Venkateshwar International School

Sector-18, Dwarka, New Delhi-78
Summer Vacations Holiday Homework (2019-2020)
Class – XI

SCIENCE STREAM

Happy Holidays!

Dear Parents
Holidays are about experiences and people,
and tuning into what you feel like doing at that moment.
It's time to Relax, Reflect and Recharge!

Summer Vacation is a welcome break. A break from studies and explanations. It is about learning new things and engaging children in various scholastics and co-scholastic areas. Keeping this in mind, our teachers have designed and framed interesting project work / assignments to be completed during Summer Vacations to encourage in depth learning, clearing concepts and preparing ground for improved academic output. As parents, kindly motivate and lend support to your children and ensure that they complete the given work well-in-time and to the best of their ability. Your encouragement can actually make a huge difference to the ultimate learning outcome of their projects.

Unit Test-2 for Class XII and Unit Test-1 for Class XI will commence from 24 June, 2019. The date-sheet and syllabus for the same has already been given and is also available on the Shaurya Dashboard.

We at Sri VIS wish you a very Happy 'World Environment Day ', to be celebrated on June 05, 2019. Let's pledge to save the environment and plant more trees!

WISH YOU VERY ENJOYABLE HOLIDAYS!

ENGLISH

1. Research on the Egyptian civilizations –with particular reference to Tut's Mummy and its discovery. Stick pictures. Read : Discovering Tut: The Saga Continues from 'Hornbill'
2. Design a poster as an appeal for conserving water as most parts of India are facing serious problems and have been hit by drought.
3. Cut out 5 clippings of Classified Ads under the given heads and paste them in your registers :
   ➢ For sale
   ➢ To-let
   ➢ Situation vacant
   ➢ For matrimonial
   ➢ Pets / kennels

4. Watch at least 3 English films from the list given below and write a review on them in 150-200 words each:
   a) Harry Potter and the Prisoner of Azkaban
   b) The Mummy
   c) Schindler's List
   d) A beautiful Mind
   e) Day After Tomorrow
   f) The Groundhog Day
   g) Forrest Gump
   h) Castaway
   i) Inception
   j) Gravity
   k) Hugo
   l) Top Gun
   m) Life of Pi

5. Revise the Syllabus of UT-1. Read all the Literature Texts included in it thoroughly.

NOTE : The Holiday Homework is to be done in English register.

MATHEMATICS

1. Complete the attached worksheets of Ch-1 & Ch-2.
2. Ch-2 Relations & Functions from NCERT Exemplar.
3. Do the following worksheets

CHAPTER - 1 (SETS)

1. Describe the following sets in set-builder form:
   $\{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}\}$ and $\{\frac{1}{2}, \frac{2}{5}, \frac{3}{10}, \frac{3}{17}, \frac{5}{26}, \frac{6}{37}, \frac{7}{50}\}$.
2. Describe the following sets in Roster form: $\{x \in N : x^2 < 25\}$ and $\{x \in R \ |x| > x\}$.
3. Using the properties of sets, prove De–Morgan's law i.e. $(A \cup B)' = A' \cap B'$ and $(A \cap B)' = A' \cup B'$
4. For any two sets A and B prove that $P(A) \cup P(B) \subset P(A \cup B)$. But $P(A \cup B)$ is not necessary be a subset of $P(A) \cup P(B)$.
5. Using the properties of sets, show that for any two sets A and B, $(A \cup B) \cap (A \cup B') = A$
6. Write [–3,7) in set-builder form.

7. Write $\{ x : -5 < x \le 9\}$ as interval.
8. What is the total number of proper subsets of a set consisting of n elements?
9. List all the subsets of the set {1,2,{3,4},5}.
10. Using the properties of sets, prove the following
   (i) (AUB) − (A∩B) = (A − B)U(B − A)
   (ii) (A∩B)U(A − B) = A
11. Are sets A = {1,2,3,4}, B = { x : x ∈ N and 5≤ x ≤7} disjoint? Why?
12. If X and Y are two sets such that n(X) = 19, n(Y) = 37 and n(X ∪ Y) = 12, find n(X ∩Y).
13. Let Aand B be two finite sets such that n(A − B)=30, n(A U B)=180, n(A ∩ B) =60, find n(B).
14. In a group of 50 people, 30 like to play cricket, 25 like to play football and 32 like to play hockey. Assume that each person in the group likes to play at least one of the three games. If 15 people like to play both cricket and football, 11 like to play football and hockey and 18 like to play cricket and hockey. Find:
   (i) How many like to play all three games?
   (ii) How many like to play only football?
   (iii) How many like to play only hockey?
   (iv) How many like to play exactly one game?
15. A survey shows that 84% of the Indians like grapes, whereas 45% like pineapple. What percentage of Indians like both grapes and pineapple?
16. In a survey of 450 people, it was found that 10 play cricket, 160 play tennis and 70 play both cricket as well as tennis. How many play neither cricket nor tennis?
17. There are 200 individuals with a skin disorder, 120 have been exposed to chemical C1, 50 to chemical C2 and 30 to both the chemical C1 and C2. Find the number of individuals exposed to (i) chemical C1 or chemical C2 (ii) chemical C1 but not chemical C2 (iii) chemical C2 but not chemical C1.

