

**HOLIDAY HOMEWORK -1<sup>ST</sup> TERM – 2017-18**

**CLASS – XI**

**MATHEMATICS:**

General Instructions:

1. Do the assignment in a separate note book.
2. Apply proper concept and suitable formulae.
3. Prepare any one of the topic which is undersigned chapters
4. Test will be commence after vacation
5. Submit the required assignment on 25<sup>th</sup>, October, 2017.

DESCRIPTION:

1. Choose any one of the following Contents and prepare , Mathematical Modelling (or) P.P.T (or) Any innovative method as you like.

**Sets**

**Relations and Functions**

**Trigonometric Functions**

**Principle of Mathematical Induction**

**Complex Numbers and Quadratic Equations**

**Sequence and Series**

**Introduction to 3-D**

2. Do prepare answers of Pre-board and mid term Exam question papers.

**BIOLOGY:**

A. Answer the questions of mid-term question paper.

B. Investigatory project.

**Step 1:** For this, you have to first select a topic for which you need to work and read different chapters of your syllabus and also consults scientific literature, magazines, newspapers, use search engines of internet, etc. Then select the topic of your interest.

**Step 2:** Planning of the project: Collect all possible available information about the topic. Prepare a rough outline of the experimental work of the project.

**Step 3:** Experimentation for the project: Plan and conduct experimental work with precision so that you are sure to get correct results.

Following points should be kept in mind while performing the experiments for the project work.

- i. Collect data with honesty and utmost care.
- ii. Record only your observation and data.
- iii. Repeat the experiment several times and take average of the results of all the experiments.
- iv. Compare your results with those available in the reference books.
- v. Discuss your results in the light of available information about the project and draw out meaningful conclusion.
- vi. Make use of histograms, graphs, photographs, diagrams or models, case studies to support your observations and conclusions.

- vii. Give a list of books, magazines/journals and internet sites you have consulted during the course of your project.
- viii. Acknowledge the guidance, help and assistance rendered by your teachers, parents, neighbors and friends by expressing sincere gratitude and thanks to them in the beginning.

**Step 4:** How to write: You are required to get their project report typed on bond paper sheets and to represent it in the best possible manner. The project report should be written in the following sequence:

Title/Aim- Name of the project.

- **Introduction-** Information collected from various sources related to the topic.
- **Requirements-** Materials required for experimental work.
- **Procedure-** Write details of the experimental work you have performed.
- **Observations-** Record your observations/data in the form of tables, histograms, graphs, photographs, etc.
- **Results/Conclusion-** Give analysis of the data and compare your results with those available in the literature and draw conclusions.
- **References-** Give the list of books, internet websites, magazines or journals you have consulted, for the project work.

### **CHEMISTRY:**

A) Prepare & write the mid-term question paper.

B) Prepare the following questions given below,

1. Learn & write 1-30 atomic numbers(Z), Element name, Element symbol, No. Of electrons, protons. neutrons & write electronic configuration.
2. Learn & write concept of Nature of matter.
3. Learn & write the concepts of metals ,non-metals & metalloids.
4. Learn & write Heisenberg's principle & Debroglie equation.
5. Learn & write the bond parameters.
6. Learn & write the molecular orbital theory.
7. Learn & write A short note about Buffer solutions.
8. Learn & write the Dalton's law of partial pressures.
9. Write algorithm for predicting position of an element in the periodic table.
10. Learn & write the concept of hybridisation.

### **PROJECT:**

1. The study of methods of purification of water.
  - a. Issac roy
  - b. Abdur
  - c. Tarun
  - d. Pradeep
  - e. Sriram

2. Study of activity of fruit and vegetable juices.
  - a. Srikar    b. Samir    c. Mahendra    d. Pavan    e. Charan
3. Investigation of the foaming capacity of different washing soaps and effect of addition of Sodium carbonate on them.
  - a. Krishnasai    b. Aman    c. Sourajit    d. Suchandra    e. Yagnateja

## PHYSICS:

- A) Prepare a working model based on laws of physics
- B) Write the answers for the midterm question paper
- C) Prepare the following questions given below

### MOTION IN A STRAIGHT LINE

1. The distance travelled by a body varies directly proportional to the square of time. What type of motion this body has?
2. Find the distance travelled by the uniformly accelerated object moving in one dimension in nth second.
3. A balloon starts rising from the ground with an acceleration of  $1.25 \text{ ms}^{-2}$ . After 8 s, a stone is released from the balloon. Find the time taken by the stone to reach the ground after its release. Take  $g = 10 \text{ ms}^{-2}$ .
4. A particle travels half the distance with a speed  $v_0$ . The remaining part of the distance was covered with speed  $v_1$  for half the time and with speed  $v_2$  for the other half of the time. Find the average speed of the particle averaged over the whole time of motion.
5. Can the speed of a body change if its velocity is constant? Explain.
6. Deduce the equations of motion by calculus method.
7. Chandigarh and Ambala are connected with a regular bus service. A bus leaving in either direction every T minutes. A boy cycling with a speed of 10 km/h from Chandigarh to Ambala notices that a bus crosses him after every 15 min towards Ambala and after every 5 minutes towards Chandigarh. Calculate the time T and the speed of the buses. Assume that speed of buses is constant.
8. If the time displacement graph of a particle is parallel to the time axis what will be velocity of the particle?

