacitor.



Q19. A parallel plate capacitor with air between the plates has a capacitance of 8 pF . The separation between the plates is now reduced by half and the space between them is filled with a medium of dielectric constant 5. Calculate the value of capacitance of parallel plate capacitor in second case.

Q20. A uniform electric field of 2 kNC^{-1} is in the x-direction. A point charge of 3 μC initially at rest at the origin is released. What is the kinetic energy of this charge at x = 4m?

Q.21. Two identical metal plates are given the charges Q_1 and Q_2 ($Q_2 < Q_1$) respectively. If they are now brought close together to form a parallel plate capacitor with capacitance C then what is the potential difference between them?

Q22. Three charges Q, +q and +q are placed at the vertices of a right angle isosceles triangle as shown. Find the magnitude of Q for which net electrostatic energy of the configuration is zero.

Q.23. A charge Q is distributed over the two concentric hollow spheres of radii 'r' and 'R'(R>r) such that the surface densities are equal. Find the potential at the common centre.

Q.24. An electric dipole is held in an uniform electric field. Using suitable diagram, show that it doesn't undergo any translatory motion, and (ii)Derive an expression for torque acting on it and specify its direction.

Q25. The field potential inside a charged ball depends only on the distance from its centre as $V=ar^2+b$, where a and b are constants. Find the space charge distribution r(r) inside the ball.

CASE STUDY QUESTIONS

1.Vivek was studying in his room. Suddenly he observed that the speed of his fan was going on decreasing from last two days. His father explained that there is a device in fan which maintain the speed. Read the following questions and answer: His father also explained that how the device is connected in circuit. His father also told that AC circuit becomes inductive when this device is connected in circuit. A phase difference arises due to which leads to generate rotating magnetic fields and hence produce torque to rotor for rotating.

Question No.1: Name the device used.
Question No.2: Explain the principle of device.
Question No.3: How capacitor is connected in circuit?
Question No.4: What is the function of capacitor in ceiling fan?
Question No.5: why capacitor start motors are not available in large size?

2. Lightning is an electric current. Within a thundercloud way up in the sky, many small bits of ice (frozen raindrops) bump into each other as they move around in the air. All of those collisions create an electric charge. After a while, the whole cloud fills up with electrical charges. The positive charges or protons form at the top of the cloud and the negative charges or electrons form at the bottom of the cloud. Since opposites attract, that causes a positive charge to build up on the ground beneath the cloud. The grounds electrical charge concentrates around anything that sticks up, such as mountains, people, or single trees. The charge coming up from these points eventually connects with a charge reaching down from the clouds and lightning strikes.

(i) Charge is the property associated with matter due to which it produces and experiences

(a) electric effects only
(b) magnetic effects only
(c) both electric and magnetic effects
(d) None of these

(ii) When some charge is transferred to ...*A*... it readily gets distributed over the entire surface of ... *A*... If some chargeis put on ... *B*..., it stays at the same place. Here, A and B refer to

(a) insulator, conductor
(b) conductor, insulator
(c) insulator, insulator
(d) conductor, conductor

(iii)On charging by conduction, mass of a body may

(a) increase (b) decreases

(c) increase or decrease (d) None of these

(iv) If one penetrates a uniformly charged spherical cloud, electric field strength

(a) decreases directly as the distance from the centre

(b) increases directly as the distance from the centre

(c) remains constant

(d) None of these

(v) The law, governing the force between electric charges in the cloud is known as

(a) Ampere's law (b) Ohm's law

(c) Faraday's law (d) Coulomb's law

3.Prepare an Investigatory project as per the list forwarded in your what sup group ?

HOLIDAY HOMEWORK MATHS(2022-23) CLASS XII

Do these 10 Practical in your Practical Notebook .

(1) To verify that the relation R in the set L of all lines in a plane, defined by R = $\{(l, m) : l \wedge m\}$ is symmetric but neither reflexive nor transitive.
(2) To demonstrate a function which is not one-one but is onto.
(3) To draw the graph of $\sin^{-1}x$, using the graph of $\sin x$ and demonstrate the concept of mirror reflection (about the line $y = x$).
(4) To find analytically the limit of a function $f(x)$ at $x = c$ and also to check the continuity of the function at that point.
(5) To understand the concepts of decreasing and increasing functions.
(6) To understand the concepts of local maxima, local minima and point of inflection.
(7) To construct an open box of maximum volume from a given rectangular sheet by cutting equal squares from each corner.
(8) To verify that amongst all the rectangles of the same perimeter, the square has the maximum area.
(9) To verify that angle in a semi-circle is a right angle, using vector method.
(10) To explain the computation of conditional probability of a given event A, when event B has already occurred, through an example of throwing a pair of dice.

Solve the following questions:

(1) Show that $A = \begin{bmatrix} 5 & 3 \\ -1 & -2 \end{bmatrix}$ satisfies the equation $A^2 - 3A - 7I = O$ and hence find A^{-1}.

(2) Find nonzero values of x satisfying the matrix equation:

$$x\begin{bmatrix} 2x & 2 \\ 3 & x \end{bmatrix} + 2\begin{bmatrix} 8 & 5x \\ 4 & 4x \end{bmatrix} = 2\begin{bmatrix} (x^2+8) & 24 \\ 10 & 6x \end{bmatrix}$$

(3) $A = \begin{bmatrix} cosa & sina \\ -sina & cosa \end{bmatrix}$, then show that $A^2 = \begin{bmatrix} cos2a & sin2a \\ -sin2a & cos2a \end{bmatrix}$.

