KENDRIYA VIDYALAYA Jhagrakhand
Summer holidays homework
Class XII

Q.1 Solve the question of class test and monthly test.

Q.2 Prepare a project of SCIENCE for NCSC/ SCIENCE EXIBITION

Q.3 Boiling point of water at 750 mm Hg is 99.63°C. How much sucrose is to be added to 500 g of water such that it boils at 100°C.

Q4. Concentrated nitric acid used in laboratory work is 68% nitric acid by mass in aqueous solution. What should be the molarity of such a sample of the acid if the density of the solution is 1.504 g mL–1?

Q5 A solution of glucose in water is labelled as 10% w/w, what would be the molality and mole fraction of each component in the solution? If the density of solution is 1.2 g mL–1, then what shall be the molarity of the solution?

Q6 How many mL of 0.1 M HCl are required to react completely with 1 g mixture of Na2CO3 and NaHCO3 containing equimolar amounts of both?

Q7 A solution is obtained by mixing 300 g of 25% solution and 400 g of 40% solution by mass. Calculate the mass percentage of the resulting solution.

Q8 An antifreeze solution is prepared from 222.6 g of ethylene glycol ($C_2H_6O_2$) and 200 g of water. Calculate the molality of the solution. If the density of the solution is 1.072 g mL–1, then what shall be the molarity of the solution?

Q9 A sample of drinking water was found to be severely contaminated with chloroform ($CHCl_3$) supposed to be a carcinogen. The level of contamination was 15 ppm (by mass): (i) express this in percent by mass (ii) determine the molality of chloroform in the water sample.

Q10 What role does the molecular interaction play in a solution of alcohol and water?

Q11 Why do gases always tend to be less soluble in liquids as the temperature is raised?

Q12 State Henry's law and mention some important applications.

Q13 The partial pressure of ethane over a solution containing 6.56×10^{-3} g of ethane is 1 bar. If the solution contains 5.00×10^{-2} g of ethane, then what shall be the partial pressure of the gas?

Q14 What is meant by positive and negative deviations from Raoult's law and how is the sign of ΔmixH related to positive and negative deviations from Raoult's law?

Q15 An aqueous solution of 2% non-volatile solute exerts a pressure of 1.004 bar at the normal boiling point of the solvent. What is the molar mass of the solute?

Q16 Heptane and octane form an ideal solution. At 373 K, the vapour pressures of the two liquid components are 105.2 kPa and 46.8 kPa respectively. What will be the vapour pressure of a mixture of 26.0 g of heptane and 35 g of octane?

Q17 The vapour pressure of water is 12.3 kPa at 300 K. Calculate vapour pressure of 1 molal solution of a non-volatile solute in it.

Q18 Calculate the mass of a non-volatile solute (molar mass 40 g mol^{-1})which should be dissolved in 114 g octane to reduce its vapour pressure to 80%.

Q19 A solution containing 30 g of non-volatile solute exactly in 90 g of water has a vapour pressure of 2.8 kPa at 298 K. Further, 18 g of water is then added to the solution and the new vapour pressure becomes 2.9 kPa at 298 K. Calculate: (i) molar mass of the solute (ii) vapour pressure of water at 298 K.

Q20 A 5% solution (by mass) of cane sugar in water has freezing point of 271K. Calculate the freezing point of 5% glucose in water if freezing point of pure water is 273.15 K.

Q21 Two elements A and B form compounds having formula AB2 and AB4 . When dissolved in 20 g of benzene (C6H6), 1 g of AB2 lowers the freezing point by 2.3 K whereas 1.0 g of AB4 lowers it by 1.3 K. The molar depression constant for benzene is 5.1 K kg mol–1. Calculate atomic masses of A and B.

Q22 At 300 K, 36 g of glucose present in a litre of its solution has an osmotic pressure of 4.98 bar. If the osmotic pressure of the solution is 1.52 bars at the same temperature, what would be its concentration?

Q23 Suggest the most important type of intermolecular attractive interaction in the following pairs. (i) n-hexane and n-octane (ii) I 2 and CCl4 (iii) NaClO4 and water (iv) methanol and acetone (v) acetonitrile (CH3CN) and acetone (C3H6O).

Q24 Based on solute-solvent interactions, arrange the following in order of increasing solubility in n-octane and explain. Cyclohexane, KCl, CH3OH, CH3CN.

