CHEMISTRY

1. If benzoic acid (M = 122 g mol-1) is associated into a dimer when dissolved in benzene and the osmotic pressure of a solution of 6.1 g of benzoic acid in 100 mL benzene is 6.5 atm at 27oC, then what is the percentage association of benzoic acid? (Given : R = 0.0821 L atm K-1 mol-1)

12. 0.3 g of acetic acid (M = 60 g mol-1) dissolved in 30 g of benzene shows a depression in freezing point equal to 0.45o C. Calculate the percentage association of acid if it forms a dimer in the solution. (Given: Kf for benzene = 5.12 K kg mol-1)

13. When 20 g of a non-volatile solid is added to 250 ml of water, the freezing point of water becomes . Calculate molecular mass of the solid if kf of water is . −0.9 C [2] 0 1.86 Ckg/mol 0

14. Which of the products will be a major product in the reaction given below? Explain.

 CH3CH=CH2 + HI → CH3CH2CH2I + (A) CH3CHICH3 (B)

15. The electrophilic substitution of arenes with iodine require the presence of an oxidising agent. Explain.

16. How will you bring the conversion? Toluene to benzyl alcohol

17. Distinguish between the terms molality and molarity. Under what condition are the molarity and molality of a solution nearly the same?

18. What is osmotic pressure and how is it related to the molecular mass of a non volatile solute?

19. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K2SO4 in 2 litre of water at 25°C, assuming that it is completely dissociated.

20. What are the IUPAC names of the insecticide DDT and benzenehexachloride? Why is their use banned in India and other countries?

21. A hydrocarbon C5H10 does not react with chlorine in dark but gives a single monochloro compound C5H9Cl in bright sunlight. Identify the hydrocarbon.

22. A compound 'A' contains carbon and hydrogen only and has molecular mass of 72. Its photo chlorination gives a mixture containing only one monochloro and two dichloro hydrocarbons. Deduce the structure of A and the chlorinated products.

English

English Project (Mandatory to do):-
1. In 'The Last Lesson,' Alphonse Daudet is focusing on the theme of freedom, language, patriotism and love for one's mother tongue.
   TOPIC : "People are not enslaved, as long as they hold fast to their language it is as if they had the key to their prison."- The last lesson.
   Marks Allotted :- Project (5) + Viva (5)
   The instructions for making the project :-
   • Cover page with school's name, logo, student's details and the name of subject teacher.
   • Certificate
   • Acknowledgement
   • Importance of Language
   • Meaning of 'Linguistic chauvinism'
   • Find examples in history where conquered people had their language taken away from them or had a language imposed of them—What was the result/outcome
   • Problems faced by linguistic minority
   • How can they keep their language alive
   • Linguistic human rights
   • Linguistic Chauvinism examples from English literature
   Note: The project should be hand written except the cover page, acknowledgement and certificate can be printed.
   Writing :-
   1. You are moved by the miserable condition of the street children who make a living by collecting saleable material from rubbish dumps and live in unhealthy surroundings. Write a letter to the Editor of a national daily requesting him to highlight their plight and urge the society and authorities to provide them with opportunities for growth and development. You are Suraj/Sumitra of 10, Raj Nagar, Odisha.
   2. A book fair was organized in your city, Bhopal. Thousands of people including a large number of students visited the fair. It aroused a great interest in reading and buying books. You want that such book fairs are held

in other cities of the state also to promote the habit of reading. Write a letter in 120-150 words to the editor of a local newspaper giving your views. You are Navtej/Navita, F-112 Malviya Nagar, Bhopal.

3. It gives you a good feeling when you read in the newspapers how patients from abroad come to hospitals in India and get themselves treated at a fraction of expenses they will have incurred elsewhere. Write a letter in 120-150 words to the Editor of a national daily describing the importance of medical tourism for India. You are Karan/ Karuna M 114, Mall Road, Kanpur.

4. You are Ashutosh/Ashita Sarin, residing at 28, H-Block, Ashok Vihar, Delhi. You love Delhi and its beautiful architecture. Recently you visited the Red Fort and were disturbed to see the poor maintenance of the monument by the authorities concerned as well as by the careless and negligent attitude of the visitors who spoil the buildings by writing names, messages on the walls, domes, etc. Write a letter to the Editor, The Statesman, expressing concern over this state and the need for awakening a sense of pride and love for such monuments among the common people.

Literature :-

Lesson – 1, 'The Last Lesson' (Flamingo)

1. "When a people are enslaved, as long as they hold fast to their language it is as if they had the key to their prison."

