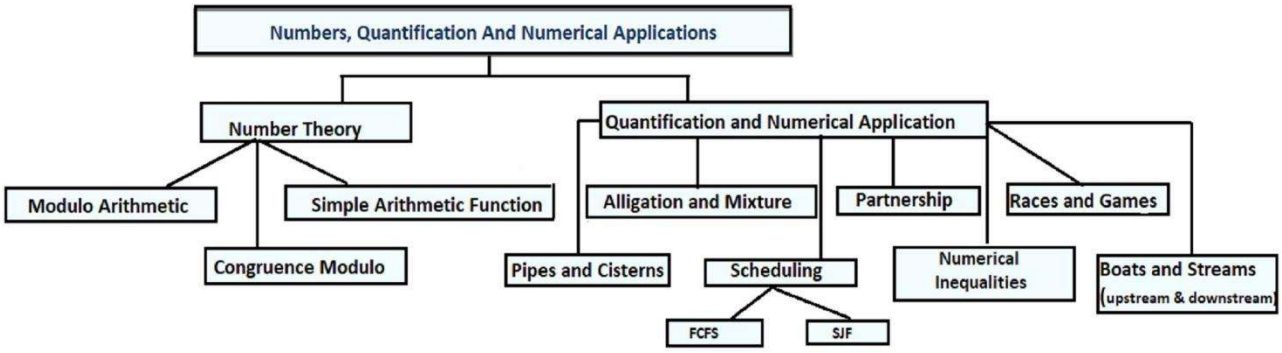
DAV PUBLIC SCHOOL, GANDHI NAGAR (CCL), RANCHI

(HOLIDAY HOME WORK)

CLASS: XII **SUBJECT: APPLIED MATHS (241)**

Concept Map



1. Find the sum of 132 and 121 mod 23. 18. If $100 \equiv x \pmod{\ }$, then the least positive value of x is

(a) 7 (b) 3 (c) 6 (d) 4

2. Find 76 (mod3).

3.A retailer has250 kg of rice, a part of which he sells at 10% profit. The remaining quantity of rice is of low quality and he sold it at 5% loss. Overall he made a profit of 7%. Find the quantity of rice sold at 5% loss.

4. In what ratio must rice at 69 per kg be mixed with rice 100 per kg so that the mixture be worth 80 per kg?

5. The average salary per head of the entire staff of a small factory including the supervisor and labours is 5750. The average salary per head of the supervisor is 20,000 and that of the labours is 5000. Find the number of labours in the factory if there are 4 supervisors

6.A man can row 7½ km/h in still water. If in a river running at 1.5 km an hour, it takes him 50 minutes to row to a place and back ,how far off is the place?

7. The speed of a motor boat and that of the current of water is 36:5. The boat goes along with the current in 5 hours 10 minutes. How much time will it take to come back?

8. What time will it be after 1250 hours .if the present time is 9:00 pm?

9.*A* can fill a tank in 30 hours and pipe B in 45 hours. If both the pipes are opened in an empty tank, how much time will it take to fill the tank?

10.A pipe can fill a cistern in 6 hours. Due to a leakage in the tank the cistern is just full in 9 hours.How much time the leakage will take to empty the tank?

11.A cistern can be filled by pipes *A* and *B* in 4 hours and 6 hours respectively. When full, the cistern can be emptied by pipe *C* in 8 hours. If all the pipes were turned on at the same time, in how much time will the cistern be filled?

12.*A,B* and *C* enter into a partnership. *B* contributes 1/3 of the capital, while *A* contributes as much as *B* and *C* together contribute. Find the ratio of their capitals.

13.Rahul got 5000 as his share out of the total profit of 9000. Ramesh had invested 3000 for 6 months, while Rahul invested for the whole year. Find the amount invested by Rahul.

14.Priya started a tiffin service business by investing 40000. After 4 months her friend Rekha joined her business and invested 50000 in it. What will be the share of Rekha in the profitif they earn 220000 as profit in the entire year?

