

SELAQUI INTERNATIONAL SCHOOL
HOLIDAY HOMEWORK
SUMMER VACATION 2018-19
(CLASS XI PURE SCIENCE)

ENGLISH

Read the entire NOVEL- THE CANTERVILLE GHOST as prescribed by CBSE (weightage-12 marks)

Students can refer to the following website to watch the movie

<https://www.youtube.com/watch?v=yT-pb3gQqWs>

Answer the following questions :-

- 1. England and America are contrasted a few times in this book. Choose a character and write about how that character felt about America and England, and why they felt this way.**
- 2. The separation of classes is quite a significant theme in this book. What are these classes? How does this separation affect the characters belonging to them?**

Multiple Choice Questions

1. Where does Mr. Otis first see the ghost?

- (a)** Outside his bedroom.
- (b)** In the attic.
- (c)** In the tub.
- (d)** In the library.

2. What does the ghost do all night after leaving the Otis family?

- (a)** Fixes the window.
- (b)** Plots his revenge.
- (c)** Lubricates his chains.
- (d)** Paints a picture.

3. Why does Mr. Otis do what he does to the pond?

- (a)** Virginia may have fallen in.
- (b)** Other victims have been found there.
- (c)** Virginia has been known to nap around there.
- (d)** There are lots of hiding places there.

4. Where does the ghost plan to make a weekly appearance?

- (a)** The kitchen.
- (b)** The attic.
- (c)** The corridor.
- (d)** The library.

5. What does Mr. Otis think the people staying on his land have done with Virginia?

- (a)** Made her forget the time.
- (b)** Seduced her.
- (c)** Entertained her.
- (d)** Kidnapped her

MATHS

1. Prepare list of formulas on the following given topics. Please make diagrams wherever required and learn the formulas.
 - Algebra
 - Geometry
 - Trigonometry
 - Mensuration
 - Statistics(Use chart paper or a scrap copy)
2. Do Miscellaneous exercises of Chapter 1 , 2 and 4(separate notebook)

SCIENCE

PHYSICS :

SelaQui International School/Home Assignment/2018-19

WORKSHEET - 01

PHYSICS STD XI

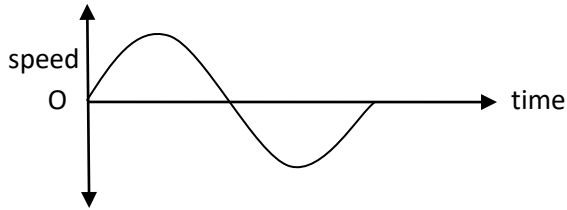
1. Can a body have zero velocity and finite acceleration ? Explain. (1)
2. Derive the relation $v^2 = u^2 + 2 a s$ by calculus method, where the symbols have their usual meaning. (3)
3. The distance x of a particle moving in one dimension, under the action of a constant force is related to time t by the equation $t = \sqrt{x} + 3$, where x is in metres to and t is in seconds. Find the displacement of the particle when its velocity is zero. (3)
4. A balloon is ascending at the rate of 14 m/s at a height of 98 m above the ground, when a packet is dropped from the balloon. After how much time and with what velocity does it reach the ground ? (4)
5. A body travels a distance of 20 m in the 7 th second and 24 m 9 th second. How much distance shall it travel in the 15 th second ? (4)

All the best.

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WORKSHEET - 02

PHYSICS STD XI

1. What is wrong with the speed time graph as shown in figure (1)



2. A car covers the first half of the distance between two places at a speed of 40 km h^{-1} , and second half at 60 km h^{-1} . What is the average speed of the car? (2)
3. A body travels a distance of 20 m in the 7th second and 24 m in 9th second, how much distance shall it travel in the 15th second? (2)
4. A parachutist bails out from a aeroplane and after dropping through a distance of 40 m opens the parachute and decelerates at 2 ms^{-2} . If he reaches the ground with a speed of 2 ms, how long is he the air? At what height did he bail out from the plane? (3)
5. Two towns A and B are connected by a regular bus service with a bus leaving in either direction every T min. A man cycling with a speed of 20 km/h in the A to B notices that a bus goes past him every 18 min in the direction of his motion, and every 6 min in the opposite direction. What is the period T of the bus service and with what speed (assumed constant) do the busses ply on the road? (3)
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All the best

