

SAINIK SCHOOL BHUBANESWAR, ODISHA
SUMMER VACATION TASK, SESSION 2021-22

CLASS –XII(CHEMISTRY)

Chapter-1 (SOLUTIONS)

1. 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.
2. Explain the solubility rule “like dissolves like” in terms of intermolecular forces that exist in solutions.
3. Concentration terms such as mass percentage, PPM, mole fraction and molality are independent of temperature, however molarity is a function of temperature. Explain.
4. What is the significance of Henry’s Law constant K_H ?
5. Why are aquatic species more comfortable in cold water in comparison to warm water?
6. (a) Explain the following phenomena with the help of Henry’s law.
 - (i) Painful condition known as bends.
 - (ii) Feeling of weakness and discomfort in breathing at high altitude.(b) Why soda water bottle kept at room temperature fizzes on opening?
7. Why is the vapour pressure of an aqueous solution of glucose lower than that of water?
8. How does sprinkling of salt help in clearing the snow covered roads in hilly areas? Explain the phenomenon involved in the process. What is “semi permeable membrane”?
9. Why is it not possible to obtain pure ethanol by fractional distillation? What general name is given to binary mixtures which show deviation from Raoult’s law and whose components cannot be separated by fractional distillation. How many types of such mixtures are there?
10. When kept in water, raisin swells in size. Name and explain the phenomenon involved with the help of a diagram. Give three applications of the phenomenon.
11. 0.6 ml of acetic acid (CH_3COOH) having density 1.06 g mL^{-1} is dissolved in 1Lt of water. The depression in F.P observed for this strength of acid was 0.0205°C . Calculate the Vant Hoff factor and dissociation constant for acid.
12. A solution prepared by dissolving 8.95mg of a gene fragment in 35.0 mL of water has an osmotic pressure of 0.335 torr at 25°C . Assuming that the gene fragment is a non-electrolyte, calculating its molar mass.
13. The reaction, $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \longrightarrow 2\text{NO}(\text{g})$ contributes to air pollution whenever a fuel is burnt in air at a high temp. at 1500 K, equilibrium constant K for it is 1.0×10^{-5} . Suppose in a case $[\text{N}_2] = 0.80\text{ mol L}^{-1}$ and $[\text{O}_2] = 0.20\text{ mol L}^{-1}$ before any reaction occurs. Calculate the equilibrium concentrations of the reactants and the products after the mixture has been heated to 1500k.
14. A solution of glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) in water is labeled as 10% weight . What would be the molality of the solution. (molar mass of glucose = 180 g mol^{-1})
15. Two elements A and B form compounds having formulae AB_2 and AB_4 when dissolved in 20g of benzene (C_6H_6). 1g of AB_2 lowers the freezing point by 2.3K whereas 10g of AB_4 lowers it by 1.3K. The molal depression constant for benzene is $5.1\text{ K kg mole}^{-1}$. Calculate the atomic masses of A and B.

Chaptert-2(ELECTROCHEMISTRY)

16. What does the negative sign in the expression $E^\circ \text{Zn}^{2+}/\text{Zn} = - 0.76\text{ V}$ mean?
17. Aqueous copper sulphate solution and aqueous silver nitrate solution are electrolysed by 1 ampere current for 10 minutes in separate electrolytic cells. Will the mass of copper and silver deposited on the cathode be same or different? Explain your answer.
18. Depict the galvanic cell in which the cell reaction is $\text{Cu}(\text{s}) + 2\text{Ag}^+(\text{aq}) \rightarrow 2\text{Ag}^+(\text{aq}) + \text{Cu}^{2+}$.
19. Value of standard electrode potential for the oxidation of Cl^- ions is more positive than that of water, even then in the electrolysis of aqueous sodium chloride, why is Cl^- oxidised at anode instead of water?
20. What is electrode potential?
21. Why is alternating current used for measuring resistance of an electrolytic solution?

