ST. THOMAS SCHOOL
HOLIDAY HOMEWORK
CLASS: XII

Biology

1. Genetic disorder.
2. Gene therapy
3. Human Genome project
4. DNA fingerprinting
5. Bio- piracy
6. Cancer
7. AIDS/ Hepatitis
8. Drug addiction and community
9. Role of the micro – organism in Industry
10. Human population
11. Mendelian Inheritance
12. Environmental resistance.
13. Role of agrichemicals in increasing food production.
Make the project on any one of the topics listed above.

Physics

S. No.	Project Title	Roll Number Range
1.	Microscope and Astronomical telescope	1-8
2.	Huygens' principle and its applications.	9-16
3.	Dual nature of radiation and matter	17-24
4.	Atoms and Nuclei	25-32
5.	P-N Junction diode and its applications	33-43

Note:-The project must be made according to following instructions:-
1. The project will contain the following pages;
   a. Front Page (Colored, typed): It must contain project title, school logo, School Name, Session (2021-22), submitted by(under this your name with class with section will be mentioned) and submitted to(under this name of your subject teacher i.e. Mr. Deepak Sharma will be mentioned)
   b. Acknowledgement (Black and White, typed)
   c. Certificate (Black and White, typed)
   d. Index (Black and White, typed)
   e. 10-Pages of content in writing (hand written) including analysis/material aid (graph, data, structure, pie chart, histograms, diagrams etc.) along with conclusion of the investigatory project.
   f. Bibliography
2. This project must be spiraled with top transparent sheet and blue back sheet

Chemistry

Make a project on anyone of the following topics:
1. Amino acids: Peptides, structure and classification, protein structure and their role in the growth of living beings
2. Nucleic Acids: DNA and RNA- there structure. Unique nature. Importance in evolution and their characteristic features.
3. Carbohydrates and their metabolism. Blood- haemoglobin and respiration.
4. Vitamins and Hormones
5. Natural polymers (any 5)- structure, characteristics uses. Synthetic polymers (any 5)- method of preparation, structure ,characteristics and uses.
6. Types of Dyes- methods of preparation, characteristics and uses.
7. Chemicals in medicines: Antiseptics, Antibiotics, Antacids, etc and their uses.
8. Chemicals and chemical processes in forensic studies.
9. Insecticides, pesticides and chemical fertilizers.
10. Ancient Indian medicines and medicinal plants.
11. Effect of Green House Gases.
12. How plastics have changed the world both socially and economically.
Minimum number of pages : 30

English Language

1.Write the compositions on the following:(400-450 Words)
   Religious Fanaticism
   Ambition
2. Write an article titled, 'RISE OF CRIME POST COVID-19 IN INDIA'. You may take help of the following points.(250-300 Words).

The COVID-19 pandemic-- included economic recession-- pushed a large number of people into extreme poverty and unemployment-- let you decreased social spending by the government, increased prices of consumer goods and consequently rise in crime-- with pandemic disrupting business and with remote working becoming reality-- cyber crime raising substantially-- measures to check the rising graph of crime in India.

English Literature
Write the character sketch of the following: (250 Words each).
(a) Prospero
(b) Miranda
(c) Ferdinand
(d) Ariel
(e) Caliban

Computer Science

Note : Solve and execute the following programs and compile printout of the program in a file as a project(Use transparent file for project).

Question 1:
An Achilles Number is a number that is powerful but not a perfect power.

A Powerful Number is a positive integer N, such that for every prime factor p of N, p^2 is also a factor.
A Perfect Power is a positive integer N such that it can be expressed as a^b, where a and b are natural numbers > 1.

72, 108, 200, 288 are some of the first few Achilles Numbers.

The prime factors of 72 = 2 × 2 × 2 × 3 × 3.
Both 2 and 22 = 4 are factors of 72.
Both 3 and 32 = 9 are factors of 72.
Also, 72 can't be represented as a^b.
Therefore, 72 is an Achilles Number.

Write a program in Java to input an integer from the user and check whether it is an Achilles Number or not.

Question 2:
A sphenoid number is a positive integer which has exactly three distinct prime factors.

For example, 30 is a sphenoid number because 30 = 2 × 3 × 5.
66, 70, 78, 102, 114 are some more examples of sphenoid numbers.

Write a program in Java to input a positive integer from the user and check whether it is a sphenoid number or not.

Question 3:
Write a program to input an integer from the user, and check if that number is a full prime.
A number is said to be a full prime if it is a prime number and all its digits are also prime numbers.
For example, 23 is a full prime number because 23 it is prime, and all its digits 2, 3 are also prime.

Question 4:
A Multiple Harshad number is an integer which when divided by the sum of its digits, produces another Harshad number.