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WORKSHEET - 03

PHYSICS STD XI

1. Find $\frac{dy}{dx}$ of $y = x \sin x$. (1)
2. Integrate : $\int (x^2 + \frac{1}{x}) dx$ (1)
3. Write two characteristics of a standard unit. (1)
4. Write dimensional formula for (a) Stress and (b) Plank's constant. (1)
5. Write two limitations of dimensional analysis. (1)
6. The position of particle at time t is given by $x(t) = (\frac{V_0}{\alpha})(1 - e^{-\alpha t})$, where V_0 is a constant and $\alpha > 0$.
What are the dimensions of V_0 and α ? (2)
7. Name the various forces exists in nature. (2)
8. Convert 100 Joule into Erg, with the help of dimensional analysis. (2)
9. New system of units is so chosen that the unit of mass equals α kg, the unit of length equals β m and the unit of time is γ sec. How much will 5 Joule measure in this new system? (3)
10. Given that the period T of oscillation of a gas bubble from an explosion under water depends on P, d and E; where P is the pressure, d is the density of water and E is the total energy of explosion. Find dimensionally a relation for T. (4)
11. If the velocity of light C, the constant of gravitation G and Plank's constant \hbar , be chosen as fundamental units, find the value of length and time in terms of dimensions of these quantities. (4)

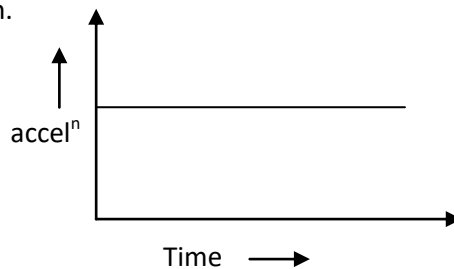
All the best.

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WORKSHEET - 04

PHYSICS STD XI

1. Define average velocity and instantaneous velocity. (1)
2. Under what condition will the distance and displacement of moving object have the same magnitude ? (1)
3. Draw the following graphs (expected the nature only) between distance and time of an object in case of (a) for a body at rest, (b) for a body moving with constant acceleration. (1)
4. Can a body be at rest as well as in motion at the same time ? Explain. (2)
5. If the displacement of a body is zero, is the distance covered by it necessarily zero ? comment with suitable illustration. (2)
6. Acceleration-time graph of a moving object is shown in fig. draw the velocity time graph corresponding to this type of motion. (2)



All the best.

1. Express the wavelength of yellow light (5893\AA) in term of nm. (1)
2. If $x = a + bt + ct^2$, where x is in metre and t is in second, what is the unit of c ? (1)
3. Discuss briefly the limitations of dimensional analysis. (2)
4. Write the dimensions of a/b in the relation $F = a\sqrt{x} + bt^2$ where F is force, x is distance and t is the time. (2)
5. Verify dimensionally the relation, $t = 2\pi \sqrt{\frac{l}{g}}$. (2)
6. According to Vander Waal's equation, the Pressure (P), volume (V) and temperature (T) are related as $\left[P + \frac{a}{V^2} \right] (V - b) = RT$. Determine the dimensions of a and b . (3)
7. If force F , velocity v and time t are taken as fundamental quantities, what should be the dimensions of work (W) in terms of F , v and t ? (3)
8. Test by method of dimensions the correctness of the equation, $\delta = \frac{mgl^3}{4bd^3Y}$ where δ is the depression produced at the centre of a bar of length l , breadth b and depth d , placed symmetrically on two knife edges near its end and loaded in the middle of mass m and Y is the young's modulus of the material of the bar. (3)
9. A gas bubble from an explosion under water oscillates with a period T proportional to $P^a \rho^b E^c$, where P is the static pressure, ρ is the density of water and E is total energy of the explosion. Find the values of a , b , and c . (5)

All the best.

CHEMISTRY :

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1. **a.** A student wants to determine the volume of 27.2 g of a substance. He looks up the density of the material in a reference book, where it is reported to be 2.4451 g/cm³. He performs the calculation in the following manner:

$$27.2 \text{ g} \times 1.0 \text{ cm}^3 / 2.4 \text{ g} = 11.3 \text{ cm}^3$$

Is the calculated answer correct? If not, explain why it is not correct.

- b.** Another student performs the calculation in the following manner:

$$27.2 \text{ g} \times 1.00 \text{ cm}^3 / 2.45 \text{ g} = 11.1 \text{ cm}^3$$

Is this a “better” answer than that of the first student? Is this the “best” answer, or could it be “improved”? Explain.

