

**HOLIDAY HOMEWORK 2018-19**
**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 10<sup>th</sup> July 2018.
- 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**

Read the novel, The Invisible man and write a 300- 400 word book review covering the following aspects: Plot and theme, main characters, setting, language and vocabulary and any other elements which make the story interesting.

**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)  $A = \begin{pmatrix} 3 \\ 5 \\ 2 \end{pmatrix}, B = (1 \ 0 \ 4)$
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  $A^2 = K A - 2I_2$

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

1. 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:

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

2. 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:**

$$3. \begin{vmatrix} a & a+b & a+2b \\ a+2b & a & a+b \\ a+b & a+2b & a \end{vmatrix} = 9b^2(a+b)$$

$$4. \begin{vmatrix} b+c & c+a & a+b \\ q+r & r+p & p+q \\ y+z & z+x & x+y \end{vmatrix} = 2 \begin{vmatrix} a & b & c \\ p & q & r \\ x & y & z \end{vmatrix}$$

$$5. \begin{vmatrix} 3a & -a+b & -a+c \\ a-b & 3b & c-b \\ a-c & b-c & 3c \end{vmatrix} = 3(a+b+c)(ab+bc+ca)$$

$$6. \begin{vmatrix} (b+c)^2 & a^2 & bc \\ (c+a)^2 & b^2 & ca \\ (a+b)^2 & c^2 & ab \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)(a^2+b^2+c^2)$$

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

$$8. \begin{vmatrix} (b+c)^2 & ab & ac \\ ab & (c+a)^2 & bc \\ ac & bc & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^3$$

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

$$10. \text{ Using properties of determinants, Solve for } x: \begin{vmatrix} a+x & a-x & a-x \\ a-x & a+x & a-x \\ a-x & a-x & a+x \end{vmatrix} = 0$$

11. Using properties of determinants, show that  $\Delta ABC$  is isosceles if

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

12.

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 he invest 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 at least 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 of 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 :  $x + 3y \leq 60$

$$x + y \geq 10$$

$$x \leq y$$

$$x \geq 0, y \geq 0$$

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 liters 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  $x + 2y \leq 120$ ,  $x + y \geq 60$ ,  $x - 2y \geq 0$ ,  $x, y \geq 0$ .

### Subject: Physics

S. No.	Name of Student	Topic for Investigatory Project
1	Aman Aggarwal	To study various factors on which the internal resistance/emf of a cell depends
2	Niketan Kumar	
3	Ayush Rungta	
4	Aryan Agrawal	
5	Ishan Rana	
6	Notsonu Khatsu	To design appropriate logic gate combination for a given truth table.
7	Maurice Yengkhom	
8	Benhilo Kent	
9	Aman Agrawal	
10	Aryaman Julka	
11	Keshav Chhaparia	To set up a common base transistor circuit and to study its input and output characteristic and to calculate its current gain.
12	Nikhil Waikhom	
13	Anuj Gupta	

14	Krishna Aggarwal	To investigate the dependence, of the angle of deviation, on the angle of incidence, using a hollow prism filled, one by one with different transparent fluids.
15	Shubh Sharma	
16	Reemak Dawe	
17	Yogesh Rathi	
18	Issac Chera	
19	Pawan Kumar Jaishwal	
20	Tarh Koniya	

**Subject: Chemistry**

**INSTRUCTIONS/GUIDELINES FOR 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.
- 4) One topic is given to two students but each student will submit his/her own work.

**Complete the investigatory project as per the given topics**

S. No.	Name of Student	Topic for Investigatory Project
1	Aman Aggarwal	To study the presence of Oxalate ion contained in Guava fruit in different stages of ripening.
2	Niketan Kumar	
3	Shubh Sharma	
4	Ayush Rungta	Preparation of soya bean milk and its comparison with the natural milk.
5	Aryan Agrawal	
6	Reemak Dawe	
7	Ishan Rana	To study the effect of potassium bisulphite as good preservative under various condition (concentration, time and temperature).
8	Notsonu Khatsu	
9	Yogesh Rathi	
10	Maurice Yengkhom	To study the quantity of casein present in different samples of milk
11	Benhilo Kent	
12	Issac Chera	
13	Aman Agrawal	To study the presence of insecticide / pesticide ((Nitrogen containing) in various fruits and vegetables.
14	Aryaman Julka	
15	Pawan Kumar Jaishwal	
16	Keshav Chhaparia	To analyse the given samples of commercial antacids by determining the amount of HCl they can neutralise.
17	Nikhil Waikhom	
18	Tarh Koniya	
19	Anuj Gupta	To study the settling of mixture of cement with sand, lime and fly ash with respect to time and strength.
20	Krishna Aggarwal	

### **Subject: Biology**

1) Make a Project on any one of the following topics. Add diagrams and photographs wherever necessary. Prepare a proper Index, Acknowledgment and References taken.

