DAVID MODEL SENIOR SECONDARY SCHOOL

Main Road Tukmirpur

SUMMER HOLIDAYS HOMEWORK (2024-2025)
Class : XII (Science)

General Instruction: Follow the subject wise given instructions and submit the given task the very first day when the school reopens.

ENGLISH

Q1. You are Health Secretary, Students Council Citizens Public School, Ram Bagh, Varanasi. The Council has decided to start from the second of October a week-long cleanliness drive around the school. Draft a notice in about 50 words asking the Class XII students to enrol for the drive.

Q2. Water supply will be suspended for eight hours (10 a.m. to 6 p.m.) on 6th of June for cleaning of the water tank. Write a notice in about 50 words, advising the residents to store water for a day. You are Karan Kumar/Karuna Bajaj, Secretary, Janata Group Housing Society, Palam Vihar, Kurnool.

Q3. You are Jasveen / Jasbir, you recently visited a significant historical site. You were astounded to discover it in such a condition of disrepair. Using your own thoughts, compose a letter to the editor of a major newspaper noting the terrible condition of significant archaeological and historical sites. Highlight the lack of vital services, the poor condition of upkeep, and people's abuse of it. Make suggestions about how to improve the issue.

Q4. You are Kanika / Karan. Your school's Fitness Club hosted a workshop called "Art of Living for Students." Write a letter to the editor of the local daily newspaper, giving your thoughts on the matter.

Q5. Write a self composed poem or article for the school magazine.

PHYSICS

Make a project file on the given topic according to your Roll No. on A4 sheet.

(i) Ohm law (R. No. 1, 25 & 49)
(ii) Kirchoff law (R. No. 2, 26 & 50)
(iii) Charge (R. No. 3 & 27)
(iv) Gauss Thesrem (R. No. 4 & 28)
(v) Meter bridge (R. No. 5 & 29)
(vi) Magnetism (R. No. 6 & 30)
(vii) Amper circuital law (R. No. 7 & 31)
(viii) Elechomagnetic law Ineluction (R.No.8 & 32)
(ix) A-C-Generation (R. No. 9 & 33)
(x) Transformer (R. No. 10 & 34)
(xi) Elechomagnetic wave (R. No. 11 & 35)
(xii) Reflection & Refraction (R. No. 12 & 36)
(xiii) Prism (R. No. 13 & 37)
(xiv) Optical Instrument (R. No. 14 & 38)
(xv) Ahmauclei / electron (R. No. 15 & 39)
(xvi) Radio Activity (R. No. 16 & 40)
(xvii) Semi Conductor (R. No. 17 & 41)
(xviii) Rectifier (R. No. 18 & 42)
(xix) Moving coil galvanometer (Ameter / Voltmeter) (R. No. 19 & 43)
(xx) Lens / Mirror (R. No. 20 & 44)
(xxi) Alternating current & Direct current (R. No. 21 & 45)
(xxii) Magnetic effect of current (R. No. 22 & 46)
(xxiii) Quantum Mechanics (R. No. 23 & 47)
(xxiv) Capacitor (R. No.24 &48)

BIOLOGY

Write answer of the given questions on A4 sheets.

Q1. Write a case study on any of the following topics or any topic of your choice on A4 sheets

a) Cell Culture and Animal Models for Antiviral Drug Discovery and Development

b) Application of Separation Techniques in Novel Coronavirus (COVID-19) Research

c) Left vs Right Brain

d) Medical Significance of Hormones In the human body.

e) Anxiety and stress caused by extreme physical exercise.

f) Discuss the link between physical inactivity and noncommunicable diseases

Q2. Write the following experiments and observations in lab manual.

(i) List of Experiments

a) Prepare a temporary mount to observe pollen germination.

b) Study the plant population density by quadrat method.

c) Study the plant population frequency by quadrat method.

d) Prepare a temporary mount of onion root tip to study mitosis.

e) Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.