### MOTION IN A PLANE

1. At what angle the two forces  $(F_1 + F_2)$  &  $(F_1 - F_2)$  act so that the resultant is  $\sqrt{2}(F_1^2 + F_2^2)$ .
2. Two forces each of 4 N acts on a body at an angle of  $60^\circ$ . Find the magnitude and the direction of the resultant force acting on the body.
3. Explain (i) negative vector (ii) co-initial vector (iii) orthogonal unit vector (iv) equal vector.
4. Is it possible to accelerate a particle if it is travelling at constant speed?
5. Show that there are two angles of projection for which the horizontal range is same.
6. What is centripetal acceleration? Find its magnitude & direction in case of a uniform circular motion of an object.
7. Calculate the angular speed of the second hand of a clock. If the length of the seconds hand is 4 cm, calculate the speed of the tip of the second hand.
8. A ball is projected horizontally from the top of the tower of height 100 m with a velocity of 5 m/s. Calculate the time taken by the ball to reach the ground.

## LAWS OF MOTION

1. Write and explain the types of inertia with example.
2. Write three consequences of Newton's second law of motion.
3. Why a cricket player lowers his hands while catching a cricket ball?
4. Why does a heavy gun recoil so strongly as a light gun firing the same bullet?
5. Derive an expression for work done when a body is made to slide up a rough inclined plane.
6. Why does a pilot not fall down, when his aeroplane loops a vertical loop?
7. A golf ball of mass 60 g at rest is hit with a striker. Find the impulse of the hit if the ball stops after travelling a horizontal distance of 50 m with a uniform retardation of  $4 \text{ ms}^{-2}$ .
8. Write the laws of limiting friction.

## WORK, ENERGY AND POWER

1. Explain the natures of work done with two examples of each.
2. Define conservative & non conservative forces with example.
3. A man rowing a boat upstream is at rest with respect to the shore. Is any work being done in this case?
4. A cake of mud is thrown on a wall where it sticks. What happens to its initial kinetic energy?
5. Discuss elastic collision in one dimension. Obtain expression for velocities of the two bodies after such a collision.
6. From where does the energy in a water fall come?
7. A ball falls under gravity from a height of 10 m with an initial downward velocity  $u$ . It collides with the ground, loses 50% of its energy in collision and then rises back to the same height. Find the initial velocity  $u$ .
8. A motor can pump up water to fill a tank of volume  $500 \text{ m}^3$  in 25 minutes, which is placed at a height of 20 m. If efficiency of the motor is 40%, calculate the power of the motor.

## SYSTEM OF PARTICLES AND ROTATIONAL MOTION

1. What do you mean by centre of mass of a system? Obtain an expression for the centre of mass of a system consisting of two particles.
2. From a uniform disc of radius  $R$ , a circular hole of radius  $R/2$  is cut out. The centre of the hole is at  $R/2$  from the centre of the original disc. Locate the centre of mass of the resulting flat body.
3. Two masses 6 & 2 units are at positions  $6\hat{i} - 7\hat{j}$  and  $2\hat{i} + 5\hat{j} - 8\hat{k}$  respectively. Deduce the position of their centre of mass.
4. Calculate moment of inertia of a circular disc of radius 10 cm, thickness 5 mm and uniform density  $8 \text{ g/cc}$  about a transverse axis through the centre of the disc.
5. A uniform metal bar of length 70 cm and mass 4.0 kg is placed horizontally on two knife-edges pivoted at 10 cm from each end of the rod. A 6.0 kg weight is suspended at 30 cm from one end. Find the reactions at the knife-edges.  $g = 9.8 \text{ N/kg}$ .
6. State and prove theorems of parallel and perpendicular axes.
7. A body of mass 1.0 kg is rotating on a circular path of diameter 2.0 m at the rate of 10 rotations in 3.14s. Calculate (i) angular momentum and (ii) rotational kinetic energy of the body.
8. Two bodies of masses 1 kg and 2 kg are located at (1,2) & (-1,3) respectively Calculate the coordinates of the centre of mass.

## GRAVITATION

1. What do you mean by escape velocity? Derive the formula for escape velocity of a particle from a planet of mass  $M$  and radius  $R$ .
2. State Kepler's laws of planetary motion. What conclusions were drawn by Newton from these laws?
3. Suppose there existed a planet that went around the sun twice as fast as the earth. What would be its orbital size as compared to that of the earth?
4. If the radius of earth is 6400 km and acceleration due to gravity is  $9.8 \text{ m/s}^2$ , then calculate mass and density of earth.
5. At what point above the surface of earth, the gravitational potential is  $-5.12 \times 10^7 \text{ J/kg}$  and the acceleration due to gravity is  $6.4 \text{ ms}^{-2}$ . Assuming the mean radius of the earth to be 6400 km, calculate the height of this point above the earth's surface.
6. A body of height equal to the radius of the surface of the earth. With what velocity be it thrown so that it goes out of the gravitational field of the earth? Mass of earth =  $6 \times 10^{24} \text{ kg}$ ; radius of earth =  $6.4 \times 10^6 \text{ m}$ ;  $G = 6.67 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$ .
7. With what velocity must a body be thrown upward from the surface of the earth so that it reaches a height of  $10 R_e$ ? Earth's mass =  $6 \times 10^{24} \text{ kg}$ , radius of earth =  $6.4 \times 10^6 \text{ m}$  &  $G = 6.67 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$ .
8. Show that weight of all the bodies at the centre of earth is zero.

## COMPUTER SCIENCE

- 1) Students should write minimum of 15 new C++ programs (Other than text book) in assignment book from the following chapters.
  - ➔ Getting started with C++
  - ➔ Data Handling
  - ➔ Operators and expressions in C++
- 2) Students should practice the above programs on computer and generate executable files.
- 3) Students should submit practiced source code and exe files in soft copy i.e. in CD/DVD.
- 4) Students should prepare project reports on any topic connected to computer science subject and submit in soft copy as well as hard copy.  
Example topics are : Processor management, Memory management, Operating System , etc.