Q25 Amongst the following compounds, identify which are insoluble, partially soluble and highly soluble in water? (i) phenol (ii) toluene (iii) formic acid (iv) ethylene glycol (v) chloroform (vi) pentanol.

Q26 If the density of some lake water is 1.25g mL–1 and contains 92 g of Na+ ions per kg of water, calculate the molarity of Na+ ions in the lake.

Q27 If the solubility product of CuS is 6×10^{-16}, calculate the maximum molarity of CuS in aqueous solution.

Q28 Calculate the mass percentage of aspirin (C9H8O4) in acetonitrile (CH3CN) when 6.5 g of C9H8O4 is dissolved in 450 g of CH3CN.

Q29 Nalorphene (C19H21NO3), similar to morphine, is used to combat withdrawal symptoms in narcotic users. Dose of nalorphene generally given is 1.5 mg. Calculate the mass of 1.5×10^{-3} m aqueous solution required for the above dose.

Q30 Calculate the amount of benzoic acid (C6H5COOH) required for preparing 250 mL of 0.15 M solution in methanol.

Q31 The depression in freezing point of water observed for the same amount of acetic acid, trichloroacetic acid and trifluoroacetic acid increases in the order given above. Explain briefly.

Q32 Calculate the depression in the freezing point of water when 10 g of CH3CH2CHClCOOH is added to 250 g of water. $K_a = 1.4 \times 10–3$, $K_f = 1.86$ K kg mol–1 .

Q33 19.5 g of CH2 FCOOH is dissolved in 500 g of water. The depression in the freezing point of water observed is 1.00 C. Calculate the van't Hoff factor and dissociation constant of fluoroacetic acid.

Q34 Vapour pressure of water at 293 K is 17.535 mm Hg. Calculate the vapour pressure of water at 293 K when 25 g of glucose is dissolved in 450 g of water.

Q35 Henry's law constant for the molality of methane in benzene at 298 K is 4.27 × 105 mm Hg. Calculate the solubility of methane in benzene at 298 K under 760 mm Hg.

Q36 100 g of liquid A (molar mass 140 g mol–1) was dissolved in 1000 g of liquid B (molar mass 180 g mol–1). The vapour pressure of pure liquid B was found to be 500 torr. Calculate the vapour pressure of pure liquid A and its vapour pressure in the solution if the total vapour pressure of the solution is 475 Torr.

Q38 Benzene and toluene form ideal solution over the entire range of composition. The vapour pressure of pure benzene and toluene at 300 K are 50.71 mm Hg and 3Q06 mm Hg respectively. Calculate the mole fraction of benzene in vapour phase if 80 g of benzene is mixed with 100 g of toluene.

Q39 The air is a mixture of a number of gases. The major components are oxygen and nitrogen with approximate proportion of 20% is to 79% by volume at 298 K. The water is in equilibrium with air at a pressure of 10 atm. At 298 K if the Henry's law constants for oxygen and nitrogen at 298 K are 3.30 × 107 mm and 6.51 × 107 mm respectively, calculate the composition of these gases in water.

Q40 Determine the amount of CaCl2 (i = 2.47) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75 atm at 27° C.

Q.1. Plot a graph showing the variation of coulomb force (F) versus $(1/r^2)$, where r is the distance between the two charges of each pair of charges : (1μC, 2μC) and (2μC, – 3μC). Interpret the graphs obtained.

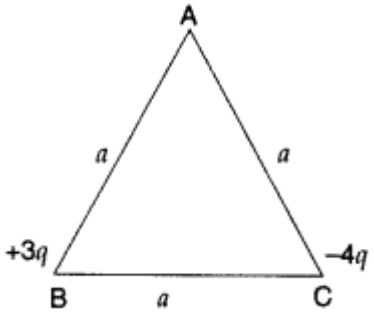
Q.2 A hollow cylindrical box of length 1m and area of cross-section 25 cm^2 is placed in a three dimensional coordinate system as shown in the figure. The electric field in the region is given by VECTOR $E=50xi\hat{}$ where E is in NC^{-1} and x is in metres. Find

- Net flux through the cylinder.
- Charge enclosed by the cylinder

Q.3 Given a uniform electric field VECTOR $E = 2 \times 10^3 i\hat{}$ N/ C, find the flux of this field through a square of side 20 cm, whose plane is parallel to the y-z plane. What would be the flux through the same square, if the plane makes an angle of 30° with the x-axis?