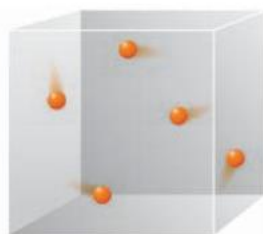
c. Say that you have ten ball bearings, each having a mass of 1.234 g and a density of 3.1569 g/cm³. Calculate the volume of these ten ball bearings. In performing the calculation, present your work as unit conversions, and report your answer to the correct number of significant figures.

d. Explain how the answer that you calculated in part c is the “best” answer to the problem?

2. Say you live in a climate where the temperature ranges from -10°C to 50°C and you want to define a new temperature scale, YS (YS is the “Your Scale” temperature scale), which defines this range as 0.0°YS to 100.0°YS.
- a.** Come up with an equation that would allow you to convert between °C and °YS.
- b.** Using your equation, what would be the temperature in °C if it were 66°YS?
3. Zinc metal reacts with yellow crystals of sulfur in a fiery reaction to produce a white powder of zinc sulfide. A chemist determines that 65.4 g of zinc reacts with 32.1 g of sulfur. How many grams of zinc sulfide could be produced from 20.0 g of zinc metal?
4. When a mixture of aluminum powder and iron(III) oxide is ignited, it produces molten iron and aluminum oxide. In an experiment, 5.40 g of aluminum was mixed with 18.50 g of iron(III) oxide. At the end of the reaction, the mixture contained 11.17 g of iron, 10.20 g of aluminum oxide, and an undetermined amount of unreacted iron(III) oxide. No aluminum was left. What is the mass of the iron(III) oxide?
5. Vinegar contains acetic acid (about 5% by mass). Pure acetic acid has a strong vinegar smell but is corrosive to the skin. What volume of pure acetic acid has a mass of 35.00 g? The density of acetic acid is 1.053 g/mL.
6. The figures below represent a gas trapped in containers. The orange balls represent individual gas atoms. Container A on the left has a volume that is one-half the volume of container B on the right.



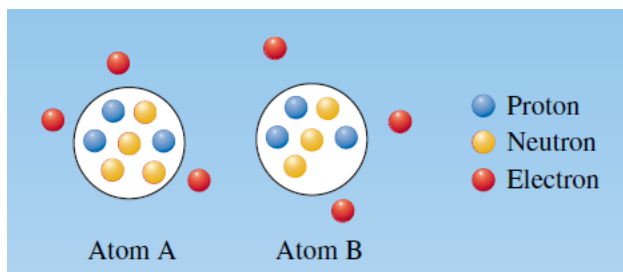
A



B

- a. How does the mass of gas in one container compare with the mass of gas in the other?
- b. Which container has the greater density of gas?
- c. If the volume of container A were increased to the same volume as container B, how would the density of the gas in container A change?

7. Consider the following depictions of two atoms, which have been greatly enlarged so you can see the subatomic particles.



- a. How many protons are present in atom A?
- b. Can you identify the real element represented by the drawing of atom A? If so, what element does it represent?
- c. What is the charge on element A? Explain how you arrived at your answer.
- d. Write the atomic symbol and the atomic number of atom B.
- e. What is the mass number of atom B? How does this mass number compare with that of atom A?
- f. What is the charge on atom B?
- g. Draw pictures like those above of ${}^6\text{Li}_3^+$ and ${}^6\text{Li}_3^-$ atoms. What are the mass number and atomic number of each of these atoms?
- h. Consider the two atoms depicted in this problem and the two that you just drew. What is the total number of lithium isotopes depicted? How did you make your decision?
- i. Is the mass number of an isotope of an atom equal to the mass of the isotope of the atom? Be sure to explain your answer.

8. Compounds of europium, Eu, are used to make color television screens. The europium nucleus has a charge of +63. How many electrons are present in the neutral atom? In the Eu^{+3} ion?

9. While roaming a parallel universe, you discover the hypothetical element "Z." You obtain a representative sample of the element and discover that it is made up of two isotopes, Z-47 and Z-51. To help your science team calculate the atomic mass of the substance, you send the following drawing of your sample with your report.

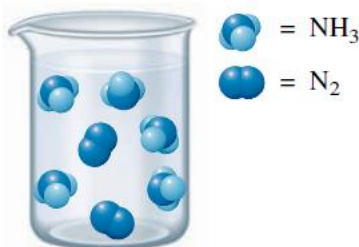


In the report, you also inform the science team that the blue atoms are Z-47, which have an isotopic mass of 47.510 amu, and the orange atoms are Z-51, which have an isotopic mass of 51.126 amu. What is the atomic mass of element Z?