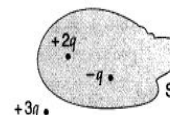
22. A galvanic cell has electrical potential of 1.1V. If an opposing potential of 1.1V is applied to this cell, what will happen to the cell reaction and current flowing through the cell?
23. How will the pH of brine (aq. NaCl solution) be affected when it is electrolysed?
24. Unlike dry cell, the mercury cell has a constant cell potential throughout its useful life. Why?
25. Solutions of two electrolytes 'A' and 'B' are diluted. The Λ_m of 'B' increases 1.5 times while that of A increases 25 times. Which of the two is a strong electrolyte and why?
26. The electrical resistance of column of 0.05m NaOH solution of diameter 1 cm & length 50 cm is $5.55 \times 10^3 \text{ ohm}$. Calculate its resistivity, conductivity and molar conductivity.
27. (a) Calculate the charge in coulombs required for oxidation of two moles of water to oxygen.
(b) A copper-silver cell is set up. The copper ion concentration is 0.10M. The concentration of silver ion is not known. The cell potential when measured was 0.422V. Determine the concentration of silver ions in the cell. ($E^\circ_{\text{Ag}^+/\text{Ag}}=0.80\text{V}$, $E^\circ_{\text{Cu}^{2+}/\text{Cu}}=0.34\text{V}$)
28. Calculate molality of KI solution if its density is 20% (w/w).
29. Two students performed two different experiments on electrolysis. Student A electrolysed 1litre of 1M aq. Solution of KMnO_4 till after reduction the final solution to 0.1M K_2MnO_4 . Student B electrolyzed NiSO_4 solution by passing 12 ampere current but the efficiency was only 60%. (Atomic mass of Ni=58.7 g mol^{-1})
a) What is the amount of electricity used by student A?
b) What is the amount of Ni deposited on cathode per hour in solution used by student B.

Chapter-3(CHEMICAL KINETICS)

30. A reaction is second order with respect to a reactant. How is the rate of reaction affected if the concentration of the reactant is
(a) doubled and (b) reduced to half ?
31. What is the effect of temperature on the rate constant of a reaction? How can this temperature affect on rate constant be represented quantitatively?
32. A reaction is first order in A and second order in B.
(a) Write the differential rate equation.
(b) How is the rate affected on increasing the concentration of B three times?
(c) How is the rate affected when the concentrations of both A and B are doubled?
33. Calculate the half-life of a first order reaction from their rate constants given below:
(a) 200 s^{-1} (b) 2 min^{-1} (c) 4 years^{-1}
34. The half-life for radioactive decay of ^{14}C is 5730 years. An archaeological artifact containing wood had only 80% of the ^{14}C found in a living tree. Estimate the age of the sample.
35. The rate constant for a first order reaction is 60 s^{-1} . How much time will it take to reduce the initial concentration of the reactant to its 1/16th the value?
36. During nuclear explosion, one of the products is ^{90}Sr with half-life of 28.1 years. If $1 \mu\text{g}$ of ^{90}Sr was absorbed in the bones of a newly born baby instead of calcium, how much of it will remain after 10 years and 60 years if it is not lost metabolically.
37. For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction.
38. A first order reaction takes 40 min for 30% decomposition. Calculate $t_{1/2}$.
39. The rate constant for the decomposition of hydrocarbons is $2.418 \times 10^{-5} \text{ s}^{-1}$ at 546 K. If the energy of activation is 179.9 kJ/mol, what will be the value of pre-exponential factor.
40. The rate constant for the first order decomposition of H_2O_2 is given by the following equation:
$$\log k = 14.34 - 1.25 \times 10^4 K/T$$

Calculate E_a for this reaction and at what temperature will its half-period be 256 minutes?
41. The decomposition of A into product has value of k as $4.5 \times 10^3 \text{ s}^{-1}$ at 10°C and energy of activation 60 kJ mol^{-1} . At what temperature would k be $1.5 \times 10^4 \text{ s}^{-1}$?
42. The time required for 10% completion of a first order reaction at 298K is equal to that required for its 25% completion at 308K. If the value of A is $4 \times 10^{10} \text{ s}^{-1}$. Calculate k at 318K and E_a .