Q.4 An electric dipole is placed in a uniform electric field $E\rightarrow$ with its dipole moment $\vec{p}$ parallel to the field. Find
(i) the work done in turning the dipole till its dipole moment points in the direction opposite to VECTOR E.
(ii) the orientation of the dipole for which the torque acting on it becomes maximum

Q.5 Two point charges + 3q and – 4q are placed at the vertices 'B' and 'C' of an equilateral triangle ABC of side 'a' as given in the figure. Obtain the expression for



(i) the magnitude and
(ii) the direction of the resultant electric field at the vertex A due to these two charges

Q.6 An electric dipole of dipole moment $p\rightarrow$ is placed in a uniform electric field $E\rightarrow$?. Obtain the expression for the torque $\tau\rightarrow$experienced by the dipole. Identify two pairs of perpendicular vectors in the expression.

Q.7 i) Derive the expression for electric field at a point on the equatorial line of an electric dipole.
(ii) Depict the orientation of the dipole in
(a) stable,
(b) unstable equilibrium in a uniform electric field.

Q.8 Define electric dipole moment. Is it a scalar or a vector? Derive the expression for the electric field of a dipole at a point on the equatorial
plane of the dipole.

Q.9 Why do the electric field lines not form closed loops?

Q.10 Two charges of magnitudes -3Q and + 2Q are located at points (a, 0) and (4a, 0) respectively. What is the electric flux due to these charges through a sphere of radius '5a' with its centre at the origin?

Q.11 Write the expression for the work done on an electric dipole of dipole moment p in turning it from its position of stable equilibrium to a position of unstable equilibrium in a uniform electric
field E.

Q.12 Why do the electric field lines never cross each other?

Q.13 **Two point charges +q and +9q are separated by a distance of 10 a. Find the point on the line joining the two changes where electric field is zero?**

Q.14 Two point electric charges of value q and 2q are kept at a distance d apart from each other in air. A third charge Q is to be kept along the same line in such a way that the net force acting on q and 2q is zero. Calculate the position of charge Q in terms of q and d.

Q.15 What is the force between two small charged spheres having charges of 2×10^{-7} C **and** 3×10^{-7} C **placed 30 cm apart in air?**

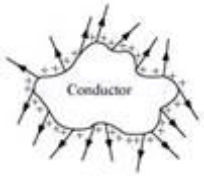
Q.16 A polythene piece rubbed with wool is found to have a negative charge of 3×10^{-7} C
(a) Estimate the number of electrons transferred (from which to which?)
(b) Is there a transfer of mass from wool to polythene?

Q.17 A point charge of 2.0 μC **is at the centre of a cubic Gaussian surface 9.0 cm on edge. What is the net electric flux through the surface?**

Q.18 A conducting sphere of radius 10 cm has an unknown charge. If the electric field 20 cm from the centre of the sphere is 1.5×10^3 N/C **and points radially inward, what is the net charge on the sphere?**

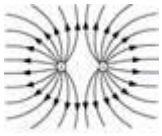
Q.19 Which among the curves shown in cannot possibly represent electrostatic field lines?

(a)

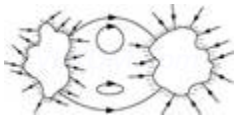


(b)

(c)



(d) 

(e) 

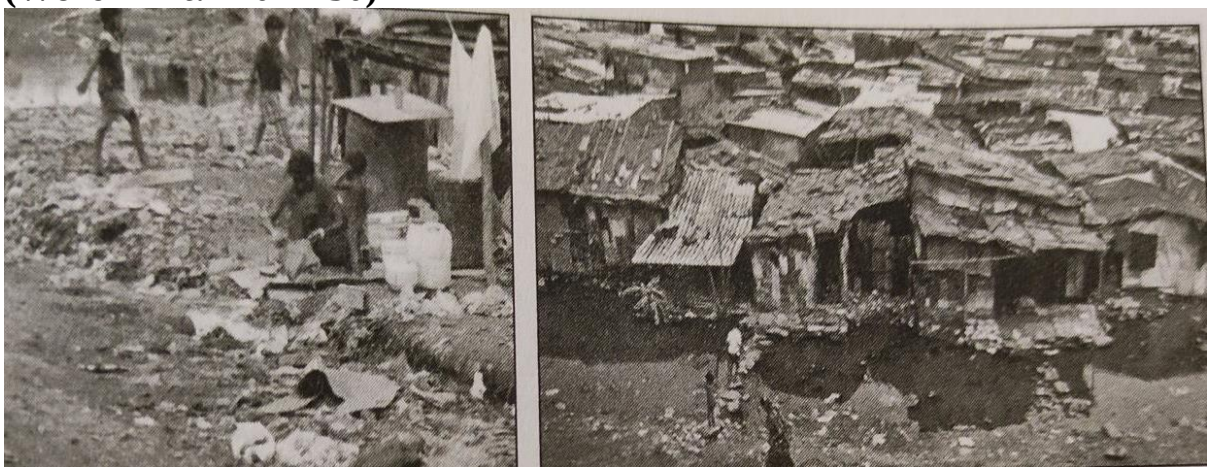
Q.20 Derive an expression for coulomb's law in vector form.