For example, consider the number 6804.
6 + 8 + 0 + 4 = 18.
6804 / 18 = 378
3 + 7 + 8 = 18
1 + 8 = 9.
18 / 9 = 2.
So, 6804 is a Multiple Harshad number.

A Harshad number is an integer which is divisible by the sum of its digits. It is also known as a Niven number.
For example, 18 is a Harshad number, because 1 + 8 = 9, which divides 18.

Write a program in Java to enter a number and check if it is a Multiple Harshad number.

Question 5:
IMEI (International Mobile Equipment Identity) is a number which is used to identify mobile phones. It consists of 15 digits that include various information about the mobile device.
The steps to check if an IMEI number is valid are as follows:
1. Starting from the rightmost digit, find the double of every second digit.
2. If the new value is a 2-digit number, then add the digits of that number to form a new 1-digit number.
3. Find the sum of all the digits.
4. If the sum is divisible by 10, then it is a valid IMEI number, otherwise not.

Write a Java program to accept a number and check if it is a valid IMEI number. Display a suitable message accordingly.

Question 6:
A Fascinating number is one which when multiplied by 2 and 3 and then, after the results are concatenated with the original number, the new number contains all the digits from 1 to 9 exactly once. There can be any number of zeroes and are to be ignored.

Example: 273
273 × 1 = 273
273 × 2 = 546
273 × 3 = 819

Concatenating the results we get, 273546819 which contains all digits from 1 to 9 exactly once.

Thus, 273 is a Fascinating number.

Accept two positive integers m and n, where m must be less than n and the values of both 'm' and 'n' must be greater than 99 and less than 10000 as user input. Display all Fascinating numbers that are in the range between m and n (both inclusive) and output them along with the frequency, in the format given below:

Test your program with the following data and some random data:
Example 1:
INPUT:
m = 100
n = 500
OUTPUT:
THE FASCINATING NUMBERS ARE:
192 219 273 327
FREQUENCY OF FASCINATING NUMBERS IS: 4

Question 7:
A MOBIUS function M(N) returns the value -1 or 0 or 1 for a natural number (N) by

the following conditions are defined:
When,
M(N) = 1 if N = 1
M(N) = 0 if any prime factor of N is contained in N more than once.
M(N) = (-1)P if N is the product of 'P' distinct prime factors.

Write a program to accept a positive natural number (N) and display the MOBIUS result with proper message.
Design your program which will enable the output in the format given below:

Sample 1:
INPUT: 78
OUTPUT:
78 = 2 × 3 × 13
NUMBER OF DISTINCT PRIME FACTORS = 3
M(78) = -1
Sample 2:
INPUT: 34
OUTPUT:
34 = 2 × 17
NUMBER OF DISTINCT PRIME FACTORS = 2
M(34) = 1
Sample 3:
INPUT: 12
OUTPUT:
12 = 2 × 2 × 3
DUPLICATE PRIME FACTORS
M(12) = 0
Sample 4:
INPUT: 1
OUTPUT:
1 = 1
NO PRIME FACTORS
M(1) = 1

Question 8:
A Goldbach number is a positive even integer that can be expressed as the sum of two odd primes.
Note: All even integer numbers greater than 4 are Goldbach numbers.
Example:
6 = 3 + 3
10 = 3 + 7
10 = 5 + 5
Hence, 6 has one odd prime pair 3 and 3. Similarly, 10 has two odd prime pairs, i.e. 3, 7 and 5, 5.

Write a program to accept an even integer 'N' where N > 9 and N < 50. Find all the odd prime pairs whose sum is equal to the number 'N'.
Test your program with the following data and some random data:
Example 1:

INPUT:
N = 14
OUTPUT:
Prime pairs are:
3, 11
7, 7
Example 2:
INPUT:
N = 30
OUTPUT:
Prime numbers are:
7, 23
11, 19
13, 17
Example 3:
INPUT:
N = 17
OUTPUT:
Invalid input. Number is odd.

Question 9:
A Prime-Adam integer is a positive integer (without leading zeroes) which is a prime as well as an Adam number.

Prime number: A number which has only two factors, i.e. 1 and the number itself. Example: 2, 3, 5, 7, etc.

Adam number: The square of a number and the square of its reverse are reverse to each other. Example: If n = 13 and reverse of 'n' is 31, then, 13^2 = 169, and 31^2 = 961 which is reverse of 169. Thus, 13 is an Adam number.