(ii) Study and observe the following (Spotting):

a) Flowers adapted to pollination by different agencies (wind, insects, birds).

b) Pollen germination on stigma through a permanent slide or scanning electron micrograph.

c) Identification of stages of gamete development, i.e., T.S. of testis and T.S. of ovary through permanent slides (from grasshopper/mice).

d) T.S. of blastula through permanent slides (Mammalian).

e) Controlled pollination – emasculation, tagging and bagging.

f) Common disease causing organisms like Ascaris, Entamoeba, Plasmodium, any fungus causing ringworm through permanent slides, models or virtual images or specimens. Comment on symptoms of diseases that they cause.

g) Models specimen showing symbiotic association in root nodules of leguminous plants, lichens , Cuscuta on host (parasitic).

h) Flash cards models showing examples of homologous and analogous organs.

CHEMISTRY

Write answer of the given questions on A4 sheets.

Q1. Define the following

a) ideal and non ideal solution with positive and negative deviation

b) Azeotropic solution with maximum and minimum boiling azeotrpes

c) Colligative properties

Q2. Do ncert exercise Q.no 1.5,1.6,1.7,1.17,1.18,1.19,1.20,1.21,1.22,1.32,1.33

Q3. Under what condition is Ecell=0 or $\triangle rG=0$?

Q4. Depict the galvanic cell in which the cell reaction is : - Cu + 2Ag+ --> 2Ag + Cu2+

Q5. A galvanic cell has electrical potential of 1.1 V. If an opposing potential of 1.1 V is applied to this cell, what will happen to the cell reaction and current flowing through the cell?

Q6. Write the Nernst equation for the cell reaction in the Daniel cell of Cu and Zn. How will the Ecell be affected when concentration of Zn2+ ions is increased?

Q7. Consider the figure and answer the following questions.

a) Cell 'A' has Ecell= 2V and Cell 'B' has Ecell = 1.1V which of the two cells 'A' or 'B' will act as an electrolytic cell. Which electrode reactions will occur in this cell?

b) If cell 'A' has Ecell= 0.5V and 'B' has Ecell = 1.1V then what will be the reactions at anode and cathode?

Q8. Do ncert exercise 2.5,2.16

Q9. Why does a galvanic cell become dead after some time?

Q10. At what pH of HCl solution will hydrogen gas electrode show electrode potential of –0.118 V? H2 gas is passed at 298 K and 1 atm pressure.

Q11. One half-cell in a voltaic cell is constructed from a silver wire dipped in silver nitrate solution of unknown concentration. The other half-cell consists of a zinc electrode in a 0.10 M solution of Zn(NO3)2. A voltage of 1.48 V is measured for this cell. Use this information to calculate the concentration of silver ions in the solution. (Given:E(Zn2+/Zn)= –0.763 V, E(Ag+/Ag)= 0.80 V)

Q12. 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.

Q13. 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?

Q14. How will the pH of brine (aq NaCl solution) be affected when it is electrolysed?

Q15. How many moles of mercury will be produced by electrolysing 1.0 M Hg(NO3)2 solution with a current of 2.00 A for 3 hours?

Q16. Calculate the time to deposit 1.27 g of copper at cathode when a current of 2 A was passed through the solution of CuSO4. (Molar mass of Cu = 63.5 g/mol)

Q17. Chromium metal is electroplated using an acidic solution containing CrO3 according to the following equation:
CrO3(aq) + 6H+(aq) + 6e- --> Cr(s) + 3H2O

Calculate how many grams of chromium will be electroplated by 24,000 coulombs. How long will it take to electroplate 1.5 g chromium using 12.5 A current? [Atomic mass of Cr = 52 g/mol]

Q18. The conductivity of metals decreases while that of electrolytes increases with increase in temperature. Why?

Q19. For a reaction R —> P, half-life (t1/2) is observed to be independent of the initial concentration of reactants. What is the order of reaction?