After reading M. Hamel"s statement you begin to realise the importance of mother tongue that is losing its significance in the present times.
Write an article for a national daily on the need of reviving the status of the mother tongue.

2. Then he turned to the black board , took a piece of chalk and bearing on with all his might , he wrote as large as he could – Vive La France .... Abraham Lincoln , a former President of America said , "I like to see a man proud of the place in which he lives. I like to see a man live so that his place will be proud of him." After reading the lesson and the above quote of Abraham Lincoln you begin to reflect on the loss of spirit of patriotism amongst the youth in India due to which there is no respect for one"s countrymen and no determination amongst the youth to lead the country to a better future. Write an article in about hundred words for a national magazine on the need for revival of patriotic spirit amongst the youth in India.

3 "........ his terrible iron ruler under his arm". It has been said, "spare the rod and spoil the child".
The abolition of corporal punishment from schools in India has boosted students" confidence. Do you agree or not?

3. "They preferred to put you to work on a farm or at the mills, so as to have a little more money". Some parents do not understand the importance of education. They want their kids to work. The Govt. Has introduced the Right to Education Act. What changes it can bring about in the attitude of the parents. Explain.

4. The elders of the village were sitting in the classroom. The participation of the community is necessary for a healthy and productive education system. Comment.

5. Franco Prussian war had impacted all spheres of life, even the schools. It caused an emotional turmoil in the life of the civilians. Can war/violence be a solution to any problem?

6. "It was so warm, so bright .... birds were chirping ...... The Prussian soldiers were drilling .... It was all much more tempting". In the present scenario / times there are more distractions (malls, i-pads, facebook etc). The will to resist is the only solution. Explain.

7. Mr. Hamel becomes an honest role model for the students on the day of the last lesson. How does a teacher play a constructive role in the life of the students in the present times.

Lesson – 1, 'The Third Level' (Vistas)

1. Was the Third level a medium of escape for Charley? Why/Why not?
2. Why is Grand Central compared to a tree?
3. How did Charlie realize that he had reached the third level?
4. Do you think that the third level was a medium of escape for Charley? Elaborate.
5. How did The World help Charley to confirm his doubts regarding the existence of a third level?
6. Why did Charley think that Sam could not practice psychiatry in Galesburg?

Maths

1. CBSE 2020: Given a relation R in the set A = {1, 2, 3, 4} defined by R = {(x, y) : x is a factor of y}, write the set R. Is R reflexive? Justify your answer.

2. CBSE 2019: If A = {1, 2, 3, 4} and R = {(x, y) : y = x + 1, x, y ∈ A}, find the domain and range of the relation R.

3. CBSE 2018: Define the function f: R → R by $f(x) = \frac{x^2-1}{x-1}$. Find the range of the function.

4. CBSE 2017: If $f(x) = \frac{x-1}{x+1}$, find the inverse of the function and hence find the range of f^-1(x).

5. CBSE 2016: Determine whether the following function is invertible: $f(x) = \frac{x+1}{x-2}$. If yes, find the inverse of the function.

6. CBSE 2015: Let f: R → R be defined by $f(x) = x^2 + 4x - 5$. Show that f is one-to-one and onto. Find f^-1(x).

7. CBSE 2014: Given the relation R on the set A = {1, 2, 3, 4, 5} defined by R = {(x, y) : x + y = 6}, write the relation R. Is R symmetric? Justify.

8. CBSE 2013: If f: R → R is defined by $f(x) = \frac{x^2+2}{x^2-3x+2}$, find the range of the function.

9. CBSE 2012: Show that the function f: R → R defined by $f(x) = \frac{x+1}{x-1}$ is one-to-one.

10. CBSE 2011: Let f: R → R be defined by $f(x) = \frac{x^2+1}{x^2+x+1}$. Show that f is onto.

11. CBSE 2010: Define the function f: R → R by $f(x) = \frac{1}{x^2-x-2}$. Find the domain and range of the function.

12. CBSE 2009: Determine the inverse of the function f: R → R given by $f(x) = 3x - 2$. Also, find the domain and range of f^-1(x).