10. In a series of oil-drop experiments, the charges measured on the oil drops were $3.20 \times 10^{-19} \text{ C}$, $6.40 \times 10^{-19} \text{ C}$, $9.60 \times 10^{-19} \text{ C}$, and $1.12 \times 10^{-18} \text{ C}$. What is the smallest difference in charge between any two drops? If this is assumed to be the charge on the electron, how many excess electrons are there on each drop?

11. Ethylene glycol is used as an automobile antifreeze and in the manufacture of polyester fibers. The name glycol stems from the sweet taste of this poisonous compound. Combustion of 6.38 mg of ethylene glycol gives 9.06 mg CO_2 and 5.58 mg H_2O . The compound contains only C, H, and O. What are the mass percentages of the elements in ethylene glycol?

12. You react nitrogen and hydrogen in a container to produce ammonia, NH_3 (g). The following figure depicts the contents of the container after the reaction is complete.



- Write a balanced chemical equation for the reaction.
- What is the limiting reactant?
- How many molecules of the limiting reactant would you need to add to the container in order to have a complete reaction (convert all reactants to products)?

13. A sample of an ethanol–water solution has a volume of 54.2 cm^3 and a mass of 49.6 g. What is the percentage of ethanol (by mass) in the solution? (Assume that there is no change in volume when the pure compounds are mixed.) The density of ethanol is 0.789 g/cm^3 and that of water is 0.998 g/cm^3 . Alcoholic beverages are rated in *proof*, which is a measure of the relative amount of ethanol in the beverage. Pure ethanol is exactly 200 proof; a solution that is 50% ethanol by volume is exactly 100 proof. What is the proof of the given ethanol–water solution?

14. Two compounds have the same composition: 92.25% C and 7.75% H.

- Obtain the empirical formula corresponding to this composition.
- One of the compounds has a molecular mass of 52.03 amu; the other, of 78.05 amu. Obtain the molecular formulas of both compounds.

15. Oxalic acid is a toxic substance used by laundries to remove rust stains. Its composition is 26.7% C, 2.2% H, and 71.1% O (by mass), and its molecular mass is 90 amu. What is its molecular formula?

16. Potassium superoxide, KO_2 , is employed in a self-contained breathing apparatus used by emergency personnel as a source of oxygen.



If a reaction vessel contains 0.25 mol KO_2 and 0.15 mol H_2O , what is the limiting reactant? How many moles of oxygen can be produced?

17. Consider the hypothetical atom X that has one electron like the H atom but has different energy levels. The energies of an electron in an X atom are described by the equation

$$E = -\frac{R_{\text{H}}}{n^3}$$

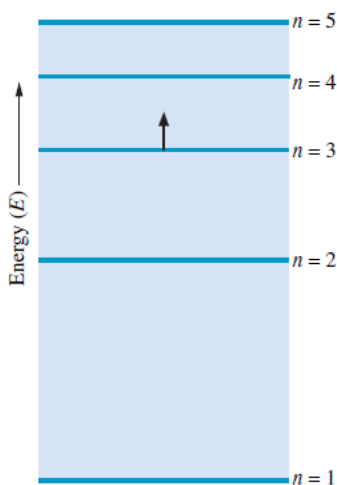
where R_H is the same as for hydrogen (2.179×10^{18} J). Answer the following questions, *without calculating energy values*.

- How would the ground-state energy levels of X and H compare?
- Would the energy of an electron in the $n = 2$ level of H be higher or lower than that of an electron in the $n = 2$ level of X? Explain your answer.
- How do the spacings of the energy levels of X and H compare?
- Which would involve the emission of a higher frequency of light, the transition of an electron in an H atom from the $n = 5$ to the $n = 3$ level or a similar transition in an X atom?
- Which atom, X or H, would require more energy to completely remove its electron?
- A photon corresponding to a particular frequency of blue light produces a transition from the $n = 2$ to the $n = 5$ level of a hydrogen atom. Could this photon produce the same transition ($n = 2$ to $n = 5$) in an atom of X? Explain.

18. Hemoglobin is the oxygen-carrying molecule of red blood cells, consisting of a protein and a non-protein substance. The non-protein substance is called heme. A sample of heme weighing 35.2 mg contains 3.19 mg of iron. If a heme molecule contains one atom of iron, what is the molecular mass of heme?

19. What is the de Broglie wavelength of a 145 g baseball traveling at 30.0 m/s (67.1 mph)? Is the wavelength much smaller or much larger than the diameter of an atom (on the order of 100 pm)?

20. Given the following energy level diagram for an atom that contains an electron in the $n = 3$ level, answer the following questions.