Q20. For a chemical reaction R —> P, the variation in the concentration (R) vs. time (t) plot is given as :

(i) Predict the order of the reaction. (ii) What is the slope of the curve ?

Q21. If the rate constant of a reaction is k = 3 ×10-4 s-1, then identify the order of the reaction.

Q22. What do you understand by the rate law and rate constant of a reaction ? Identify the order of a reaction if the units of its rate constants are :

(i) L-1mols-1 (ii) Lmol-1s-1

Q23. (i) What is the order of the reaction whose rate constant has same units as the rate of reaction ?

(ii) For a reaction A + H2O ----> B; Rate is directly proportional to [A]. What is the order of this reaction?

Q24. For a reaction : H 2+ Cl2 ----> 2HCl, Rate = k

(i) Write the order and molecularity of this reaction, (ii) Write the unit of k.

Q25. For a chemical reaction R -----> P, variation in ln[R] vs time (t) plot is given below:
For this reaction :

(i) Predict the order of reaction. (ii) What is the unit of rate constant (k)?

Q26. State a condition under which a bimolecular reaction is kinetically first order reaction.

Q27. Derive integrated rate equation for rate constant of a first order reaction.

Q28. Write the rate equation for the reaction A2 + 3B2 ----> 2C, if the overall order of the reaction is zero.

Q29. A first order reaction takes 20 minutes for 25% decomposition. Calculate the time when 75% of the reaction will be completed.

Q30. Half-life for a first order reaction is 693 s. Calculate the time required for 90% completion of this reaction.

Q31. Following data are obtained for the reaction: N2O5 ----> 2NO2 + 1/2O2

t (sec)

0

300

600

[N2O5] (mol/L)

1.6×10-2

0.8×10-2

0.4×10-2

(i) Show that it follows first order reaction. (ii) Calculate the half-life.

Q32. The rate constant for a first order reaction is 60 s-1. How much time will it take to reduce 1 g of the reactant to 0.0625 g?

Q33. For the first order thermal decomposition reaction, the following data were obtained :

C2H5Cl(g) -----> C2H4(g) + HCl(g)

Time(s)

Total Pressure (atm)

0

0.30

300

0.50

Calculate the rate constant.

Q34. Rate constant k for a first order reaction has been found to be 2.54 × 10-3 sec-1. Calculate its 3/4th life.

Q35. Write the rate law for a first order reaction. Justify the statement that half life for a first order reaction is independent of the initial concentration of the reactant.

Q36. Why molecularity is applicable only for elementary reactions and order is applicable for elementary as well as complex reactions ?

Q37. (a) If half life period of a first order reaction is x and 3/4th life period of the same reaction is y, how are x and y related to each other ?

(b) In some cases it is found that a large number of colliding molecules have energy more than threshold energy, yet the reaction is slow. Why ?

Q38. All energetically effective collisions do not result in a chemical change. Explain with the help of an example.

Chapter : Haloalkanes and Haloarenes

Solve NCERT Exercise Question No. 6.11 and 6.19 in your notebook.

MATHEMATICS

Write answer of the given questions on A4 sheets.

Q1. Show that $\tan\left(\frac{1}{2}\ sin^{-1}\frac{3}{4}\right) = \frac{4-\sqrt{7}}{3}$.

Q2. If $A = \begin{bmatrix}1 & -1\\ 2 & -1\end{bmatrix}$ and $B = \begin{bmatrix}a & 1\\ b & -1\end{bmatrix}$ and $(A + B)^2 = A^2 + B^2$, then find the values of *a* and *b*

Q3. If $y = \cot^{-1} x$, then $(1+ x^2)\ y_2$ is equal to ……

Q4. Express $\sin^{-1}\left(\frac{\sin x+\cos x}{\sqrt{2}}\right)$, where $-\frac{л}{4} < x < \frac{л}{4}$, in the simplest form.

Q5. Find the value of $\sin^{-1}\left(\sin\left(\frac{43л}{5}\right)\right)$.