- How is charge produced? Write the properties of charged particles.
- State and Define the S I unit of charge.
- Does the charge $20 \times 10^{-25} \text{ C}$ exist? Explain.
- How many electrons are there in 10C ?
- State Gauss theorem in electrostatics. Obtain the expression for electric field at a point due to an infinitely long thin uniformly charged straight wire of linear charge density $\lambda \text{ Cm}^{-1}$.
- Two point charges $6 \mu\text{C}$ and $-2 \mu\text{C}$ are separated by a distance 1m in air. Calculate at what point on the line joining the two charges is the electric field zero?
- A hollow metallic sphere of radius 5cm is charged such that potential at its centre is 20V . What is the potential on its surface?
- Calculate the amount of work done in rotating a dipole of dipole moment $3 \times 10^{-8} \text{ Cm}$ from its position of stable equilibrium to the position of unstable equilibrium in a uniform electric field of intensity 10^4 N/C
- Using Gauss law, derive an expression for the electric field intensity at any point outside a uniformly charged thin spherical shell of radius R and charge density $\sigma \text{ C/m}^2$. Draw the field lines when the charge density of the sphere is (i) positive, (ii) negative.
- A uniformly charged conducting sphere of 2.5 m in diameter has a surface charge density of 100 mC/m^2 . Calculate the (i) charge on the sphere (ii) total electric flux passing through the sphere.
- Derive an expression for the torque experienced by an electric dipole kept in a uniformly electric field.
- Use Gauss's law to derive the expression for the electric field between two uniformly charged large parallel sheets with surface charge densities σ and $-\sigma$ respectively.
- Solve the numerical from NCERT from chapter 1.
- Which orientation of an electric dipole in a uniform electric field would correspond to stable equilibrium?
- If the radius of the Gaussian surface enclosing a charge is halved, how does the electric flux through the Gaussian surface change ?
- Figure shows three point charges, $+2q$, $-q$ and $+3q$. Two charges $+2q$ and $-q$ are enclosed within a



surface 'S'. What is the electric flux due to this configuration through the surface 'S'?

- Name the physical quantity whose S.I. unit is JC^{-1} . Is it a scalar or a vector quantity?
- A charge ' q ' is placed at the centre of a cube of side l . What is the electric flux passing through each face of the cube?
- Two charges of magnitudes $-2Q$ and $+Q$ are located at points $(a, 0)$ and $(4a, 0)$ respectively. What is the electric flux due to these charges through a sphere of radius ' $3a$ ' with its centre at the origin?
- 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 .
- 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 .
- Draw a plot showing variation of electric field with distance from the centre of a solid conducting sphere of radius R , having a charge of $+Q$ on its surface.
- 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: $(1\mu\text{C}, 2\mu\text{C})$ and $(2\mu\text{C}, -3\mu\text{C})$. Interpret the graphs obtained.
- Define electric flux. Write its S.I. units.
- Two charged spherical conductors of radii R_1 and R_2 when connected by a conducting wire acquire charges q_1 and q_2 respectively. Find the ratio of their surface charge densities in terms of their radii.

SAINIK SCHOOL BHUBANESWAR
SUMMER VACATION TASK FOR THE SESSION 2022-23

SUBJECT : MATHEMATICS
CLASS – XII

Instructions :

- Go through the NCERT text book thoroughly.
 - Can take reference from videos (class lectures) on the topics from Youtube .
 - Learn the formulae uploaded as Formula sheet in the School Website.
 - Solve the questions in Separate Maths Note Book.
 - Utilize the available time to solve the Chapters (Class XI) from NDA Pathfinder as your preparations towards NDA.
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Chapter-01
Relation and Function
Assignment - 1
4 Marks Questions