CHAPTER -2 (RELATIONS AND FUNCTIONS)

1. Find x and y if $(x^3 - x, y^2 - 5y + 6) = (0,0)$
2. Determine the domain and range of the relation defined as:
   R = {(a, b): a, b ∈ N, $a < 5, b = 3a + 1$}
3. Find the domain and range of the following functions:
   (i) $f(x) = |x + 1|$ (ii) $f(x) = \frac{|x-3|}{x-3}$, $x \in R$
4. If P = {1,3}, Q = {2,3,5}, find the number of relations from A to B
5. If $f(x) = \frac{1}{1-x}$, show that f[f{f(x)}] = x

6. A function f : R → R is defined as $\begin{cases} x^2 + 1 \, ; x \le -2 \\ 2x + 1 \, ; -2 < x \le 3 \\ 2x^2 - 3 \, ; 3 < x < 8 \end{cases}$

   Find (i) f(0)   (ii) f(3)   (iii) f(5)   (iv) f(-1)   (v) f(-3)

6. Let f be the subset of Z ×Z defined by f={(ab,a+b):a,b∈Z}. Is f a function from Z to Z? Justify your answer.

8. Let A = {1,2,3}, B = {2,3,4}, C = {4,5} and D = {5,6,7,8}
   Verify that :
   (a) A × (B∩C) = (A×B)∩(A×C)
   (b) A × C is a subset of B × D.

9. Let f and g be two real valued functions, defined by, f(x) = 2x + 5 , g(x) = $x^2 + x$,
   find (i) (f + g)(−2) (ii) (f − g)(1) (iii) (fg)(−1) (iv) gf(2)

10. Find the domain and range of the function, $f(x) = \frac{x^2-x+1}{x^2+x+1}$

11. Find the domain and range of the function, $f(x) = \frac{1}{1-x^2}$

12. Find the domain and range of $f(x) = |x - 3|$.

13. Let A = {1,2,3,4}, B = {1,4,9,16,25} and R be a relation defined from A to B as,
    R = {(x, y) : x ∈ A, y ∈ B and y = x^2 }
    (a) Depict this relation using arrow diagram.   (b) Find domain of R.
    (c) Find range of R.   (d) Write co-domain of R.

14. Let R = { (x, y) : x, y ∈ N and y = 2x} be a relation on N. Find :
    (i) Domain   (ii) Co domain   (iii) Range
    Is this relation a function from N to N?

15. Find the domain and range of, f(x) = |2x − 3| − 3

16. Draw the graph of the Greatest Integer function.

17. Draw the graph of the Constant function f(x)=5. Find its domain and range.

18. Draw the graph of the signum function.

19. If y = $\frac{ax-b}{bx-a}$, show that f(y) = x.

PHYSICS

1. Do NCERT exercise of chapter 2 (Unit and Measurement)
2. Do assignment sheets on the following chapters.

Chapter-2 (UNITS AND MEASUREMENT)

Very short answer type questions, (1 mark question)

Q1: Among which type of elementary particles does the electromagnetic force act?
Q2. Name the forces having the longest and shortest range of operation.
Q4. If 'slap' times speed equals power, what will be the dimensional equation for 'slap'?
Q5. If the units of force and length each are doubled, then how many times the unit of energy would be affected?
Q6. Can a quantity has dimensions but still has no units?
Q7. Justify L +L = L and L − L =L.
Q8. Can there be a physical quantity that has no unit and no dimensions?
Q9. Given relative error in the measurement of length is 0.05, what is the percentage error?
Q10.If g is the acceleration due to gravity and λ is wavelength, then which physical quantity does represented by √(g λ).