Q6. The volume of a cube increasing at the rate of 9 cm^3 per second. How fast is its surface area increasing when the length of an edge is 10 cm?

Q7. Differentiate $\tan^{-1}\left(\frac{1+\cos x}{\sin x}\right)$ with respect to x

$\tan^{-1}\left(\frac{3x-x^2}{1-3x^2}\right)$, $|x| < \frac{1}{\sqrt{3}}$ w.r.t $\tan^{-1}\left(\frac{x}{\sqrt{1-x^2}}\ .\right)$

Q8. 10 Find A such that $\begin{bmatrix}2 & -1\\ 1 & 0\\ -3 & 4\end{bmatrix} A = \begin{bmatrix}-1 & -8\\ 1 & -2\\ 9 & 22\end{bmatrix}$.

Q9. Let A $\{x \in z ; 0 \le x \le \mathbf{12}\}$. 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 equivalence class [2]. -1

Q10. If A $\begin{bmatrix}3 & 2 & 1\\ 4 & -1 & 2\\ 7 & 3 & -3\end{bmatrix}$, then find A^{-1} hence solve the following system of equation.

3x + 4y + 7z = 14 , 2x – y + 3z = 4 , x+2y -3z = 0 .

Q11. Determine the product of $\begin{bmatrix}-4 & 4 & 4\\ -7 & 1 & 3\\ 5 & -3 & -1\end{bmatrix}$ and $\begin{bmatrix}1 & -1 & 1\\ 1 & -2 & -2\\ 2 & 1 & 3\end{bmatrix}$ and then use to solve system of equations. x- y + z = 4 , x-2y – 2z = 9 and 2x + y +3z = 1 .

Q12. Let N denote the set of all natural numbers and R be the relation on N xN

defined by (a ,b) R (c, d) if ad(b + c) = bc(a+d) . show that R is an equivalence relation.

Q13. If $y = \sqrt{a + \sqrt{a + x}}$, then find $\frac{dy}{dx}$.

Q14. If y = $\frac{x\cos^{-1}x}{\sqrt{1-x^2}} - \log\sqrt{1-x^2}$, then prove that $\frac{dy}{dx} = \frac{\cos^{-1}x}{(1-x^2)^{3/2}}$.

Q15. Differentiate $tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$ w.r.t $sin^{-1}\frac{2x}{1+x^2}$, if x ∈ (-1 , 1).

Q16. If x = sint , y = sinpt , prove that (1 – x^2) $\frac{d^2y}{dx^2}$ - x$\frac{dy}{dx}$ + p^2y = 0.

Q17. If x^m y^n = (x + y)$^{m+n}$, prove that $\frac{d^2y}{dx^2} = 0$.

Q18. If y = x^x , prove that $\frac{d^2y}{dx^2} - \frac{1}{y}\left(\frac{dy}{dx}\right)^2 - \frac{y}{x} = 0$.

Q19. If x = a cos $+b\sin\theta$, y = a sin θ – b cos θ , show that $y^2\frac{d^2y}{dx^2} - x\frac{dy}{dx}$ + y = 0.

Q20. If y = $\left(x + \sqrt{1+x^2}\right)^n$, then show that (1 + x^2) $\frac{d^2y}{dx^2}$ + x$\frac{dy}{dx}$ = n^2y.

Q21. If A = $\begin{bmatrix} 2 & 3 & 10 \\ 4 & -6 & 5 \\ 6 & 9 & -20 \end{bmatrix}$, find A^{-1}. Using A^{-1} solve the system of equations

$$\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 2, \frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 5, \frac{6}{x} + \frac{9}{y} - \frac{-20}{z} = -4.$$

Q22. Do all examples of NCERT from chapter 1 to 5.

Q23. Draw the graphs of $\sin^{-1}$ x , $\cos^{-1}$ x, $\tan^{-1}$ x, $\cot^{-1}$ x , $\sec^{-1}$ x , cosec^{-1} x on chart paper also write their range and domain.