1. Show that an onto function $f: \{1,2,3\} \rightarrow \{1,2,3\}$ is always one-one and vice-versa.
2. Check the injectivity and surjectivity of the function $f: \mathbb{N} \rightarrow \mathbb{N}$ defined by

$$f(x) = \begin{cases} \frac{n+1}{2} & , \quad n \text{ odd} \\ \frac{n}{2} & , \quad n \text{ even} \end{cases}$$

3. Show that if $f: A \rightarrow B$ and $g: B \rightarrow C$ are one-one then $g \circ f: A \rightarrow C$ is also one-one.
4. Show that if $f: A \rightarrow B$ and $g: B \rightarrow C$ are onto then $g \circ f: A \rightarrow C$ is also onto.
5. Let $f: \mathbb{W} \rightarrow \mathbb{w}$ be defined as

$$f(x) = \begin{cases} n-1 & , \quad n \text{ odd} \\ n+1 & , \quad n \text{ even} \end{cases}$$

Show that f is invertible. Find the inverse of f . Where, \mathbb{W} is the set of all whole numbers.

6. Show that $f: \mathbb{R} \rightarrow \{x \in \mathbb{R} : -1 < x < 1\}$ defined by $f(x) = \frac{x}{1+|x|}$, $x \in \mathbb{R}$ is a bijective function.

7. Check the injectivity and surjectivity for the $f : \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = \frac{x}{1+x^2}, \forall x \in \mathbb{R}$
8. Let C be the set of complex numbers. Prove that $f : C \rightarrow \mathbb{R}$ given by $f(z) = |z|^2, \forall z \in C$ is neither one-one nor onto.
9. Let the function $f : \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = \cos x \forall x \in \mathbb{R}$. Show that f is neither one-one nor onto.
10. Let $A = [-1, 1]$. Then discuss whether $f : A \rightarrow A$ defined as $f(x) = x|x|$ is one-one, onto or bijective.
11. Classify the following functions as one-one, onto or bijective.
- (i) $f : \mathbb{N} \rightarrow \mathbb{N}$ defined by $f(x) = x^2 + 1$
- (ii) $f : \mathbb{Z} \rightarrow \mathbb{Z}$ defined by $f(x) = x^3$
12. Consider $f : \mathbb{R} - \left\{ \frac{4}{3} \right\} \rightarrow \mathbb{R} - \left\{ \frac{4}{3} \right\}$ given by $f : \mathbb{R} - \left\{ \frac{4}{3} \right\} \rightarrow \mathbb{R} - \left\{ \frac{4}{3} \right\}$ defined by $f(x) = \frac{4x+3}{3x+4}$. Show that f is bijective.
- Ans. $f^{-1}(x) = \frac{4x-3}{4-3x}, f^{-1}\left(\frac{4}{3}\right) = \frac{-3}{4}, x = \frac{11}{10}$
13. Show that $f : \mathbb{Q} - \{3\} \rightarrow \mathbb{Q}$ defined by $f(x) = \frac{2x+3}{x-3}$
14. Let $f : [0, \infty) \rightarrow \mathbb{R}$ be a function defined by $f(x) = 9x^2 + 6x - 5$. Prove that f is not invertible. Modify, only the codomain of f to make f invertible and then find its inverse.
15. Let $f, g : \mathbb{R} \rightarrow \mathbb{R}$ be two functions defined as $f(x) = |x| + x$ and $g(x) = |x| - x \forall x \in \mathbb{R}$. Then, find $f \circ g$ and $g \circ f$.
16. If the function $f : \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = 2x - 3$ and $g : \mathbb{R} \rightarrow \mathbb{R}$ by $g(x) = x^3 + 5$, then prove that $g \circ f : \mathbb{R} \rightarrow \mathbb{R}$ is a bijective function. Also, verify that $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$.
17. If $f : \mathbb{R} \rightarrow \mathbb{R}$ is defined by $f(x) = x^2 - 3x + 2$ write $f(f(x))$