Short answer type questions (2 marks)

Q1. If heat dissipated in a resistance can be determined from the relation: $H = I^2Rt$ joule , If the maximum error in the measurement of current, resistance and time are 2% ,1% , and 1% respectively, What would be the maximum error in the dissipated heat?

Q2. Name any three physical quantities having the same dimensions and also give their dimensions.

Q3. In Van der Wall's equation $(P + a/V^2)(V - b) = RT$, Determine the dimensions of a and b.   {Ans : $[a] = [ML^5T^{-2}]$, $[b] = [M^0L^3T^0]$}.

Q4. Give the limitations of dimensional analysis.

Q5. If $X = a + bt^2$, where X is in meter and t is in second . find the unit of a and b?

Q7. Show that the maximum error in the quotient of two quantities is equal to the sum of their individual relative errors.

Q8. Deduce the dimensional formulae for the following physical quantities.
   a) Gravitational constant.   b) Power
   c) coefficient of viscosity   d) Surface tension.

Q9. Name the four basic forces in nature. Arrange them in the order of their increasing strengths.
   (i)   Gravitational force
   (ii) Electromagnetic force
   (iii) nuclear force
   (iv) Weak force.   [Ans :Fg :Fw: Fe:Fs=1:10^{25}:10^{36}:10^{38}]

Q10. Convert 1 Newton force in to Dyne.

Short answer type questions: (3 marks)

Q1. If E,M,J and G respectively denote energy, mass, angular momentum and gravitational constant, Calculate the dimensions of EJ^2/ M^5G^2

Q2. The frequency ν of vibration of stretched string depends on its length L its mass per unit length m and the tension T in the string obtain dimensionally an expression for frequency ν.

Q4. A physical quantity X is given by $X = A^2 B^3 / C \sqrt{D}$, If the percentage errors of measurement in A,B,C and D are 4%,2%,3% and 1% respectively, then calculate the % error in X.

Q5. If two resistors of resistance $R_1=(4 \pm 0.5)\Omega$ and $R_2=(16 \pm 0.5)\Omega$ are connected (1) In series and (2) Parallel . Find the equivalent resistance in each case with limits of % error.

Q6. The length of a rod measured in an experiment was found to be 2.48m, 2.46, 2.50m and 2.48m and 2.49m, Find the average length, the absolute error in each observation and % error.

Q7. A famous relation in physics relates moving mass m to the rest mass m_0 of a particle in terms of its speed v and the speed of the light c. A boy recalls the relation almost correctly but forgets where to put the constant c. He writes:
$m = m_0/ (1 - v^2)^{1/2}$ .Guess where to put the missing c.

Q8. A calorie is a unit of heat energy and it equals about 4.2 J, where 1 J = 4.2 kgm^2s^{-2}. Suppose we employ a system of units in which the unit of mass equals α kg, the unit of length equals β m, the units of time is Υ sec. show that a calorie has a magnitude 4.2 $α^{-1}β^{-2}Υ^2$ in terms of the new units.

Q9. The time period of oscillation of simple pendulum is given by $t = 2π\sqrt{(L/g)}$. What is the accuracy in the determination of 'g' if 10 cm length is known to 1 mm accuracy and 0.5 s time period is measured from time of 100 oscillations with a watch of 1 sec. resolution?

Q10. In an experiment, on the measurement of g using a simple pendulum the time period was measured with an accuracy of 0.2 % while the length was measured with accuracy of 0.5%. Calculate the percentage error in the value of g.

Long answer question (5 marks)

Q1. Explain:
   (i) Absolute error   (iii) Mean absolute error
   (ii) Relative error   (iv) percentage error
   (v) Random error

Q2. Convert:
   (i) Gravitational constant (G) = 6.67 x 10^{-11} Nm^2kg^{-2} to $cm^3g^{-1}s^{-2}$
   (ii) The escape velocity v of a body depends on, the acceleration due to gravity 'g' of the planet and the radius R of the planet, Establish dimensionally for relation for the escape velocity.

Q3.What is the parallax method of measurement? When the planet Jupiter is at a distance of 824.7 million kilometers from the Earth, its angular diameter is measured to be 35.72" of arc. Calculate the diameter of Jupiter.

HOTs

Q1. What are the dimensions of $1/u_0\epsilon_0$, where symbols have their usual meaning.

