THE SAGAR SCHOOL

HOLIDAY HOMEWORK 2019

Class/Section: XII B

This year, your holiday homework is a fun mix of all the aspects of learning. It has been designed to ensure that you enjoy and learn at the same time. Special attention has been taken to ensure that you use your creativity, your innovative ideas and your imagination to shape your holiday homework into fantastic 'creations'. So enjoy your holidays spending quality times with your near and dear ones and devote sometimes to learn new things.

General Instructions:

- Holiday Homework of all subjects to be done in **separate Stick Files** (only).
- The areas to be covered are suggested below. You can of course use your creativity and innovation for new ideas too!
- Credit will be awarded to original photographs/ drawings, illustrations and creative use of materials.
- Holiday Homework needs to be submitted on 10th July 2019.
- Holiday Homework needs to be developed and presented in this order:
  - Cover page showing title, student information, school and academic year and parent's signature.
  - List of contents with page numbers.
  - The last page should have Bibliography/ Sources of information from where you have collected your information.

Subject: English

1. Read the chapter **'Indigo'** from the book "Flamingo". After reading and analyzing this chapter try to understand the issues of poor farmers of that time and write a detailed summary of the chapter in about 120-150 words.

In India, still poor farmers are going through so many issues. Choose any one of the Agricultural issues of India that has provoked a controversy in which lives of poor farmers have been affected: a) find out the facts of the case, b) present your arguments, and c) suggest a possible settlement.

2. Read the chapter **'On the face of it'** from the book Vistas and write a detailed summary of the chapter in about 120-150 words. Attempt character sketch of Mr. Lamb and Derry (word limit: 60-80)

Subject: Mathematics

TOPIC: Matrices

1. Verify that (AB)' = B'A', where: (i) $A = \begin{pmatrix} 2 & 3 \\ 4 & 1 \end{pmatrix}, B = \begin{pmatrix} 1 & 0 & -1 \\ 2 & 1 & 3 \end{pmatrix}$ (ii) $A = \begin{pmatrix} 3 \\ 5 \\ 2 \end{pmatrix}, B = \begin{pmatrix} 1 & 0 & 4 \end{pmatrix}$
2. If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$, show that $A^2 - 5A + 7I = 0$. Hence find A^{-1}.
3. Express $\begin{pmatrix} 4 & 3 & 7 \\ 6 & 5 & -8 \\ 1 & 2 & 6 \end{pmatrix}$ as a sum of a symmetric matrix and a skew-symmetric matrix.
4. Let $A = \begin{pmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{pmatrix}$, prove by mathematical induction that $A^n = \begin{pmatrix} \cos n\alpha & \sin n\alpha \\ -\sin n\alpha & \cos n\alpha \end{pmatrix}$ for every positive integer n.

5. If A = $\begin{pmatrix} 3 & 2 \\ 1 & 1 \end{pmatrix}$, verify that $A^2 - 4A + I = 0$ hence find A^{-1}

6. If A = $\begin{pmatrix} 3 & -2 \\ 4 & -2 \end{pmatrix}$ find k such that $A^2 = KA - 2I_2$

7. If the matrix $\begin{pmatrix} -2 & x-y & 5 \\ 10 & 0 & 4 \\ x+y & z & 7 \end{pmatrix}$ is symmetric, find the values of x,y and z.

8. Find the inverse of the matrix by using elementary operation: $\begin{pmatrix} 1 & 3 & -2 \\ -3 & 0 & -1 \\ 2 & 1 & 0 \end{pmatrix}$

9. If $A^{-1} = \begin{pmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{pmatrix}$ and B= $\begin{pmatrix} 3 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{pmatrix}$, find $(AB)^{-1}$

10. Find the matrix X such that $\begin{pmatrix} 2 & -1 \\ 0 & 1 \\ -2 & 4 \end{pmatrix}$ X= $\begin{pmatrix} -1 & -8 & -10 \\ 3 & 4 & 0 \\ 10 & 20 & 10 \end{pmatrix}$

11. If A= $\begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{pmatrix}$, prove that $A^2 - 4A - 5I = 0$ hence find A^{-1}