Chapter-02
Inverse Trigonometric Functions
Assignment - 3
4 Marks Questions

1. Prove that $\cos^{-1} \frac{12}{13} + \sin^{-1} \frac{3}{5} = \sin^{-1} \frac{56}{65}$
2. Prove that $\tan^{-1} \frac{63}{16} = \sin^{-1} \frac{5}{13} + \cos^{-1} \frac{3}{5}$
3. Prove that $\tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{7} + \tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{8} = \frac{\pi}{4}$.
4. Solve $\tan^{-1} \frac{1-x}{1+x} = \frac{1}{2} \tan^{-1} x, x > 0$
5. If $\sin^{-1}(1-x) - 2 \sin^{-1} x = \frac{\pi}{2}$, then find the value of x.
6. Solve $\cos(\tan^{-1} x) = \sin\left(\cot^{-1} \frac{3}{4}\right)$.
7. Show that $\cot^{-1} 7 + \cot^{-1} 8 + \cot^{-1} 18 = \cot^{-1} 3$.
8. How many solutions does the equation $\tan^{-1} x - \cot^{-1} x = \tan^{-1} \left[\frac{1}{\sqrt{3}} \right]$ have?
Unique Sol.
9. Solve for x: $\tan^{-1} \frac{x-1}{x-2} + \tan^{-1} \frac{x+1}{x+2} = \frac{\pi}{4}$.
10. Prove that $\cot^{-1} \left[\frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right] = \frac{x}{2}, x \in \left(0, \frac{\pi}{4}\right)$.
11. Prove that $\tan^{-1} \left(\frac{1}{2}\right) + \tan^{-1} \left(\frac{1}{5}\right) + \tan^{-1} \left(\frac{1}{8}\right) = \frac{\pi}{4}$.
12. Prove that $\cos \left[\sin^{-1} \frac{3}{5} + \cot^{-1} \frac{3}{2} \right] = \frac{6}{5\sqrt{13}}$.

SUMMER VACATION TASK (2022-23)

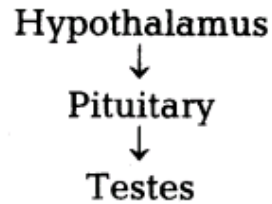
SUB-BIOLOGY

CLASS-XII

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1. Draw a labelled diagram of sectional view of a mature embryo sac of an angiosperm.
 2. (a) Describe the formation of mature female gametophyte within an ovule in angiosperms.
(b) Describe the structure of cell that guides the pollen tube to enter the embryo sac.
 3. (a) Draw a diagram of an enlarged view of TS of one microsporangium of an angiosperm and label the following parts.
 - (i) Tapetum
 - (ii) Middle layers
 - (iii) Endothecium
 - (iv) Microspore mother cell
(b) Mention the characteristic features and function of tapetum. Explain the following giving reasons.
 - (i) Pollen grains are well preserved as fossils.
 - (ii) Pollen tablets are in use of people these days.
 4. How does the pollen mother cell develop into a mature pollen grain? Illustrate the stages with labelled diagram.
 5. Draw a labelled diagram of the sectional view of a mature pollen grain in angiosperm. Explain the functions of its two different parts.
 6. What is pollen-pistil interaction and how is it mediated?
 7. Differentiate between xenogamy and geitonogamy?
 8. How do the pollen grains of *Vallisneria* protect themselves?
 9. Mention the pollinating agent of an inflorescence of small dull coloured flowers with well exposed stamens and large feathery stigma. Give any one characteristic of pollen grains produced by such flowers.
 10. Name the type of flower which favours cross-pollination.
 11. Mention the reasons for difference in ploidy of zygote and primary endosperm nucleus in an angiosperm.
 12. State one advantage and one disadvantage of cleistogamy.
 13. Why should a bisexual flower be emasculated and bagged prior to artificial pollination? Explain any two devices by which autogamy are prevented in flowering plants.
 14. Make a list of any three outbreeding devices that flowering plants have developed and explain how they help to encourage cross pollination.