Accept two positive integers are and n, where m is less than n as user input. Display all Prime-Adam integers that are in the range between m and n (both inclusive) and output them along with the frequency, in the format given below:
Test your program with the following data and some random data:
Example 1:
INPUT:
m = 5
n = 100
OUTPUT:
The Prime-Adam integers are:
11, 13, 31
Frequency of Prime-Adam integers is: 3
Example 2:
INPUT:
m = 100
n = 200
OUTPUT:
The Prime-Adam integers are:
101, 103, 113

Frequency of Prime-Adam integers is: 3
Example 3:
INPUT:
m = 50
n = 70
OUTPUT:
The Prime-Adam integers are:
NIL
Frequency of Prime-Adam integers is: 0
Example 4:
INPUT:
m = 700
n = 450
OUTPUT:
Invalid Input.

Question 10:
Write a program in Java to generate the Hailstone Sequence for a given number.

The Hailstone Sequence of numbers can be started from a given positive integer N. The remaining terms of the sequence can be evaluated by applying the following rules:

If N = 1, then the sequence terminates.
If N is even, then the next term of the sequence is N / 2.
If N is odd, then the next term in the sequence is 3 × N + 1.
For example:
INPUT:
N = 13
OUTPUT:
40 20 10 5 16 8 4 2 1
Display an appropriate message if the number N <= 0.

Question 11:
Write a program in Java to generate all the twin primes in the range 1 to N, where the value of N is entered by the user.
A twin prime is a pair of prime numbers with a difference of 2.
For example: 3, 5.
Sample Input:
N = 50
Sample Output:
3, 5
5, 7
11, 13
17, 19
29, 31
41, 43

Question 12:
A prime triplet is a collection of three prime numbers in the form

(p, p + 2, p + 6) or (p, p + 4, p + 6).
Write a program in Java to display all the possible prime triplets in the range m and n, where the value of m and n are entered by the user.
Example:
INPUT:
M=1
N=20
OUTPUT:
5,7,11
7,11,13
11,13,17
13,17,19

Question 13:
Write a program in Java to allow the user to enter a positive integer.
If the user enters a negative integer, then convert it into a positive integer.
Now check if the entered integer is a unique number or not.
A unique number is a positive integer without any duplicate digits.
Examples are 283, 7045, etc.

Question 14:
An autobiographical number is a number such that the first digit of it counts how many zeroes are there in it, the second digit counts how many ones are there and so on. An autobiographical number is like a self-descriptive number.
For example, 1210 has 1 zero, 2 ones, 1 two and 0 threes.
3211000 is another example of an autobiographical number.
Even the year 2020 is an autobiographical number!

Write a program in Java to input a positive number from the user and check whether that number is an autobiographical number or not.

Question 15:
A Jumping Number is a number in which each adjacent digit differs by only 1.
For example, 76789 is a Jumping Number.
Also note that all the one-digit numbers are considered to be Jumping Numbers.

Write a program in Java to input a positive integer and check whether it is a Jumping Number.
Display a suitable message accordingly.

Hindi

1. **Holiday homework**

   आषाढ़ का एक दिन नाटक का संपूर्ण वर्णन (लेखक परिचय ,प्रमुख पात्रों का चरित्र चित्रण, शिक्षा और संदेश एवं उद्देश्य स्पष्ट करते हुए)

   भाषा- 1-25 मुहावरे (अर्थ एवं वाक्य प्रयोग) 2-25 अशुद्ध वाक्यों को शुद्ध करके लिखिए।

   3-'युद्ध समस्याओं का हल नहीं है ', विषय पर एक सारगर्भित आलेख

   (दोनों अलग अलग फाइल में बनेंगे)

Commerce

Learn chapter 1,2 & 3

Economics

Project 1 :
   a) Conduct a socio- economic survey of a locality with reference to:
      I)   Demographic features
      II)   Consumption pattern- expenditure on necessities, comforts and
      luxuries
      III)   Occupational structure
   b) Prepare a report on the competition in the aviation sector in India with
      reference to:
      I)   Performance of the public sector and private sector
      II)   Operational strategies adopted by budget/low – cost carriers.
   c) Many thinkers believe that we are rapidly depleting our natural resources.
      Assume that there are only two inputs producing two goods with no
      improvements in technology over time as natural resources are exhausted.
      How would invention and technological8 improvement modify your answer?
      On the basis of the example, explain why it is said economic growth is a race
      between depletion and invention.
   d) Make a comparative study of the allocation of financial resource of the central
      government budget on agriculture, defence, industry and education for the
      last ten years. Prepare a report on your observations.
Project II :
   a) Demand and elasticity of demand.
   b) Supply elasticity of supply.
   c) market mechanism.
   d) Production function and cost, revenue.
   e) Money and banking.

Accounts

Practice numerical of chapter 1, 2 & 3

Math

1. Make graph of inverse trigonometric functions (domain and range). Write all the formulas also. (Section A)
2. Make project of application of calculus in Economics and Commerce. (Section C)
3. Do Relations and functions chapter.

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