12. If $\begin{pmatrix} 0 & -\tan\frac{\alpha}{2} \\ \tan\frac{\alpha}{2} & 0 \end{pmatrix}$ and I is the identity matrix of order 2, show that

$I + A = (I - A) = \begin{pmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{pmatrix}$

13. Two schools A and B want to award their selected students on the values of sincerity, truthfulness and helpfulness. The school A wants to award ₹ x each, ₹ y each and ₹ z each for the three respective values to 3, 2 and 1 students respectively with total award money of ₹ 1,600. School B wants to spend ₹ 2,300 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as before). If the total amount of award for one prize on each value is ₹ 900, using matrices, find the award money for each value. Apart from these three values, suggest one more value which should be considered for award.

TOPIC: Determinants

If A = $\begin{pmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{pmatrix}$, find A^{-1} and use it solve the system of equations:

x + y +2 z = 0, x + 2 y - z = 9, x – 3y +3 z = -14.

1. Using matrices, solve the following system of equations: 3x-y+z = 5, 2x-2y+3z = 7,x+y-z = -1.

Prove the following by using the properties of determinants:

2. $\begin{vmatrix} a & a+b & a+2b \\ a+2b & a & a+b \\ a+b & a+2b & a \end{vmatrix} = 9b^2(a+b)$

3. $\begin{vmatrix} b+c & c+a & a+b \\ q+r & r+p & p+q \\ y+z & z+x & x+y \end{vmatrix} = 2\begin{vmatrix} a & b & c \\ p & q & r \\ x & y & z \end{vmatrix}$

4. $\begin{vmatrix} 3a & -a+b & -a+c \\ a-b & 3b & c-b \\ a-c & b-c & 3c \end{vmatrix}$ =3(a+b+c)(ab+bc+ca)

5. $\begin{vmatrix} (b+c)^2 & a^2 & bc \\ (c+a)^2 & b^2 & ca \\ (a+b)^2 & c^2 & ab \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)(a^2+b^2+c^2)$

6. $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^3$

7. $\begin{vmatrix} (b+c)^2 & ab & ac \\ ab & (c+a)^2 & bc \\ ac & bc3 & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^3$

8. $\begin{vmatrix} a+x & y & z \\ x & a+y & z \\ x & y & a+z \end{vmatrix} = a^2(a+x+y+z)$

9. Using properties of determinants, Solve for x:

$$\begin{vmatrix} a+x & a-x & a-x \\ a-x & a+x & a-x \\ a-x & a-x & a+x \end{vmatrix} = 0$$

10. Using properties of determinants, show that ΔABC is isosceles if

$$\begin{vmatrix} 1 & 1 & 1 \\ 1+\cos A & 1+\cos B & 1+\cos C \\ \cos^2 A+\cos A & \cos^2 B+\cos B & \cos^2 C+\cos C \end{vmatrix} = 0$$

11. If x,y,z are real numbers such that $x + y + z = \pi$ then find the value of $\begin{vmatrix} \sin(x+y+z) & \sin(x+z) & \cos z \\ -\sin y & 0 & \tan x \\ \cos(x+y) & \tan(y+z) & 0 \end{vmatrix}$

TOPIC: Linear Programming

1. A dealer deals in two items only – item A and item B. He has₹ 50,000 to invest and a space to store at most 60 items. An item A costs₹ 2,500 and an item B costs₹500. A net profit to him on item A is₹ 500 and on item B₹150. If he can sell all the items that he purchases, how should heinvest his amount to have maximum profit? Formulate an LPP and solve it graphically.

2. A manufacturing company makes two models A and B of a product. Each piece of model A requires 9 hours of labour for fabricating and 1 hour for finishing. Each piece of model B requires 12 hours of labour for fabricating and 3 hours for finishing. The maximum number of labour hours, available for fabricating and for finishing, are 180 and 30 respectively. The company makes a profit of Rs 8000 and Rs 12000 on each piece of model A and model B respectively. How many pieces of each model should be manufactured to get maximum profit? Also, find the maximum profit.