KENDRIYA VIDYALAYA SECL, JHAGRAKHAND
Summer Holiday Home Work and Assignment
(2023 – 2024)
Subject: English Core (301)
Class – XII

Instructions:-
1. Utilize your summer vacation constructively. Read good books / English newspaper daily. Obey your parents & help them. Be in touch with your subjects. Learn 5 new words with meaning daily.
2. All summer assignments must be done in your homework copy (the writing work), Rest PPT. maintain in soft copy. Submit your summer holiday work by 23/06/2023

Dear Students,
You are required to go through the given Holiday Homework and complete it sincerely.

Q1. ***Writing Article:-***
In India, the urban poor live in sub-human conditions in slums. Write an article on 'Possible Steps to Deal with Slums in India'. You are Kundan or Kashish, City Reporter of a newspaper. You can take help from the following visual.
(Word limit: 120 – 150)



Q2. Write a letter in about **120 – 150** words to the Editor of a national daily expressing your views on the issue 'Dangers of Using Headphones on Roads and Railway Tracks'. Sign yourself as Himani / Hitesh Sabharwal of 69/7B, Lok Vihar, Rothek. You can take help from the newspaper clipping given below.

3. Imagine you are Awadh or Awani of 9/120, apartment water tank road Raipur, Tatiband. You along with your parents and younger brother and sister visited one of the historical places in India. You are very much stressed to see the negligence of authority and govt. bout upkeeping of this historical place. Write a Report in about 150 words about it. (Use past tense, passive voice indirect narration, not to use the first person 'I' instead use Third person 'he she it'only)

Q4. ***Writing Notice:-***

The NCC Air Wing of your school is organising a visit to an Air Force Station in your area. As the Senior Under Officer of the wing write a notice in not more than**50** words for all the cadets informing them about the visit.

In your notice you should include the following information:
* date, time and place of the visit
* purpose of the visit e.g. air show, flying, study aircraft, interaction with Air Force personnel (Choose one only)
* Special instructions e.g. packed food and water, venue and time of reporting for the visit, compulsory participation (Choose one only)

5. As the Sports Secretary of your school in Delhi, write a notice for your school notice board informing the students about the selling of old sports goods of your school. You are Rashmi/Subham... Read more at: https://www.adda247.com/school/notice-writing/

6. Read the poem ‘a thing of beauty , Make PowerPoint presentation of this poem. Your power Point presentation should include - about the Poet – main theme of the poem, difficult words and their meaning, Explanation of the poem accompanied by certain image or scenery apt with the stanza, and identification of literary devices used their in.

7 Include Four Extract base questions fro the poem “Thing of Beauty”

8. Read the Lesson ‘Deep water’ Make PowerPoint presentation of this Lesson. Your power Point presentation should include – about the Author – main theme of the lesson – Paragraph wise difficult words and their meaning, Explanation or main points, accompanied by certain image or scenery apt with the passage.

9. Fear is something that we must learn to overcome if we want to succeed in life. How did Douglas get over his fear of water? (Explain in 150 words)

10. The story ”Deep Water” has made you realise that with determination and perseverance ane can accomplish the impossible. Write a paragraph in about 120 words on how a positive attitude and courage will aid you to achieve success in life.

SUBJECT TEACHER

K V SECL, JKD (HOLIDAY HOMEWORK)

SESSION 2023-24 CLASS XII-A (COMPUTER SCIENCE)

1. **Solve The Networking Questions(Mcq/ Case Study Based/ CCT Based)(File attached).**
2. **Solve the MCQ/ Output finding questions based on Revision Tour.**
3. **Practice output questions based on Random module.**
4. **Learn full forms of networking.**

Pooja Gupta

PGT(CS)