# NORTH-EX PUBLIC SCHOOL, JAIN NAGAR
## WINTER HOLIDAYS HOMEWORK
## CLASS-XI-A

## ENGLISH

1. The school has organized an Inter School Elocution competition on the topic, "Stop wars, and give peace a chance". Write a notice for the school notice board. You are Vandana/Varun, school leader of Little Scholars Public School, Bangalore.

2. Last month your school library week in which reading sessions, quiz on authors and poets by the eminent writers were organized. Write a report of the Library Week Celebrations to be published in the VidyalayaPartika.

3. As the Head Boy/Girl, write a letter to the Principal of your school requesting him/her to improve the school canteen. The hygiene conditions as well as the menu needs to be improved.

4. You want to dispose of your old bike. Wrtie an advertisement to be published in 'For Sale' column of a newspaper.

## PHYSICS

1. A steel tape 1 m long is correctly calibrated for a temperature of 27.0 °C. The length of a steel rod measured by this tape is found to be 63.0 cm on a hot day when the temperature is 45.0 °C. What is the actual length of the steel rod on that day ? What is the length of the same steel rod on a day when the temperature is 27.0 °C ? Coefficient of linear expansion of steel = $1.20 \times 10^{-1} K^{-1}$

2. A 10 kW drilling machine is used to drill a bore in a small aluminium block of mass 8.0 kg. How much is the rise in temperature of the block in 2.5 minutes, assuming 50% of power is used up in heating the machine itself or lost to the surroundings? Specific heat of aluminium = 0.91 J $g^{-1}$ $K^{-1}$

3. Explain why
   (a) The angle of contact of mercury with glass is obtuse, while that of water with glass is acute.
   (b) Water on a clean glass surface tends to spread out while mercury on the same surface tends to form drops. (Put differently, water wets glass while mercury does not.)
   (c) Surface tension of a liquid is independent of the area of the surface.
   (d) Water with detergent dissolved in it should have small angles of contact.
   (e) A drop of liquid under no external forces is always spherical in shape.

4. In the HCl molecule, the separation between the nuclei of the two atoms is about 1.27 A (1 A = $10^{-10}$m). Find the approximate location of the CM of the molecule, given that a chlorine atom is about 35.5 times as massive as a hydrogen atom and nearly all the mass of an atom is concentrated in its nucleus.

5. An electron and a proton are detected in a cosmic ray experiment, the first with kinetic energy 10 keV, and the second with 100 keV. Which is faster, the electron or the proton? Obtain the ratio of their speeds, (electron mass = $9.11 \times 10^{-31}$ kg, proton mass = $1.67 \times 10^{-27}$ kg, 1 eV= $1.60 \times 10^{19}$J).

6. A pump on the ground floor of a building can pump up water to fill a tank of volume 30 $m^3$in 15 min. If the tank is 40 m above the ground, and the efficiency of the pump is 30%, how much electric power is consumed by the pump?

7. The blades of a windmill sweep out a circle of area A. (a) If the wind flows at a velocity v perpendicular to the circle, what is the mass of the air passing through it in time t? (b) What is the kinetic energy of the air? (c) Assume that the windmill converts 25% of the wind's energy into electrical energy, and that A = 30 $m^2$, v = 36 km/h and the density of air is 1.2 kg $m^{-3}$ . What is the electrical power produced?

8. A bullet of mass 0.012 kg and horizontal speed 70 $ms^{-1}$strikes a block of wood of mass 0.4 kg and instantly comes to rest with respect to the block. The block is suspended from the ceiling by thin wire. Calculate the height to which the block rises. Also, estimate the amount of heat produced in the block.

9. A passenger arriving in a new town wishes to go from the station to a hotel located 10 km away on a straight road from the station. A dishonest cab man takes him along a circuitous path 23 km long and reaches the hotel in 28 min. What is (a) the average speed of the taxi, (b) the magnitude of average velocity? Are the two equal?

10. A stone tied to the end of a string 80 cm long is whirled in a horizontal circle with a constant speed. If the stone makes 14 revolutions in 25 s, what is the magnitude and direction of acceleration of the stone?

11. An aircraft is flying at a height of 3400 m above the ground. If the angle subtended at a ground observation point by the aircraft positions 10 s apart is 30°, what is the speed of the aircraft? Time taken by aircraft from A to B is 10 s.

12. A car weighs 1800 kg. The distance between its front and back axles is 1.8 m. Its centre of gravity is 1.05 m behind the front axle. Determine the force exerted by the level ground on each front wheel and each back wheel.

13. A metre stick is balanced on a knife edge at its centre. When two coins, each of mass 5g are put one on top of the other at the 12.0 cm mark, the stick is found to be balanced at 45.0 cm. What is the mass of the metre stick?