3. Solve the following Linear Programming Problem graphically:
   Maximize Z = 3x + 4y subject to $x + y \leq 4$, $x \geq 0$, $y \geq 0$

4. A firm has to transport atleast 1200 packages daily using large vans which carry 200 packages each and small vans which can take 80 packages each. The cost for engaging each large van is₹400 and each small van is₹200. Not more than₹3,000 is to be spent daily on the job and the number of large vans cannot exceed the number of small vans. Formulate this problem as a LPP given that the objective is to minimize cost.
5. Solve the following Linear Programming problem graphically:

   Minimize: z = 6x + 3y, Subject to the constraints: $4x+y \geq 80$, $x+5y \geq 115$, $3x+2y \leq 150$

6. A housewife wishes to mix together two kinds of food, X and Y, in such a way that the mixture contains at least 10 units of vitamin A, 12 units of vitamin B and 8 units of vitamin C. The vitamin contents of one kg f food is given below :

	Vitamin A	Vitamin B	Vitamin C
Food X	1	2	3
Food Y	2	2	1

One kg of food X costs₹6 and one kg of food Y costs₹ 10. Formulate the above problem as a linear programming problem and find the least cost of the mixture which will produce the diet graphically. What value will you like to attach with this problem?

7. Solve the following linear programming problem graphically :

Minimize : $z = 3x + 9y$

When : $x + 3y \leq 60$

$x + y \leq 10$

$x \leq y$

$x \geq 0, y \geq 0$

8. Two godowns A and B have grain capacity of 100 quintals and 50 quintals respectively. They supply to 3 ration shops, D, E and F whose requirements are 60, 50 and 40 quintals respectively. The cost of transportation per quintal from the godowns to the shops are given in the following table:

Transportation cost per quintal (in Rs)		
From/To	**A**	**B**
D	6	4
E	3	2
F	2.50	3

How should the supplies be transported in order that the transportation cost is minimum?

What is the minimum cost?

9. An oil company has two depots A and B with capacities of 7000 L and 4000 L respectively. The company is to supply oil to three petrol pumps, D, E and F whose requirements are 4500L,3000L and 3500L respectively. The distance (in km) between the depots and the petrol pumps is given in the following table:

Distance in (km)		
From/To	**A**	**B**
D	7	3
E	6	4
F	3	2

Assuming that the transportation cost of 10 litres of oil is Rs. 1 per km, how should the delivery be scheduled in order that the transportation cost is minimum? What is the minimum cost?

10. Minimise and Maximise Z = 5x + 10y subject to $x\ x + 2y \leq 120$, $x + y \geq 60$, $x - 2y \geq 0$, $x, y \geq 0$.

Subject: Physics

Complete 18 practicals (Section A and Section B both) and 10 activities from 'comprehensive' lab manual, in practical file.

Subject: Chemistry

INSTRUCTIONS/GUIDELINES FOR MAKING THE PROJECT

1) The project should be made covering the following points:
   (a) Page with school logo, your name and roll no.
   (b) Index
   (c) Certificate
   (d) Acknowledgement
   (e) Object
   (f) Material required : (i) Apparatus (ii) Chemical requirement
   (g) Theory
   (h) Procedure
   (i) Observation
   (j) Result
   (k) Bibliography

2) Put diagrams and photographs wherever necessary.

3) Also give a brief introduction / description of your work immediately after index.

Complete the investigatory project as per the given topics:

S. No.	Name of the student	Topic for Investigatory Project 2019-20
1	ADYASA PANDA	To study the presence of Oxalate ion contained in Guava fruit in different stages of ripening
2	PURAB GOLECHHA	Preparation of soyabean milk and its comparison with the natural milk.
3	ADITYA BAHL	To study the effect of potassium bisulphite as good preservative under various condition (concentration, time and temperature)
4	DIVYANSH	To study the quantity of casein present in different samples of milk
5	ADITI YENGKHOM	To study the presence of insecticide / pesticide ((Nitrogen containing) in various fruits and vegetables.
6	HARSH	To analyse the given samples of commercial antacids by determining the amount of HCl they can neutralise.
7	LENDISUNGLA WALLING	To study the settling of mixture of cement with sand, lime and fly ash with respect to time and strength.