15. Draw a Longitudinal Section (LS) of a post-pollinated pistil showing entry of pollen tube into a mature embryo sac. Label filiform apparatus, chalazal end, hilum, antipodals, male gametes and secondary nucleus.
16. (i) Explain the characteristic features of wind pollinated flowers. How are insect pollinated flowers different from them?
- (ii) Explain the mutually rewarding relationship between Yucca plant and species of moth.
17. (i) Describe the endosperm development in coconut.
- (ii) Why is tender coconut considered as healthy source of nutrition?
- (iii) How are pea seeds different from castor seeds with respect to endosperm?
18. Differentiate between perisperm and endosperm giving one example of each.
19. With the help of an example of each explain the following Apomixis, parthenocarpy, polyembryony.
20. Give reasons why?
- (a) Most zygotes in angiosperms divide only after certain amount of endosperm is formed.
- (b) Groundnut seeds are ex-albuminous and castor seeds are albuminous.
- (c) Micropyle remains as a small pore in the seed coat of a seed.
- (d) Integuments of an ovule harden, and the water content is highly reduced as the seed matures.
- (e) Apple and cashew nuts are not called true fruits.
21. (a) Name the organic material exine of the pollen grain is made up of. How is this material advantageous to pollen grain?
- (b) Still, it is observed that it does not form a continuous layer around the pollen grain. Give reason.
- (c) How are 'pollen banks' useful?
22. (a) As a senior biology student you have been asked to demonstrate to the students of secondary level in your school, the procedure (s) that shall ensure cross – pollination in a hermaphrodite flower. List the different steps that you would suggest and provide reasons for each of the item.
- (b) Draw a diagram of a section of a megasporangium of an angiosperm and label funiculus, Micropyle, embryo sac and nucleus.
23. Write the location and functions of following in human testes.
- (i) Sertoli cells (ii) Leydig cells
24. List the different parts of human oviduct through which the ovum travels till it meets the sperm for fertilisation.
25. Name and explain the role of inner and middle walls of human uterus.

26. Study the following flow chart. Name the hormones involved at each stage. Explain their functions.



27. (i) Draw a diagrammatic labelled sectional view of a seminiferous tubule of a human.
(ii) Describe in sequence the process of spermatogenesis in humans.
28. (i) Give a schematic representation of spermatogenesis in humans.
(ii) At which stage of life does gametogenesis begin in human male and female, respectively?
(iii) Name the organs where gametogenesis gets completed in human male and female, respectively.
29. (i) Draw a schematic diagram of a human sperm and label the cellular components. Give the functions of any three parts.
(ii) Where are the sperm heads found embedded to survive after spermatogenesis?
30. (i) Draw a sectional view of human ovary. Label the following parts
(a) Primary follicle (b) Ovum
(c) Graafian follicle (d) Corpus luteum
(ii) Name the hormones influencing
(a) Ovulation (b) Development of corpus luteum.

Sainik School Bhubaneswar
Vacation Task (Summer): XII, English, 2022

1. Why were the villagers seated on the back benches?
2. What was unusual about the school that Franz noticed when he entered the school?
3. Why was it the last lesson? How did Franz react to it?
4. What did M. Hamel say about French language?
5. Why did not M Hamel want the people to forget French?
6. Describe how M Hamel conducted the last lesson.
7. What was the mood in the classroom when M Hamel gave his last French lesson?
8. What happened when the church clock struck twelve?
9. What does the title "Lost Spring" convey?
10. Do you think Saheb was happy to work at the tea stall? Give reasons.
11. Is it possible for Mukesh to realise his dream? Justify your answer.
12. Why was not Saheb happy on getting a job?
13. Why don't the bangle makers of Firozabad organise themselves?
14. "Saheb is no longer his own master", says the writer. What does she mean?
15. What did garbage mean to the children of Seemapuri and to their parents?
16. Describe the difficulties the bangle makers of Firozabad have to face in their lives. (150Words)
17. "It is his *karam*, his destiny" that made Mukesh's grandfather go blind. How did Mukesh disprove this belief by choosing a new vocation and making his own destiny? (150Words)

18. There is a flood of advertisements on television channels these days. Write a letter to the Editor, Indian Express about the negative influence which such advertisements have on the minds of the people. You are Sunita / Sunil of Mayur Vihar, Kanpur.
19. You are Vani / Vikrant Kapoor, Head of the Health & Wellness club of your school. Your club organized a seminar to make students aware about alarming use of chemicals in Vegetables & fruits. Experts from the medical field and consumer forums were invited to answer the queries of the audience. Write a report in 150-200 words for your school magazine.