14. A rocket is fired from the earth towards the sun. At what distance from the earth's centre is the gravitational force on the rocket zero? Mass of the sun = $2 \times 10^{30}$ kg, mass of the earth = $6 \times 10^{24}$ kg. Neglect the effect of other planets etc. (orbital radius = $1.5 \times 10^{11}$ m).

**15.** A body weighs 63 N on the surface of the Earth. What is the gravitational force on it due to the Earth at a height equal to half the radius of the Earth?

## MATHS

Q.1     Consider the experiment of rolling a die. Let Abe the event 'getting a prime number', B the event' getting an odd number'. Write the sets representing the events.
(i)  A or B                (ii) A and B                (iii) A but not B           (iv) 'not A'

Q.2     Two dice are thrown and the sum of the numbers which come up on the dice is noted. Let us consider the following events associated with this experiment.
A : 'the sum is even'.
B : 'the sum is a multiple of 3'
C : 'the sum is less than 4'.
D : 'the sum is greater than 11'.

Q.3     A bag contains 9 discs of which 4 are red, 3 are blue and2areyellow. The discs are similar in shape and size. A disc is drawn random from the bag. Calculate the probability that it will be (i) red (ii) yellow (iii) blue (iv) not blue (v) either red or blue.

Q.4     Two students Anil and Ashima appeared in an examination. The probability that Anil qualify the examination is 0.05 and that Ashima will qualify the examination is0.02. Find the probability that
(i)  Both Anil and Ashima will not qualify the examination.
(ii) At least one of them will not qualify the examination and
(iii) Only one of them will qualify the examination.

Q.5     A committee of two persons is selected from two men and two women. What is the probability that the committee will have (i) no man ? (ii) one man ? (iii) two women?

Q.6     If A,B, C are three events associated with a random experiment, prove that
$A (A \cup B \cup C) = P(A) + P(B) + P(C) - P (A \cap B) - P (A \cap C) - P(B \cap C) + P (A \cap B \cap C)$

## CHEMISTRY

1.  State Pauli Exclusion Principle and Hund's Rule of Maximum Multiplicity with example.
2.  Give reasons:
    (i)      Group 17 have very high negative electron gain enthalpy.
    (ii)     Bond angle in water is less than Ammoonia.
3.  Calculate the number of KJ of heat necessary to raise the temperature of 60 g of Al from 35 to 55 degree Celsius. Molar heat capacity of Al is 24 $Jmol^{-1}K^{-1}$.
4.  Explain the following:
    (i)      Resonance effect and hyperconjugation effect.
    (ii)     Homologous Series.
5.  Give following named reactions:
    (i)      Friedal Craft alkylation Reaction.
    (ii)     Wartz Reaction.

(iii)     Polymerisation Reaction.

**BIOLOGY**

1. **Distinguish between**
   (a) IRV and ERV
   (b) Inspiratory capacity and expiratory capacity.
   (c) Vital capacity and total lung capacity.
2. Define oxygen dissociation curve. Can you suggest any reason for its sigmoidal pattern?
3. How is respiration regulated?
4. Write the differences between:
   (a) Blood and lymph
   (b) Open and closed system of circulation
   (c) Systole and diastole
   (d) P-wave and T-wave
5. Describe the evolutionary change in the pattern of heart among the vertebrates.
6. Define a cardiac cycle and the cardiac output.
7. Draw a standard ECG and explain the different segments in it.
8. Give a brief account of the counter current mechanism.
9. Describe the role of liver, lungs and skin in excretion.
10. What is the significance of juxta glomerular apparatus (JGA) in kidney function?
11. Answer briefly:
    (a) Why are villi present in the intestine and not in the stomach?
    (b) How does pepsinogen change into its active form ?
    (c) What are the basic layers of the wall of alimentary canal?
    (d) How does bile help in the digestion of fats ?
12. Describe the process of digestion of protein in stomach.
13. How are polysaccharides and disaccharides digested ?
14. How does butter in your food get digested and absorbed in the body ?
15. Discuss the main steps in the digestion of proteins as the food passes through different parts of the alimentary canal.


**COMPUTER SCIENCE**

Q1.     What are functions in C++? Explain their types.
Q2.     Differentiate between call by value and call by reference.
Q3.     What are formal and actual parameters? Explain.
Q4.     Explain local and global variables.
Q5.     Make a poster on types of control statements in C++.

**PHYSICAL EDUCATION**

Q.1-    Define sports training and explain its concept.
Q.2-    What do you mean by warming up and limbering down?
Q.3     Explain the different principles of sports and sports training in detail.
Q.4-    Write down the difference between skill and technique.
Q.5-    Give symptoms of over-load suggest. How to overcome it?
Q.6-    Learn and write Question and answers of Chapter – 1 to 12.