Subject: Biology

I) Make a Project on any one of the following topics in a stick file. Put diagrams and photographs wherever necessary. Make a proper Index, Acknowledgment and References taken :

1. Chromosomal Disorder (any two).Write their causes ,symptoms and effects
2. Write about any four commonly used drugs by the drug addicts. What are their harmful effects and how to ensure that the youth is not attracted toward it?
3. Malaria,
4. Immune system in human body

II) Complete your Biology Practical Note book along with diagrams (As per the Board's instructions).

Subject: Psychology

CASE STUDY (QUALITATIVE RESEARCH)

Description:

1) Choose a subject for case study
2) Identify the area that you want to prepare your case study on; it could be a disorder, areas where that person is excelling- sports, academics, music, etc., poor body image, obesity, temper tantrums, substance abuse, not getting along with peers, withdrawn, etc.
3) Suggested format for preparing a case profile

i) Introduction

- A brief introduction of about one or two pages presenting the nature of the problem, its incidence, likely causes, and possible counselling outcomes.
- A half page (brief) summary of the case.

ii) Identification of data

- Name (may be fictitious)
- Diagnosed problem
- Voluntary or Referral (i.e., by whom referred – such as teacher, parent, sibling, etc.)

iii) Case History

- A paragraph giving age, gender, school attended, class presently enrolled in, etc.
- Information about socio – economic status (SES) consisting of information about mother's/father's education and occupation, family income, house type, number of members in the family – brothers, sisters and their birth order, adjustment in the family, etc.
- Information about physical health, physical characteristics (e.g. height and weight), any disability/illness (in the past and present). Etc.
- Any professional help taken (past and present), giving a brief history of the problem, attitude towards counselling (indicating the motivation to seek help, etc.)
- Recording signs (i.e., what is observed in terms of facial expressions, mannerisms, etc.) and symptoms (i.e., what the subject reports, for example, fears, worry, tension, sleeplessness, etc.)
- Psychological test that can be done (if any)

iv) Concluding comments

Subject: Painting

Prepare one thematic painting in half imperial sized sheet based on daily life subjects and color it in a balanced color scheme.

TOPIC – Boolean Algebra

1. State Demorgan's laws. Verify one of the laws using truth table.

2. State and prove

   a. Law of Duality. Give the dual of (A+BC+(AB)').

   b. Distributive Law

   c. Idempotent Law

   d. Absorption Law

3. Reduce the following Boolean expression:

   a. H(U,V,W,Z) = Σ(0,1,4,5,6,7,11,12,13,14,15)

   b. F(A,B,C,D) = π(5,6,7,8,9,12,13,14,15)

4. Verify the following algebraically:

   a. X.Y'.Z+X.Y'.Z'+X'.Y'.Z = X.Y'+Y'

   b. XY+YZ+Y'Z = XY+Z

   c. XY+YZ+YZ'=Y

5. Draw a logic circuit diagram for the following Boolean expressions:

   a. A.(B+C')

   b. X.Y'+Y.Z' (using NAND gates only)

   c. (A+B)(A+B')

   d. X(Y'+Z) (using NOR gate only)

7. A majority gate is a digital circuit whose output is 1 if the majority of inputs are 1's. The output is 0 otherwise. By means of a truth table, find the Boolean function implemented by 3-input majority gates.

8. Simplify using K-map for:

   a. F(w,x,y,z) = M2 + M3 + M4 + M5 + M6 + M7 + M9 + M11 + M13 (M-Maxterm, m-Minterm

   b. F(a,b,c,d) = π(1,2,4,5,7,10,15)

   c. F(w,x,y,z) = m2 + m3 + m5 + m6 + m7 + m9 + m11 +m13 (M-Maxterm, m-Minterm

   d. F(a,b,c,d) = Σ(0,7,8,9,10)

   e. y't' + y'z' + yzt' + yz't'