- Which transition of the electron will emit light of the lowest frequency?
- Using only those levels depicted in the diagram, which transition of the electron would require the highest frequency light?
- If the transition from the $n = 3$ level to the $n = 1$ level emits green light, what color light is absorbed when an electron makes the transition from the $n = 1$ to $n = 3$ level?

21. The space probe *Pioneer 11* was launched April 5, 1973, and reached Jupiter in December 1974, traveling a distance of 998 million km. How long did it take an electromagnetic signal to travel to Earth from *Pioneer 11* when it was near Jupiter?

22. The second is defined as the time it takes for 9,192,631,770 wavelengths of a certain transition of the cesium-133 atom to pass a fixed point. What is the frequency of this electromagnetic radiation? What is the wavelength?

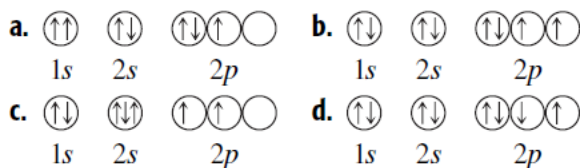
23. A hydrogen-like ion has a nucleus of charge $+Ze$ and a single electron outside this nucleus. The energy levels of these ions are $-Z^2R_H/n^2$ (where Z = atomic number). Calculate the wavelength of the transition from $n = 3$ to $n = 2$ for He^+ , a hydrogen-like ion. In what region of the spectrum does this emission occur?

24. It requires 799 kJ of energy to break one mole of carbon–oxygen double bonds in carbon dioxide. What wavelength of light does this correspond to per bond? Is there any transition in the hydrogen atom that has at least this quantity of energy in one photon?

25. A microwave oven heats by radiating food with microwave radiation, which is absorbed by the food and converted to heat. Suppose an oven's radiation wavelength is 12.5 cm. A container with 0.250 L of water was placed in the oven, and the temperature of the water rose from 20.0°C to 100.0°C. How many photons of this microwave radiation were required? Assume that all the energy from the radiation was used to raise the temperature of the water.

26. You travel to an alternate universe where the atomic orbitals are different from those on earth, but all other aspects of the atoms are the same. In this universe, you find that the first (lowest energy) orbital is filled with three electrons and the second orbital can hold a maximum of nine electrons. You discover an element Z that has five electrons in its atom. Would you expect Z to be more likely to form a cation or an anion? Indicate a possible charge on this ion.

27. Which of the following orbital diagrams are allowed and which are not allowed by the Pauli exclusion principle? Explain. For those that are allowed, write the electron configuration.



28. Write all of the possible orbital diagrams for the electron configuration $1s^22p^1$. (There are six different diagrams.)

29. Using the Bohr formula for the energy levels, calculate the energy required to raise the electron in a hydrogen atom from $n = 1$ to $n = \textit{infinity}$. Express the result for 1 mol H atoms. Because the $n = \textit{infinity}$ level corresponds to removal of the electron from the atom, this energy equals the ionization energy of the H atom.

BIOLOGY

Make a Project Report on any one of the following topics:

1. Genetic Disorders
2. Sickle-Cell Anaemia
3. Dengue
4. Jaundice

COMPUTER

1. Write a C++ program to read two decimal numbers, then multiply them together and finally print out the result (in decimal)
2. Write a C++ program to compute the area of square.
3. Write a C++ program that inputs a student's marks in three subject and prints the total and percentage marks.
4. Write a C++ program to interchange the values of two variables.(by both methods)
5. Write a C++ program to read the values of w,x,y and z and display the value of p where, $p = w+x / y - z$
6. Write a C++ program to read a temperature in Celsius and displays it in Fahrenheit
7. Write a C++ program that displays on the screen
 - a) character 'z' b) the name "Mohan" c) the number 1977
8. Assuming there are 7.481 gallons in a cubic foot, write a program that asks the user to enter the number of gallons and then display the equivalent in cubic feet.
9. Write a C++ program to calculate the value of f where, $f = (a + b / c) - d$
10. Write a C++ program to find the square of entered number.
11. Write a C++ program to find the square root of entered number.
12. Write a C++ program which adds the sales tax in the price list of items and replace the price list with the new list for 5 items.
13. Write a C++ program that reads the grams and convert it into Kilograms.
14. Write a C++ program that reads centimetre and convert it into feet.
15. Write a C++ program that accepts character between 'D' to 'Z' and prints previous three characters.

Optional

Join this python course

<https://www.edx.org/course/introduction-computer-science-mitx-6-00-1x-11>

upto Exercise-6