15. A can run 40 metres while b run 50 metres in the same time. In a 1000 m race , find by how much distance B beats A?

16. In a 200 m race , A beats B by 5 m or 3 seconds . Find A's time to cover the race course.

17. In a one kilometre race , A beats B by 30 seconds and B beats C by 15 seconds. A beats B by 180 m , then find the time taken by A to run 1 kilometre

SUBJECT: FINE ARTS

1. Any one composition

2. Still life

3. Portfolio designing (16 art work) : 8 Pencil Sketching and 8 Water colour.

SUBJECT:PHYSICS

Solve the following questions:-

1. Two point charges q_1 and q_2 are located with points having position vectors $\mathbf{r_1}$ and $\mathbf{r_2}$.

1. Find the position vector $\mathbf{r_3}$ where the third charge q_3 should be placed so that force acting on each of the three charges would be equal to zero.
2. Find the amount of charge q_3

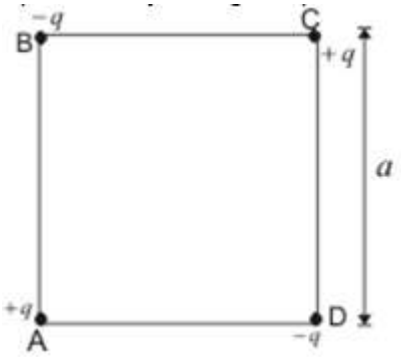
2. Consider a thin wire ring of radius R and carrying uniform charge density λ per unit length.

1. Find the magnitude of electric field strength on the axis of the ring as a function of distance x from its centre.
2. What would be the form of electric field function for x>>R.
3. Find the magnitude of maximum strength of electric field.

3.Two equally charged metal balls each of mass m Kg are suspended from the same point by two insulated threads of length l m long. At equilibrium, as a result of mutual separation between balls, balls are separated by x m. Determine the charge on each ball.

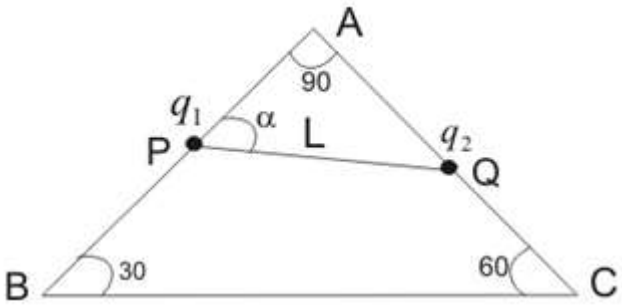
4. There are two identical particles each of mass m and carrying charge Q. Initially one of them is at rest and another charge moves with velocity v directly towards the particle at rest. Find the distance of closest approach.

5. Two opposite corners of square carry charge –q and other tow opposite corners of same square carry charge +q as shown below in the figure



All the four charges are equal in magnitude. Find the magnitude and direction of force on the charge on the upper right corner by the other three charges.

6. A rigid insulated wire frame in form of a right angled triangle ABC is set in vertical plane as shown below in the figure.



Two beads of equal masses m and each carrying charges q_1 and q_2 are connected by a chord of length l and can slide without friction on the wires. Considering the case when beads are stationary determine

1. the normal reaction on the beads
2. the angle α
3. tension in the chord

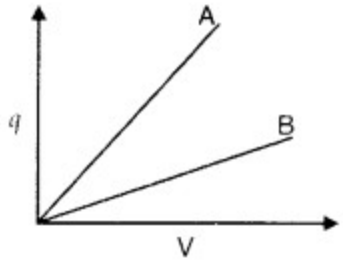
If the chord is now cut what are the value of charges for which beads continue to remain stationary.

7. An electric dipole is placed at a distance x from a infinitely long rod of linear charge density λ.

1. Find the net amount of force acting on the dipole.
2. Assuming that dipole is fixed at its centre find its time period of oscillations if the dipole is slightly rotated about its equilibrium position.

8. A thin fixed ring of radius R has a positive charge of +q C uniformly distributed over it. A particle of mass m and charge –q is placed on axis at a distance x from the centre of the ring. Show that the motion of negatively charged particle is approximately simple harmonic.

9. The given graph shows variation of charge 'q' versus potential difference 'V' for two capacitors C_1 and C_2. Both the capacitors have same plate seperation but plate area of C_2 is greater than that of C_1. Which line (A or B) corresponds to C_1 and why?



10. Two point charges, $q_1 = 10 \times 10^{-8}$C, $q_2 = -2 \times 10^{-8}$C are seperated by a distance of 60 cm in air.
(i) Find at what distance from the 1st charge, q_1 would the electric potential be zero.
(ii) Also calculate the electrostatic potential energy of the system.

11. (i) Can two equipotential surfaces intersect each other? Give reasons.
(ii) Two charges -q and + q are located at points A (0, 0, – a) and B (0, 0, +a) respectively. How much work is done in moving a test charge from point P (7, 0, 0) to Q (-3,0,0)?

