

**CLASS – XI-A****WINTER BREAK****HOMEWORK****Name:****Date:**

This is to bring to your kind notice that the school will reopen on Monday, 12th January 2015.

**ENGLISH**

1. Write a book review of “*Canterville Ghost*” by Oscar Wilde in around 200-250 words. Focus specifically on Ch 3-6 for the same.
2. You are Akash Juneja, Sports Captain of Aravali Heights School, Vasant Vihar. Write a letter to ‘Glow Sports Shop’ and order sports goods for the annual athletic meet in your school.
3. Based on your reading of ‘*Tale of Melon City*’, comment on the poem as a satire on the dysfunctional judiciary and bureaucratic system. ( 150 words)
4. Draft an advertisement for the classified section informing public about the sale of your Maruti Alto. You are going abroad and are urgently in need of a buyer. ( 50 words)

**PHYSICS**

1. The excess pressure inside a soap bubble is thrice the excess pressure inside a second soap bubble. What is the ratio between the volume of the first and the second bubble?
2. What will be the change in time period of a loaded spring, when taken to moon ?
3. A light body and a heavy body have equal momentum. Which one will have greater kinetic energy?
4. The percentage errors in the measurement of mass and speed are 2% and 3% respectively. How much will be the maximum error in the estimate of kinetic energy.



5. Can a body have a constant speed and still have a varying velocity?
6. Roofs of the huts are blown up during stormy days. Why?
7. Why steel is more elastic than rubber?
8. (i) Chinawares are wrapped in straw paper before packing. Why?  
(ii) It is difficult to move a cycle along a road with its brakes on. Explain?
9. Springs A and B are identical except that A is stiffer Than B. In which spring is more work done if they are stretched by the same force.
10. Derive expression for variation of 'g' with altitude and depth. At what height above and depth below the earth's surface, the value of g is half of its value on earth's surface.
11. If a door of a working refrigerator is kept open for a long time in a closed room, will it make the room warm or cool? Why ?
12. Water flows through a horizontal pipe whose internal diameter is 2 cm, at a speed of 1cm/s. What should be the diameter of the nozzle, if the water is to emerge at a speed of 4m/s?
13. A disc is recast into a hollow ring of same radius. Which will have large moment of inertia?
14. Show that the average K.E. of a gas molecule is directly proportional to the temperature of the gas.
15. The velocity of sound waves 'v' through a medium may be assumed to depend on:
  - (i) the density of the medium 'd' and (ii) the modulus of elasticity 'E'. Deduce by the method of dimensions the formula for the velocity of sound.
16. Describe stress strain relationship for a loaded steel wire by plotting the graph and hence explain the terms elastic limit, permanent set, breaking point.
17. The ratio of radii of two wires of same material is 2:1. If these wires are stretched by equal force. Find the ratio of stresses produced in them.
18. A man weighs 70 kg. He stands on a weighing machine in a lift, which is moving (i) upwards with a uniform speed of 10m/s.(ii) downwards with a uniform acceleration of 5m/s<sup>2</sup>(iii) upwards with a uniform acceleration of 5m/s<sup>2</sup>. What would be the readings on the scale in each case?
19. A sample of gas ( $\gamma = 1.5$ ) is compressed adiabatically from a volume of 1600 m<sup>3</sup> to 400 m<sup>3</sup>. If the initial pressure is 150 Pa, what is the final pressure and how much work is done on the gas in the process?



20. Derive expressions for velocities of the two bodies after an elastic collision in one dimension.
21. A projectile is fired with a velocity  $u$  making an angle  $\theta$  with the horizontal. Derive expressions for (i) time of flight (ii) maximum height (iii) horizontal rang. Show that for two complementary angles of projection of a projectile thrown with the same velocity, the horizontal ranges are equal. (b) At what value of angle is the horizontal range maximum?
22. Describe the working of a carnot engine. In a carnot engine, system absorbs 1000 J of heat from source at 127 C and rejects 600 J of heat in each cycle. Calculate the efficiency of engine and temperature of sink.