20. You are Reshma / Raghu staying at the Press Apartments at Nagpur. The main road leading to this colony has three open manholes causing frequent accidents at night. Also it gets so dark in the evenings in winter that the children and women just cannot venture to move out alone during night time. Write a letter to the Editor of 'The Times of India' drawing attention of the government towards this problem of the residents.

21. The new traffic rules have created a panic among people in general using two-wheelers and four-wheelers on road. Riding/driving a vehicle without proper documents such as driving license, registration, insurance, pollution certificate and without using helmet or seat belt results in imposition of heavy penalty anybody could have ever imagined. In certain cases, the ill treatment by the police also adds to the common man's woe. You are a social activist who wants to draw the attention of the concerned authorities to stop such harassment and ill treatment to people and reduce the penalty amount. Write a letter to the editor of a national daily on the issue. (120-150 words)

22. A recent study has revealed that teenagers who use the smart phone more than four hours a day dissociate themselves with family members and friends ultimately ending up in mental depression. Write an article for a national daily on 'The Impact of Smart Phone on Teenagers' creating awareness among them. You are Ankan / Anita. (150-200 words)

23. Your school recently celebrated the 150th Birth Anniversary of Mahatma Gandhi. The school also conducted various competitions among students and organised cultural programmes featuring Gandhi's life and work. As student reporter for your school magazine, write a report giving details of the celebrations. You are Paramesh/Paramita. (150-200 words)

24. Mahatma Gandhi once said, "I regard the English language as an open window for peeping into western thought and science." Write an article in 150-200 words on "The Usefulness of English Language in India ". You are Pratyush / Priya.

25. Your school celebrated the 150th Birth Anniversary of the father of the nation, Mahatma Gandhi. Write a report in 150-200 words for your school magazine, giving details of the celebration. You are Amit / Amita of Maharani Senior Secondary School, Gwalior.

26. You are Radhika /Rajeev from 21, Cherry Road, Madurai. Draft an application with a separate bio-data in about 120-150 words for the post of the librarian in Vision

Senior Secondary School, Calicut. You came to know about the vacancy in the said post from a National newspaper.

27. Rising pollution, fast and competitive lifestyle, lack of nutritious food etc. have caused health woes for a large section of our population. Providing healthcare used to be a charitable and ethical activity in the past but today it has become commercialised, a money spinning business. Write an article in 150-200 words on “How to provide proper healthcare to the common man”. You are Rohit/ Rashmi.

28. You are Raj / Rani, the Head Boy/Head Girl of DM Public School, Patna. You have to deliver a speech in your school assembly on the ‘World Peace Day’ on the topic, ‘Let’s Practise Non-Violence’. Write the speech in 150-200 words pointing out the recent acts of terrorism that claimed innocent lives, and highlighting the value of non-violence which is the need of the hour.

29. Due to a sudden landslide and unfavourable weather, Navodaya Vidyalaya Shimla has to be closed for a week. As the Principal of that school, draft a notice in not more than 50 words to be displayed at the school main gate notice board.

30. You are Secretary of Lions Club, Madurai. Write a notice in not more than 50 words informing the members to attend an extraordinary meeting of the governing body. Include details like date, time venue, etc.