Physics
(Write detail explanation of all questions with proper reason)

1. A positive point charge + Q is kept in the vicinity of an uncharged conducting plate. sketch electric lines of force originating from the point on the surface of the plate.
2. Why do the electrostatic field lines not form closed loops?
3. What is the electric flux through a cube of side 1 cm which encloses an electric dipole?
4. How does the electric flux due to a point charge enclosed by a spherical Gaussian surface get affected when its radius is increased?
5. What orientation of an electric dipole in a uniform electric field corresponds to its(i) stable and (ii)unstable equilibrium?
6. Define electric dipole moment. Is it a scalar or vector quantity ?what are its SI unit?
7. Define electric flux. write its SI unit.
8. Five point charges each of charge + Q are placed on five vertices of a regular hexagon of side(l). Find the magnitude of the resultant force on a charge -Q placed at the centre of the hexagon.
9. Does the charge given to a metallic sphere depend on whether it is Hollow or solid?give reason for your answer.
10. A charge Q is placed at the centre of a cube of side(l).what is the electric flux passing through two opposite faces of the cube?
11. The sum of two point charges is 7C. They repel each other with a force of 1 Newton when kept 30 cm apart in free space.calculate the value of each charge.
12. Represent graphically the variation of electric field with distance,for a uniformly charged plane sheet.
13. Four point charges Q, q,Q and q are placed at the corners of a square of side(a). find the resultant electric force on charge Q.
14. Three point charges q,-4q and 2q are placed at the vertices of an equilateral triangle ABC of side (l).

obtain the expression for the magnitude of the resultant electric force acting on the charge q.

15. Two charges q and -3q are placed fixed on x- axis separated by a distance 'd'.where should a third charge 2q be placed such that it will not experience any force?
16. Find an expression for the electric field strength at a distant point situated(i) on the axis and (ii)along the equatorial line of an electric dipole.
17. A charge is distributed uniformly over a ring of radius 'a'. obtain an expression for the electric field intensity E at a point on the axis of the ring.Hence show that for points at large distances from the ring, it behaves like a point charge.
18. (i) using Gauss theorem show mathematically that for any point outside the shell, the field due to uniformly charged spherical shell is same as the entire charge on the shell, is concentrated at the centre.
    (ii) why do you expect the electric field inside the shell to be zero according to this theorem?
19. (i) using Gauss's law,prove that the electric field at a point due to a uniformly charged infinite plane sheet is independent of the distance from it.
    (ii) how is the field directed if(i) the sheet is positively charged,(ii) negatively charged?

20. (i) Define torque acting on a dipole of dipole moment P is placed in a uniform electric field E. Express it in the vector form and point out the direction along which it acts.

    (ii) what happens if the field is non uniform?
1. What is the geometrical shape of equipotential surfaces due to a single isolated charge?
2. Draw equipotential surfaces due to a single point charge.
3. Two charges 2 μC and -2 μC are placed at points A and B, 5 cm apart. Depict an equipotential surface of the system.
4. What are the dimensions of capacitance?
5. A slab of material of dielectric constant K has the same area as that of the plates of a parallel plate capacitor, but has the thickness d/2, where d is the separation between the plates. Find out the expression for its capacitance when the slab is inserted between the plates of the capacitor.
6. Two capacitors of 1 μF capacitance are connected to a battery of 6 V. Initially switch S is closed. After sometime S is left open and dielectric slab of dielectric constant K = 3 are inserted to fill completely the space between the plates of the two capacitors.
   How will the (i) charge and (ii) potential difference between the plates of the capacitors be affected after the slabs are inserted?
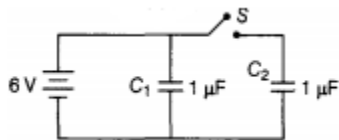
7. Electric charge is distributed uniformly on the surface of a spherical rubber balloon. Show how the value of electric intensity and potential vary on the surface, inside and outside?
8. A $5\mu F$ capacitor is charged by a 100 V supply. The supply is then disconnected and the charged capacitor is connected to another uncharged $3\mu F$ capacitor. How much electrostatic energy of the first capacitor is lost in the process of attaining the steady situation?
9. Derive the expression for the capacitance of a parallel plate capacitor having plate area A and plate separation d.
10. Two charged spherical conductors of radii R_1 and R_2 when connected by a conducting plate respectively. Find the ratio of their surface charge densities in terms of their radii .Explain using suitable diagrams, the difference in the behaviour of a conductor and dielectric in the presence of external electric field. Define the terms polarisation of a dielectric and write its relation with susceptibility.
11. A thin metallic spherical shell of radius R carries a charge Q on its surface. A point charge Q/2 is placed at its centre C and another charge + 2Q is placed outside the shell at a distance x from the centre as shown in the figure. Find the force on the charge at the centre of shell and at the point A ,the electric flux through the shell.

Do each question of N.C.E.R.T Exercise of chapter- 1 and 2