### MATHEMAICS

1. Prove that  $\tan 75^\circ = 2 - \sqrt{3}$
2. Prove that  $7^{2n} + 2^{3n-3} \cdot 3^{n-1}$  is divisible by 25.
3. Convert  $-\sqrt{3}i + 1$  to polar form.
4. Find the modulus and argument of  $(1 - i)^3$ .
5. From 7 consonants and 4 vowels, how many different words can be formed consisting of 3 consonants and 2 vowels?
6. Find the domain and range of  $y = \frac{2}{3-2x}$  ?
7. Find the term independent of  $x$  in the expansion of  $(x^2 - \frac{2}{x})^9$ .
8. If  $G$  is the geometric mean between two distinct positive numbers  $a$  and  $b$ , then show that
 
$$\frac{1}{G-a} + \frac{1}{G-b} = \frac{1}{G}$$
9. Find the derivative of the following using first principle:
 

(a) cosec $x$	(b) $\frac{\cos x}{x}$	(c) $x \cos x$	(d) $\frac{ax+b}{cx+d}$
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10. Find the equation of the circle passing through  $(0,2)$ ,  $(3,0)$  and  $(3,2)$ .
11. If  $f(x) = \frac{x-1}{x+1}$ , prove that  $f(f(x)) = \frac{1}{x}$



12. Probability of solving a certain problem independently by A and B are  $\frac{1}{4}$  and  $\frac{1}{5}$  respectively. If both try to solve the problem, find the probability that

- (a) both of them solve
- (b) exactly one of them solves
- (c) no one solves
- (d) it is solved

13. Evaluate the following:

- (a)  $\lim_{x \rightarrow 0} \frac{x \tan x}{1 - \cos x}$
- (b)  $\lim_{x \rightarrow 1} (1 - x) \tan 90x$

14. Divide 69 into 3 parts such that they are in A.P. and the product of two smaller parts is 483.

15. Find the sum of  $7, 7.7, 7.77, 7.777, \dots$  upto 50 terms.

16. Find the number of ways in which the letters of the word MACHINE can be arranged so that the vowels may occupy the odd positions.

17. If three consecutive terms in the expansion of  $(1 + x)^n$  are in the ratio 6 : 33 : 110, find n.

18. Prove that :  $\frac{\sec 8A - 1}{\sec 4A - 1} = \frac{\tan 8A}{\tan 2A}$

## COMPUTER SCIENCE:

### Data Representation

1. What is the full form of bit, ASCII, ISCII?
2. Determine the octal equivalent of the following binary numbers.
  - (i) 011001 (ii) 10101000110
3. Determine the Hexa Decimal equivalent of the following binary numbers.
  - (i) 101111100001 (ii) 10101111
4. Convert  $120_{16}$  to its Decimal equivalent
5. Convert  $25.25_{10}$  its binary equivalent.



### **General OOP Concepts**

1. What is the difference between an object and a Class?
2. What do you mean by Abstraction and Encapsulation? How are these two terms interrelated?
3. Define Polymorphism and Inheritance.
4. What do you mean by Modular Programming? Define module?

### **Getting Started with C++**

1. What is the difference between keyword and an identifier?
2. What are literals in C++? How many types of literals are allowed in C++?
3. What is the difference between 'a' and "a" in C++?
4. Differentiate between Syntax and semantic errors with example.

### **Flow of Control**

1. What is meant by an entry-controlled loop? Which C++ loops are entry-controlled?
2. What is meant by an exit-controlled loop? Which C++ loops are exit-controlled?
3. Write a program to find the factorial of a given number.
4. Write a program to print Fibonacci series (10 terms).

### **Structured Data Type: Array**

1. How many elements can the array store?
2. Write a program to arrange 10 numbers in ascending order.
3. Write a program to check whether the string is palindrome or not.
4. Write a program to find the sum of diagonal elements.
5. Write a program to find the sum of odd numbers in a matrix.



### Functions

1. What is the difference between Call by value and Call by reference?
2. What do you mean by scope and life time of a variable?
3. Write a program to print the largest element of an array using function.

### Programming Methodology

1. What are the characteristics of a good program?
2. What is the purpose of comments and indentation in a program?
3. Define (i) Robustness (ii) Guard Code.
4. What is Program Documentation?
5. What do you mean by Internal & External Documentation?
6. Define Testing and Debugging.

***Wishing you and your family a very happy and prosperous new year***