12. Draw 3 equipotential surfaces corresponding to a field that uniformly increases in magnitude but remains constant along Z-direction. How are these surfaces different from that of a constant electric field along Z- direction?

13. Two uniformly large parallel thin plates having charge densities + σ and – σ are kept in the X-Z plane at a distance 'd' apart. Sketch an equipotential surface due to electric field between the plates. If a particle of mass m and charge q' remains stationary between the plates, what is the magnitude and direction of this field?

SUBJECT:BIOLOGY

Q 1) A meiocyte of rice has 24 chromosomes .what would be the chromosome number in its endosperm cells?
Q2) A bilobed ,dithecus anther has hundred microspore mother cells per microsporangium. How many male gametophytes this anther can produce?
Q3) Both nucellus and endosperm have abundant reserve food materials. How is their food reserve

utilised in angiosperms?
Q4) Even though each pollen grain has two male gametes, why are at least 10 pollen grains and not 5 pollen grains required to fertilize 10 ovules present in a particular carpel?
Q5) It is said apomixis is a type of a asexual reproduction. justify.
Q6) Explain the process of pollination in vallisneria. How is it different in water lily, which is also an aquatic plant?
Q7) How are pollen preserved in the pollen banks? Explain how are such banks benefiting a farmer ? write any two ways.
Q8) Differentiate between geitonogamy and xenogamy in plants. Which one between the two will lead to inbreeding depression and why?
Q9) Explain any two ways by which apomictic seeds get developed ?
Q10) Double fertilization is reported in plants of both castor and groundnut, However ,the mature seeds of groundnut are non albuminous and castor are albuminous, Explain the post fertilization events that are responsible for it.
Q11) Describe any two devices in the flowering plant which prevent both autogamy and geitonogamy.Explain the events up to fertilization after the pollen tube enters one of the synergids in an ovule of an angiosperm.
Q12) what stimulates pituitary to release the hormone responsible for parturition.Name the hormones.
Q13) Mention the relationship between concentration of luteinising hormone and maintenance of endometrium in the human uterus.
Q14) Explain the hormonal control of spermatogenesis in humans.
Q15) Describe how changing level of FSH, LH and progesterone during menstrual cycle induce changes in the ovary and uterus in human being.
Q16) How is placenta formed in human female? Name the hormones which are secreted by it and are also present in non pregnant woman?
Q17) Name the stages of human embryo at which it gets implanted and Explain the process of implantation.
Q18) Differentiate between spermatogenesis and oogenesis on the basis of, time of initiation of the process, site of completion of the process, nature of meiotic division undergone by gamete mother cell.
Q19) Name the hormones secreted and write their functions:
I)Corpus luteum and placenta.
ii) during follicular phase and parturition .
Q20) Name the stages in human female when
I) Corpus luteum and placenta coexist.
ii) Corpus luteum temporarily ceases to exist.

SUBJECT: ENGLISH

1.Create mind maps for the chapters

- The Last Lesson

- The Third Level

- Lost Spring

2."Mukesh, Saheb and Franz come from very different backgrounds, yet they represent young boys shaped by their circumstances. Imagine a meeting between Mukesh, Saheb and Franz where they discuss

their struggles, dreams and attitudes toward education. How would their conversation reveal the importance of education and freedom?

Analyse with reference to both lessons."

NOTE:

The assignments must be done in separate A4 sheets, piled - up and stapled together with heading as 'ASSIGNMENT'.

SUBJECT: CHEMISTRY

1.Mole fraction of the solute in a (1.00) molal aqueous solution is:

A) (0.1770) **B)** (0.0177) **C)** (0.0344) **D)**(1.7700)

2. Which one is **not** equal to zero for an ideal solution?

A) ΔH_{mix}

B) ΔS_{mix}

C) ΔV_{mix}

D) $\Delta P = P_{observed} - P_{Raoult}$

3.Which of the following liquids would have the highest vapour pressure at a given temperature?

A) Water **B)** Methanol **C)** Ethanol **D)** Glycerol

4.If the relative decrease in vapour pressure is (0.4\) for a solution containing (1 mol) of (NaCl\) in (3mol) of (H_2O), what is the percentage ionisation of (NaCl)?

A) (60%) **B)** (80%) **C)** (40%) **D)** (100%)

5. .A (17.4\% (w/v) solution of (K_2SO_4) at (27°C) is isotonic to a (5.5%) (w/v) (NaCl) solution at the same temperature. If (NaCl) is (100%) ionised, calculate the (%) ionisation of

A) (25%) **B)** (75%) **C)** (50%) **D** (100\%)

6.(0.5) molal aqueous solution of a weak acid ((HX) is (20%) ionised. Calculate the lowering in the freezing point of the solution (Kf = 1.86 K kg mol^{-1})

A)-1.12k **B)** 0.56 K **C)**1.12K **D)** -0.5K

7.

