DAV Public School, Jehanabad, Bihar Zone – H
Summer Vacation Homework 2026 – 2027
Class XII (Science)

English

(1) You are the Cultural Secretary of your school. Write a notice in about 50 words informing students about an Inter-School Debate Competition to be held next week.
(2) You are organizing the Annual Prize Distribution Ceremony of your school. Draft a formal invitation card inviting the Chief Guest.
(3) Why did Franz think he was late for school?
(4) What announcement did M. Hamel make in the class that surprised everyone?
(5) What did the poet notice while looking at her mother beside her?
(6) Why did the poet compare her mother's face to a "late winter's moon"?
(7) Why did Charley want to escape from the modern world?
(8) How did Sam reach Galesburg according to Charley?
(9) Describe the character of the Maharaja in The Tiger King. What message does the story convey?
(10) "Language is an important part of our identity." Explain this statement with reference to The Last Lesson.

Hindi

निम्नलिखित प्रश्नों के उत्तर अपने शब्दों में लिखिए ----

1. हरिवंशरायबच्चन कीसंक्षिप्त जीवनी लिखिए और उनकी चर्चित पुस्तकों के नाम लिखिए।
2. आत्म परिचय कविता के माध्यम से कवि क्या कहना चाहता है ?
3. कवि बार-बारयहक्यों कहता है कि –दिनजल्दी -जल्दीढलताहै।
4. भक्तिनकीचारित्रिक विशेषताओं को लिखिए।
5. बाजारदर्शन पाठमें बाजारुपनकाक्या मतलब है ?
6. बाजार कीसार्थकता कातात्पर्य स्पष्ट कीजिए।
7. महादेवीवर्मा और जैनेंद्र कुमार रचित पुस्तकोंके नाम लिखिए।
8. हिंदीमें प्रकाशित समाचार पत्र और पत्रिकाओं के नाम लिखिए।
9. किसीघटना कीरिपोर्ट लिखिए।
10. अपने बारे में दसपंक्तियां लिखिए।

Maths

1. Let Z be the set of all integers and R be the relation on Z defined by R = {(a, b) : a, b ∈ Z and (a - b) is divisible by 5}. Prove that R is an equivalence relation.
2. Let R+ be the set of all non-negative real numbers. Show that the function f: R+ → [-5, ∞) defined by $f(x) = 9x^2 + 6x - 5$ is a bijective function.
3. Let A = R - {2} and B = R - {1}. If f: A → B is a function defined by f(x) = (x-1)/(x-2), show that f is both one-one and onto.
4. Two matrices A and B are given as:

A =

$$\begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \end{bmatrix}$$

[0 1 2]

and B =
[2 2 -4]
[-4 2 -4]
[2 -1 5]
Find the product AB. Use this product to solve the following system of linear equations:
$x - y = 3$
$2x + 3y + 4z = 17$
$y + 2z = 7$
5. The sum of three numbers is 6. If we multiply the third number by 3 and add the second number to it, we get 11. By adding the first and third numbers, we get double the second number. Represent this scenario algebraically and find the numbers using the matrix method.
6. If A =
[2 3]
[1 2]
verify that $A^2 - 4A + I = O$, where I is the identity matrix and O is the zero matrix of order 2. Using this equation, find A^{-1} and compute A^3.
7. For the matrix A =
[2 0 1]
[2 1 3]
[1 -1 0]
find f(A) where the polynomial is given by $f(x) = x^2 - 5x + 6$.
8. Find the values of a and b if the following function is continuous on its entire domain (specifically check at x = 2 and x = 3):
$f(x) = \{ (x^2 - 4)/(x - 2), \text{ if } x < 2$
$\{ ax + b, \text{ if } 2 \leq x < 3$
$\{ 11, \text{ if } x \geq 3$
9. Determine the value(s) of k for which the following function is continuous at x = 0:
$f(x) = \{ (1 - \cos(kx)) / (x \sin x), \text{ if } x \neq 0$
$\{ 1/2, \text{ if } x = 0$
10. Find the relationship between a and b so that the function f defined by:
$f(x) = \{ ax + 1, \text{ if } x \leq 3$
$\{ bx + 3, \text{ if } x > 3$
is continuous at x = 3. Furthermore, if a = 2, find the specific value of b.