Q24. Do lab activities 1, 2 and 5.

Q25. Do examples of ch-1 & 5. (Remaining)

Q26. Do one of the following projects. (In a file) (at least 10 pages)

(i) Applications of derivative and integration (R. No.1 to 10)

(ii) Discuss the diet problem and problem of transportation (LPP). (R. No. 11 to 20)

(iii) Detailed study of work of Ramanujan (R. No. 21 to 30)

(iv) Detailed study of work of Thales and Pythogorons (R. No. 31 to 40)

(v) Draw the graphs of following functions and their inverse to establish the relation between their graphs. (R.No. 41 to 50)

a) $\sin x, \sin^{-1} x$ b) $\cos x, \cos^{-1} x$ c) $\tan x, \tan^{-1} x$

d) $\text{cosec}\, x, \text{cosec}^{-1} x$ e) $\sec x, \sec^{-1} x$ f) $\cot x, \cot^{-1} x$

g) $x^2, \sqrt{x}$ h) $e^x, \log x$

COMPUTER SCIENCE

Write answer of the given questions on A4 sheets.

Q1. Differentiate between “w” and “r” file modes used in Python while opening a data file. Illustrate the difference using suitable examples.

Q2. Define role of random module and their functions :

a) random([n]) b) randint(a,b) c) randrange(a,b)

Q3. Write the importance of file handle (file object name) in text file. Also write the role of function open() & close().

Q4. Write all the functions to read & write operations in the text file.

Q5. Differentiate between :

a) Implicit type conversion & Explicit type conversion

b) Local variable & Global variable

c) Actual parameter & Formal parameter

Q6. What is the role of flush function in data file handling. Explain with suitable Example.

Q7. Define given below functions with suitable example:

a) seek() b) tell()

Q8. Write the importance of the 'with' block with suitable example.

Q9. What is the difference between relative path & absolute path.

Q10. Write all types of file opening mode in data file handling.

Practical File

INDEX

S. NO.	Contents	Date of Practical	Page No.	Teacher's Sign.
1	Write a program in Python to input a number from the user and calculate if the given number is prime or not.			
2	Write a program in Python to input a string from the user and find out if the given string is palindrome or not.			
3	Write a program in Python, which inputs a list L of integers and displays the sum of all such integers from the list L which end with the digit 3.			
4	Write a program in Python, which input a list of numbers and a number to be searched. If the number exists, it is replaced by 0 and if the number does not exist, an appropriate message is displayed.			
5	Write a Python program, which takes a dictionary **Student** as input, the dictionary **Student** contains **Name:(Phy ,Chem, Math)** as **key:value** pairs, program should display the average marks of all students present in dictionary.			
6	Write a Python program to read a text file **"POEM.TXT"** and print the total number of **vowels** and **consonants** separately present in the text file.			
7	Write a Python program to read a text file **"Input.txt"** and print the words starting with **'O'** (Lower/Upper both cases) in reverse order. The rest of the content is displayed normally.			
8	Write a Python program which reads the contents of a text file **"BIOPIC.TXT"** and displays the content of the file with every occurrence of the word 'he' replaced by 'she'.			
9	Write a Python program to count and display the number of lines starting with **'A'** (lower/Upper both cases) present in the text file **"Lines.TXT".**			

10	Write a Python program to count and display the number of lines that have exactly 5 words in it present in the text file **"Story.txt".**			

PHYSICAL EDUCATION

- **Make a project File of the following topics on A4 sheets.**

***Practical-1**

Labelled diagram of field & equipment of any one game of your choice of the given list.
Basketball, Volleyball, Football, Badminton, Table tennis, Cricket and chess

***Practical-2**

Write the procedure and benefits of any two Asanas, yogic kriyas and Pranayam.

***Practical -3**

a) SAI KHELO INDIA TEST b) SENIOR CITIZEN TE