1 M aqueous solutions of each of $Cu(NO_3)_2$, $AgNO_3$, $Hg_2(NO_3)_2$, $Mg(NO_3)_2$ are electrolysed using inert electrodes. Given: $E^0_{Ag^+/Ag}$ = 0.80 V, $E^0_{Hg_2^{2+}/Hg}$ = 0.79 V, $E^0_{Cu^{2+}/Cu}$ = 0.24 V and $E^0_{Mg^{2+}/Mg}$ = -2.37 V.

Statement (I) : With increasing voltage, the sequence of deposition of metals on the cathode will be Ag, Hg and Cu.

Statement (II) : Magnesium will not be deposited at the cathode instead oxygen gas will be evolved at the cathode.

In the light of the above statements, choose the most appropriate answer from the options given below :

A) Both statement I and II are incorrect B) statement I is correct and II is incorrect

c) statement I is incorrect and II is correct D) Both statement I and II are incorrect

8.

In the given electrochemical cell, $Ag(s)|AgCl(s)|FeCl_2(aq), FeCl_3(aq) \mid Pt(s)$ at 298 K , the cell potential (E_{cell}) will increase when :

A. Concentration of Fe^{2+} is increased.

B. Concentration of Fe^{3+} is decreased.

C. Concentration of Fe^{2+} is decreased.

D. Concentration of Fe^{3+} is increased.

E. Concentration of Cl^- is increased.

.

A) C,D and E only B) A and B only C)B only D) A and B only

9.

.

NERNST EQUATION NUMERICALS

Calculate the emf of the following cells at 298K

1. $Ag|Ag^+ (0.001\ M) || Cu^{2+} (0.1M)|Cu$

   [Given $E^0cell = 0.46V$] ($\log 10^5 = 5$)

2. $Al|Al^{3+} (0.001\ M) || Ni^{2+} (0.5M)|Ni$

   [Given $E^0_{Ni^{2+}/Ni} = -0.25$ V and $E^0_{Al^{3+}/Al} = -1.66$ V]

   ($\log 8 = 0.9031$ and $\log 10^{-6} = -6$)

3. $Zn|\ Zn^{2+} (0.001\ M)\ || H^+ (0.01\ M) | H_2$ (1 bar).Pt

   [Given: $E^0\ Zn^{2+}|Zn = -0.76V$, $E^0\ H^+|H_2 = 0.00$ V] ($\log 10 = 1$)

4. $Ni|Ni^{2+} (0.160\ M) || Ag^+ (0.002M)|Ag$

   [Given $E^0_{cell} = 1.05$ V] [$\log 4 = 0.6021$, $\log 10^4 = 4$]

10. When [20 g] of naphthoic acid] [C_{11} H_8 O_2] is dissolved in 50 g of benzene, a freezing point depression of 2K is observed.*(Kf= 1.72K kg/mol)*What will be the van 't Hoff factor (i)

11. In aqueous solution, K_2HgI_4 has 60% ionisation. What is Van't Hoff factor value ?

12. The chemistry of corrosion of iron is essentially an electrochemical phenomenon. Explain the reactions occurring during the corrosion of iron in the atmosphere

13. The molar conductivities of CH_3COOH at 25°C at the concentration of 0.1 M and 0.001 M are 5.20 and 49.2 cm^2 mol^{-1} respectively. Calculate the degree of dissociation of CH_3COOH at these concentrations. (Λ^{∞}_m (CH_3COOH) = 390.7 S cm^2 mol^{-1}).

14. What is the vapor pressure of an aqueous solution that has a solute mole fraction of 0.1000? The vapor pressure of water is 25.756 mmHg at 25 °C

15. At 29.6 °C, pure water has a vapor pressure of 31.1 torr. A solution is prepared by adding 86.8 g of "Y", a non volatile non-electrolyte to 350. g of water. The vapor pressure of the resulting solution is 28.6 torr. Calculate the molar mass of Y.