Physics

A Write the answer of the following questions. [Each carries 2 Marks] **[16]**

1. An infinite line charge produces a field of 9×10^4 N/C at a distance of 2 cm. Calculate the linear charge density. $\left[\frac{1}{4\pi\varepsilon_0} = 9\times10^9\ \text{Nm}^2\text{C}^{-2}\right]$
2. Write and explain Coulomb's law in the vector form.
3. Write only statements of Kirchhoff's junction rule and loop rule.
4. Derive condition for balance of Wheatstone Bridge.
5. At room temperature (27° C) the resistance of heating element is 100 Ω. What is the temperature of the element if the resistance is found to be 134 Ω, given that the temperature coefficient of material of the resistor is 1.7×10^{-4} °C^{-1} ?
6. The resistance of the platinum wire of a platinum resistance thermometer at the ice point is 5Ω and at steam point is 5.23Ω. When it is inserted in a hot bath, the resistance of the wire is 5.795Ω. Calculate the temperature of the bath.
7. Write note on Mobility.
8. Derive the formula for the torque acting on a dipole placed in uniform external electric field.

B Write the answer of the following questions. [Each carries 3 Marks] **[21]**

9. Derive an expression for the electric field due to an infinitely long straight uniformly charged wire.
10. Write limitations of Ohm's law with corresponding V-I graphs.
11. Obtain formula for equivalent emf and equivalent internal resistance of series combination of two cells of emf ε_1 and ε_2 and internal resistance r_1 and r_2 respectively.
12. A battery of V volt and negligible internal resistance is connected across the diagonally opposite corners of a cubical network consisting of 12 equal resistors each of resistance RΩ. Determine the equivalent resistance of the network.
13. A heating element using nichrome connected to a 230V supply draws an initial current of 4.6A which settles after a few seconds to a steady value of 2.3A. What is the steady temperature of the heating element if the room temperature is 27°C. [$\alpha = 1.7 \times 10^{-4}$°C^{-1}]
14. Drift velocity of electron passing through conductor is given by equation $v_d = -\frac{eE}{m}\tau$ By accepting this equation obtain the equation of conductivity, $\sigma = \frac{ne^2}{m}\tau$
15. Derive formula for equivalent emf and equivalent internal resistance of two cells having emf ε_1 and ε_2, internal resistance r_1 and r_2 are connected in parallel.

8. Derive the formula for the torque acting on a dipole placed in uniform external electric field.

B Write the answer of the following questions. [Each carries 3 Marks] [21]

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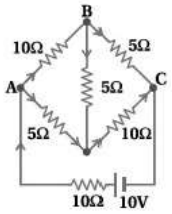
C Write the answer of the following questions. [Each carries 4 Marks] [8]

16. For electric dipole, (a) At any point on the axis, (b) At any point of the equatorial plane obtain the equations of electric field.
17. Determine the current in each branch of the given network.



Chemistry

Biology

1. Sexual Reproduction in Flowering Plants
2. Human Reproduction
3. Reproductive Health

General Instructions:-

*Complete the work in a separate Biology notebook/project file.
*Draw neat and labelled diagrams wherever required.
*Use coloured pencils for diagrams and charts.
*Write answers in your own words.
*Maintain cleanliness and proper presentation.

Part A – Chapter-wise Assignment

Chapter 1: Sexual Reproduction in Flowering Plants

A. Very Short Answer Questions

a. Define pollination.
b. What is microsporogenesis?
c. Name the different types of pollination.
d What is double fertilization?
e. Define polyembryony.

B. Short Answer Questions

a Differentiate between self-pollination and cross-pollination.

b Explain the structure of pollen grain.

c. Describe the structure of embryo sac.

d Explain the process of fertilization in flowering plants.

e Write the significance of seed and fruit formation.

Informatics Practices

1. What is Pandas library of Python?
2. What do you understand by axes in a NumPy array?
3. Define axes for a 2d ndarray.
4. How is Series data structure different from a dataframe data structure?
5. Write a program to create a series object using a dictionary that stores the number of students in each house of class 12 A of your school.
6. Given are two objects, a list object namely lst1 and a series object namely ser1, both are having similar values i.e., 2, 4, 6, 8. Find out the output produced by following statements:

   i. print(lst1 * 2) ii. Print(ser1*2)
7. Write statements to delete a row from a DataFrame.
8. Write statements to delete a column from a DataFrame.
9. What is the difference between iloc and loc with respect to DataFrame?
10. Which function would you use to rename the index/column names in a DataFrame?