(4) Construct a 3 × 3 matrix whose elements are given by $a_{ij} = \frac{(i+2j)}{5}$

(5) If A, B are symmetric matrices of same order, then what can be said for matrix AB – BA?

(6) Express the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ -4 & -1 & 0 \\ 3 & 5 & 1 \end{bmatrix}$ as the sum of a symmetric and a skew-symmetric matrix.

(7) Complete the following table.

Order of the matrix

A	B	A ± B	AB
2 × 2	2 × 2		
2 × 3	3 × 2		
3 × 4	4 × 1		
3 × 3	3 × 3		
2 × 3		2 × 3	
	3 × 2		1 × 2
2 × 3		2 × 3	

(8) Two booksellers A and B sell the textbook of Mathematics and Applied Mathematics. In the month of march, bookseller A sold 250 books of Mathematics and 400 books of Applied Mathematics whereas bookseller B sold 230 books of Mathematics and 425 books of Applied Mathematics. In the month of April, bookseller A sold 550 books of Mathematics and 300 books of Applied Mathematics and bookseller B sold 270 books of Mathematics and 450 books of Applied Mathematics. Represent the given information into matrix form and Find the total sale for both the booksellers in the month of March and April, using matrix algebra.

(9) For what value of k, points P (3,-2), Q (8, 8) and R (k, 2) are collinear.

(10) If the value of a third order determinant is 11, then the value of the square of the determinant formed by the cofactors will be: (a.) 1331 (b). 14641 (c.) 121 (d.) 11

(11) If A is square matrix such that $A^2 = A$, then $(I + A)^3 - 7A$ is equal to

a) 3A b) I – A c) A d) I

Question No. 12 to 15 are based on the given text. Read the text carefully and answer the questions:

On her birthday, Seema decided to donate some money to the children of an orphanage home. If there were 8 children less, everyone would have got ₹10 more. However, if there were 16 children more, everyone would have got ₹10 less. Let the number of children be x and the amount distributed by Seema for one child be y (in ₹).

(12)The equations in terms x and y are:

a. 5x - 4y = 40
5x - 8y = -80

b. 5x - 4y = 40
5x - 8y = 80

c. 5x + 4y = 40
5x - 8y = -80

d. 5x- 4y = 40
5x + 8y= -80

(13) The number of children who were given some money by Seema is:

a. 23 b. 30 c. 40 d. 32

(14) 14. How much amount is given to each child by Seema?

a. ₹ 26 b. ₹ 32 c. ₹ 30 d. ₹ 62

15. How much amount does Seema spend in distributing the money to all the students of the Orphanage?

a. ₹ 609 b. ₹ 960 c. ₹ 906 d. ₹ 690

(16) The principal value of following questions:

(i) $\tan^{-1}(\tan\frac{7\pi}{6})$ (ii) $\cos^{-1}(\frac{-1}{\sqrt{2}})$ (iii) $\sin^{-1}(\frac{-1}{\sqrt{2}})$ (iv)$\sec^{-1}(-\sqrt{2})$ (v)$\text{cosec}^{-1}(\frac{2}{\sqrt{3}})$

(17) Number of relations that can be defined on the set A = {a, b, c, d} is

a. 24 b. 4^4 c. 16 d. 2^{16}

(18) Consider the non – empty set consisting of children in a family and a relation R defined as a R b if a is brother of b. Then R is

a. both symmetric and transitive b. transitive but not symmetric

c. neither symmetric nor transitive d. symmetric but not transitive

(19) If the set A contains 5 elements and the set B contains 6 elements, then the number of one – one and onto mappings from A to B is

a. none of these b. 720 c. 120 d. 0

(20) Consider the mapping f : A→ B is defined by f(x) = $\frac{x-1}{x-2}$ such that f is a bijection.

(i) Domain of f is

a. R - {0} b. R - {2} c. R - {1, 2} d. R

(ii) Range of f is

a. R b. R - {1, 2} c. R - {1} d. R - {0}

(21)Use the product $\begin{bmatrix}1 & -1 & 2\\ 0 & 2 & -3\\ 3 & -2 & 4\end{bmatrix}\begin{bmatrix}-2 & 0 & 1\\ 9 & 2 & -3\\ 6 & 1 & -2\end{bmatrix}$ to solve the system of equations.

x – y + 2z = 1 , 2y - 3z = 1 , 3x – 2y + 4z = 2

(22) The sum of three numbers is 6. If we multiply third number by 3 and add second number to it, we get 11. By adding first and third numbers, we get double of the second number. Represent it algebraically and find the numbers using matrix method.

(23) Let A be a nonsingular square matrix of order 3 X 3 .Then $|adjA|$ is equal to

(a) $|A|$ (b)$|A|^2$ (c) $|A|^3$ (d) $|A|$

HOLIDAY HOMEWORK ENGLISH

NOTE: DO THESE ASSIGNMENTS IN YOUR ENGLISH HOLIDAY H.W.NOTEBOOK/ A4 SHEETS/RULED SHEETS.

1. Collect varied invitation formats-(formal and informal) and make a collage depicting varieties of invitations. Sa be pasted in a holiday H.W. notebook if collage is not feasible.

2. (A) Draft a job application with cover letter and complete Resume for the post of a TGT Science teacher.

2. (B) Make a list for Educational Qualification required for various jobs and show presentation in tabular format.

4. Prepare notes based on the chapter, **Poets and Pancakes**. Follow the format of note making