1. Stem cells and their uses in treating blood cancers and immune disorders.
2. Drug addiction and commonly abused drugs.
3. Cancer.
4. Swine flu.
5. Effects of Narcotic drugs on the Brain.
6. Gene therapy for some diseases like Cystic fibrosis, Hemophilia, Parkinson's disease and SCID.
7. Ebola.
8. Aids.
9. Malaria,
10. Immune system in human body

2) Complete your Biology Practical Note book along with diagrams (As per the CBSE instructions).

### **Subject: Psychology**

#### **CASE STUDY (QUALITATIVE RESEARCH WORK)**

##### **Description:**

Step 1: Choose a subject for study

Step 2: Look into his/her problem

Step 3: Describe the problem, its symptoms, and treatment method that can be taken up/

Step 4: Demographic detail of the subject.

Step 5: In depth personal details, description, and experiences of the subject.

Step 6: Psychological Tests (optional) can be done on the subject.

Step 7: Conclusion.

**Note: If the subject is from school, step 5 to 7 can be completed after vacations.**

##### **PRACTICAL FILE**

Theoretical write-up of Practical Files, for boards, is to be completed during vacations. Handouts will be provided.

### **Subject: Computer Science (C++)**

1. Write an interactive C++ program to take two single dimensional arrays of integers and merge them into a single dimensional array, excluding the common elements of both the arrays.
2. Write an interactive program in C++ language to create an application program which generates the telephone bills. It stores various details of users Telephone Number, Name, Address, No. of calls, local or STD/ISD call. Compute the amount to be paid if the charges per local call is Rs. 2/- and for STD/ISD call is Rs. 5/-. It should have feature of searching the customer records using the telephone number. The application should be designed user friendly.
3. Write an interactive C++ program using Structures to calculate the total and average of scores of a selected student. The program should prompt the student to input the stu\_id. This stu\_id is checked against the stu-ids' and make sure it really exists. Calculate the total and average, if the scores in assignment1 (out of 10 marks), assignment2 (out of 10 marks), mid-term score (out of 30 marks), and final score (out of 50 marks) are given.
4. Write an interactive C++ program to display a table that represents a Pascal triangle of any size. Hint: In Pascal triangle, the first and the second rows are set to 1. Each element of the triangle (from the third row downward) is the sum of the element directly above it and the element to the left of the element directly above it. See the below given example Pascal Triangle of size=5:

1  
1 1  
1 2 1  
1 3 3 1

5. Write an interactive program in C++ language to create an application similar to “NOTEPAD”. Write a program, mynotepad.cpp, which reads words from any file having extension “.txt” and displays each word on a line by itself. A word is defined as any sequence of characters separated by a blank, a tab, or a newline. Note that this definition for a word considers punctuation as part of the word. This program should have features like cut, copy, paste, write and search. The application should be designed user-friendly.

### **Subject: Economics**

**You need to follow the guidelines listed below to complete this project:**

- Explanation of the concept:
- Meaning and Definition
- Application of the concept
- Diagrammatic Explanation (if any)
- Numerical Explanation related to the concept etc. (if any)
- Students’ own views/perception/ opinion and learning from the topic.

### **Suggested List of topics [ANY ONE TOPIC]**

- Price Determination- Harsh Garg
- Human Development Index- Harshil
- Production Possibility Curve- Arnav
- Demand and its determinants- Rohan Dhawan
- Production –Returns to a Factor- Yash
- Inflation in India- Pawan Jaiswal
- Monopoly- Puneet
- Oligopoly- Ashish
- Monopolistic Competition- Himanshu
- Perfect competition- Shubham
- Central Bank and its functions- Aastha
- Government Budget & its Components- Nitin
- GST - Chetan
- Foreign Exchange Markets- Harsh Agarwal
- Self-help Group- Girish
- Balance of payments – Anurag

**N.B:** Make your report investigatory; do the research work on the policies and the steps that are implemented in the recent years; collect data on the budgetary policies taken up by the government; give examples of local markets, if any; give examples of the changes within your society; take in as many practical examples that you can to make your project/ report varied but be practical.

### **GENERAL GUIDELINES:**

1. The total length of the project will be of 25 to 30 pages.
2. The project should be handwritten.
3. The project should be presented in a neat folder.
4. The project report should be developed in the following sequence-
  - (a) Cover page should include the title of the Project, student information, school and year.
  - (b) List of contents.
  - (c) Acknowledgements and preface (acknowledging the institution, the places visited and the persons who have helped.
  - (d) Introduction.

- (e) Topic with suitable heading.
- (f) Planning and activities done during the project, if any.
- (g) Observations and findings of the visit.
- (h) Conclusions (summarized suggestions or findings, future scope of study).
- (i) Photographs (if any).
- (j) Bibliography

**Subject: Painting**

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