****

Subject: MATHS (041)

1. Let R be a relation on the set N of natural numbers defined by n R m iff n divides m. Then R is :

(a) Reflexive and symmetric (b) Transitive and symmetric
(c) Equivalence (d) Reflexive , transitive but not symmetric

2. Let L denote the set of all straight lines in a plane. Let a relation R be defined by l R m iff l is perpendicular to m for all l, m ∈ L. Then, R is:

(a) Reflexive (b) symmetric (c) transitive (d) none

3. Let A = {1,2,3}, Then number of reflexive relations on A is:

(a) 64 (b) 128 (c) 8 (d) 32

4. Let A = {1,2,3}, Then number of symmetric relations on A is:

(a) 64 (b) 128 (c) 8 (d) 32

5. Let A = {(a, b), (c, d), (e, f)}, Then number of relations on A is:

(a) 640 (b) 512 (c) 256 (d) 1024

6. For real numbers x and y, define x R y iff $x - y + \sqrt{2}$ is an irrational number. Then the relation R is:

(a) Reflexive (b) symmetric (c) transitive (d) none

7. Total no. of functions from set A to set B such that A = {1,2,3,4} and B = {a, b, c} is:

(a) 64 (b) 81 (c) 12 (d) 36

8. Total number of equivalence relation defined on set A = {1, 2, 3, 4} is:

(a) 16 (b) 4 (c) 9 (d) 1

9. Let A = { 1,2,3,…….,9}, and R be the relation on A X A defined by (a, b) R (c, d) if a + d = b + c for all (a, b) , (c, d) ϵ A X A. Prove that R is an equivalence relation and also obtain the equivalence class [(2, 5)]

10. Let f : N U {0} → N U {0} be defined by f(x) = $\begin{cases} x+1, if\ x\ is\ even \\ x-1, if\ x\ is\ odd \end{cases}$ Is 'f ' one-one and onto?

11. Consider f: R - $\left\{\frac{-4}{3}\right\}$ → R - $\left\{\frac{4}{3}\right\}$ given by f(x) = $\frac{4x+3}{3x+4}$. Show that f is bijective.

12. Show that the function f : R → R defined by f(x) = $\frac{x}{x^2+1}$, ∀ x ∈ R is neither one – one nor onto.

13. Consider f : R_+ → [5,∞) given by f(x) = $9x^2 + 6x - 5$. Is 'f ' one-one and onto?

14. Consider f : R_+ → [-9, ∞) given by f(x) = $5x^2 + 6x - 9$. Verify f is bijective or not ?

15. Let N be the set of all natural numbers and let R be a relation on N X N , defined by (a, b) R (c, d) ⇔ ad = bc ∀ (a, b), (c, d) ∈ N X N

16. Let A = { x ∈ Z : $0 \leq x \leq 12$ } . Show that R = { (a , b) : a , b ∈ A , $|a - b|$ is divisible by 4 } is an equivalence relation. Find the set of all elements related to 1. Also write the equivalence class [2].

17. Let N be the set of all natural numbers and R be the relation on N X N defined by (a ,b) R (c ,d) iff ad (b + c) = bc (a + d). Check whether R is an equivalence relation.

18. Find the total no. of onto functions from set A to set B where, A = {1,2,3,4,5} and B = {a, b, c}

19. The domain of g(x) = $Cos^{-1}(x^2 - 1)$, hence find the value of 'x' for which g(x) = $\frac{\pi}{3}$, Also find the range of $Cos^{-1}(x^2 - 1)$

20. Find the domain of p (x) = $\sin^{-1}(1 - 2x^2)$. Hence, find the value of x for which p(x) = $\frac{\pi}{6}$. Also, write the range of 2p(x) + $\frac{\pi}{2}$.

CASE STUDY BASED

21. In two different societies , there are some school going students including boys as well as girls. Raman forms two sets with these students as his college project. Let A = { a_1 , a_2 , a_3 , a_4 , a_5 } and B = { b_1, b_2, b_3, b_4 }, where a_i and b_i are school going students of first and second society respectively.

Using the above information , answer the following questions :

(i) The mapping f = { (a_1, b_1) , (a_2, b_3) (a_3, b_2), (a_4, b_4), (a_5, b_4)} associating students of first society to the students of second society is

(a) one-one but not onto (b) only onto but not one-one
(c) one-one and onto both (d) neither one-one nor onto

(ii) The number of functions from A to B is

(a) 20 (b) 5^4 (c) 4^5 (d) $^5P_4$

(iii) The number of functions from B to A is

(a) 20 (b) 5^4 (c) 4^5 (d) $^5P_4$

(iv) The number of one-one function from A to B

(a) 0 (b) 5^4 (c) 4^5 (d) $^5P_4$

(v) The number of onto function from A to B

(a) 240 (b) 480 (c) 1024 (d) 512

X----------X