Sainik School Bhubaneswar

Summer Vacation Task

Session 2022 - 23

Class - XII

Subject - Computer Science

1. What are the advantages of Python programming language?
2. In how many different ways can you work in Python?
3. What are the advantages/disadvantages of working in interactive mode in Python?
4. Write Python statement for the following in interactive mode:
 - (a) To display sum of 3, 8.0, 6*12
 - (b) To print sum of 16, 5.0, 44.0.
5. What are operators? Give examples of some unary and binary operators.
6. What is an expression and a statement?
7. What all components can a Python program contain?
8. What are variables? How are they important for a program?
9. Write the output of the following:
 - (i) for i in '123' :
 print ("guru99",i,)
 - (ii) for i in [100, 200, 300]
 print (i)
 - (iii) for j in range (10, 6,-2) :
 print(j*2)
 - (iv) for x in range (1,6) :
 for y in range (1,x+1) :
 print(x,' ',y)
 - (v) for x in range (10, 20):
 if (x == 15) :
 break
 print (x)
 - (vi) for x in range (10,20):
 if (x%2 == 0):
 continue
 print (x)
10. Write the output of the following program on execution if x = 50:

```
if x>10:  
    if x>25:  
        print("OK")  
    if x>60:  
        print ("GOOD")  
elif x>40:  
    print ("AVERAGE")
```

else:

```
print("NO,OUTPUT")
```

11. What are the various ways of creating a list?
12. What are the similarities between strings and lists?
13. Why are lists called a mutable data type?
14. What is the difference between insert () and append () methods of a list?
15. Write a program to calculate the mean of a given list of numbers.
16. Write a program to calculate the minimum element of a given list of numbers.
17. Write a code to calculate and display total marks and percentage of a student from a given list storing the marks of a student.
18. Write a Program to multiply an element by 2 if it is an odd index for a given list containing both numbers.
19. Write a program to shift elements of a list so that the first element moves to the second index and second element moves to the third index, and so on, and the last element shifts to the first position.

Suppose the list is: [10, 20, 30, 40]

After shifting, it should look like: [20, 30, 40, 10]

20. A list Num contains the following elements:

3, 25, 13, 6, 35, 8, 14, 45

Write a program to swap the content with the next value divisible by 5 so that the resultant list looks like:

25, 3, 13, 35, 6, 8, 45, 14

21. Write a program to accept values from a user in a tuple, add these values to tuple and display its elements one by one. Also display its maximum and minimum value.
22. Write a program to input any values for two tuples. Print it, interchange it and then compare them.
23. Write a Python program to input 'n' classes and names of their class teachers to store them in a dictionary and display the same. Also accept a particular class from the user and display the name of the class teacher of that class.
24. Write a program to store student names and their percentage in a dictionary and delete a particular student name from the dictionary. Also display the dictionary after deletion.
25. Write a Python program to input names of 'n' customers and their details like items bought, cost and phone number, etc., store them in a dictionary and display all the details in a tabular form.
26. Write a Python program to capitalize first and last letters of each word of a given string
27. Write a Python program to remove duplicate characters of a given string.
28. Write a Python program to compute sum of digits of a given string.
29. Write a Python program to find the second most repeated word in a given string.
30. Write a Python program to change a given string to a new string where the first and last chars have been exchanged.
31. Write a Python program to multiply all the items in a list.
32. Write a Python program to get the smallest number from a list.
33. Write a Python program to append a list to the second list.

34. Write a Python program to generate and print a list of first and last 5 elements where the values are square of numbers between 1 and 30 (both included).
35. Write a Python program to get unique values from a list.
36. Write a Python program to convert a string to a list.
37. Write a Python script to concatenate the following dictionaries to create a new one:

```
D1= { 'A':1, 'B' :2, 'C':3}  
D2={'D' :4}
```

Output should be:

```
{'A':1, 'B':2, 'C':3, 'D':4}
```

38. Write a Python script to check if a given key already exists in a dictionary.
39. Write a Python script to print a dictionary where the keys are numbers between 1 and 15 (both included) and the values are square of keys.

Sample Dictionary

```
{1:1, 2: 4, 3:9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64, 9: 81, 10: 100, 11: 121, 12: 144, 13: 169, 14:  
196, 15: 225}
```

40. Write a Python script to merge two Python dictionaries.

-----END-----