                                              Ans : [$M^0L^2T^{-2}$]

Q2.What is the dimensions of $1/2\epsilon_0E_2$, Where E electric field and ϵ_0 permittivity of free space.   Ans : [$M^1L^{-1}T^{-2}$]

Q3. The pairs of physical quantities that have the same dimensions are:
   (a) Reynolds's number and coefficient of friction,
   (b) Curie and frequency of a light wave
   (c) Latent heat and gravitational potential
   (d) Planck's constant and torque.

Q4. If L,C,R represent inductance , capacitance and resistance respectively, the combinations having dimensions of frequency are
   (a) 1√CL   (b) L/C   (c) R/L   (d)
                                              R/C Ans : (a) and (c).

Q5. If the error in radius is 3%, what is error in volume of sphere?
   (a) 3 %   (b) 27 %   (c) 9 %   (d) 6 %
   [Ans : (c) 9%]

Chapter- 3 (MOTION IN ONE DIMENSION)

1. An electron is emitted with a velocity of 5 x 10^6 m/s. It is accelerated by an electric field in direction of initial velocity at 3 x 10^{14} m/s². If it's final velocity is 7 x 10^6 m/s .Calculate the time taken by the electron to attain the final velocity and the distance covered by it.

2. A man walks on a straight road from his home to a market 2.5km away with a speed of 5 km/h. What is the magnitude of the average velocity and average speed of the man over the interval of time (i) 0 to 30 min (ii) 0 to 40 min (iii) 0 to 50 min?

3. The position- time graph for a dancer demonstrating dance steps along a straight line is as shown in figure. What are the average speed and average velocity during time interval t = 0 s to t =5 s? What is the average velocity of the dancer during the time interval between t = 5 s to t = 9 s?
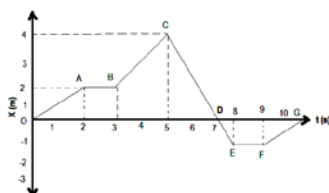
4. A rocket is vertically fired and ascends with a constant vertical acceleration. In the duration of 5s, It attains upward velocity of 150 m/s. After 5s, its engine stop functioning and rocket continues to move as free particle and finally returns on the earth. Draw the   v-t graph of the rocket and calculate:

   (i) the height reached by the rocket during the period of burning of fuel
        ($g = 10$ m/s^2)
   (ii) maximum height reached by the rocket.
   (iii) the acceleration of the rocket during the period of fuel burning.

5. The v-t graph of an object moving along a straight line is shown in figure. Find the distance covered by the object in time $t = 0s$ to $t = 7s$ and the maximum value of acceleration during this interval.
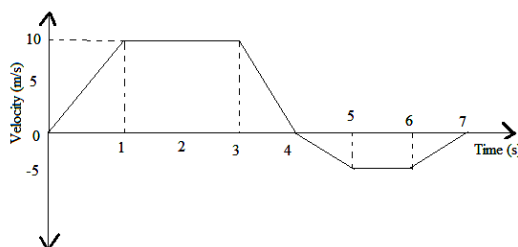
5. The position of a particle moving along a straight line is given by $x = 3+8t+7t^2$, where x is in meters and time is in second. Find (i) initial velocity (ii) velocity at
   $t = 2s$ (iii) acceleration at $t = 5s$ and (iv) average velocity $t = 0s$ to $t = 2s$.
7. The position traversed by a particle moving along a straight line is given by
   $x = (3+ 180t+ 50t^2)$ m. Find (i) the initial velocity of the particle. (ii) the velocity at the end of 4s. (iii) the acceleration of the particle and (iv) average velocity during time interval t=1s to t=3s.
8. The velocity of a particle is given by the equation $V=(2t^2 + 5)$ cm/s. Find
   (i) the change in velocity of the particle during the time interval between $t_1=2s$
        to $t_2=4s$.
   (ii) the average acceleration during the same interval and
   (iii) the instantaneous acceleration at $t_2= 4s$.

9. A stone is thrown vertically upwards with a velocity of 4.9 m/s. calculate
   (i) the maximum height reached. (ii) the time taken to reach maximum height.
   (iii) velocity with which it returns to the ground and (iv) time taken to reach the
       ground.
10. A parachutist bails out from an aero plane and after dropping through a distance of 40 m, he opens the parachute and decelerate at 2 m/s^2. If he reaches ground with a speed of 2m/s, how long is he in the air? At what height did he bail out from the plane?
11. On a two lane road, car A is travelling with a speed of 36 km/h. Two cars B and C approach car A in opposite directions with a speed of 54 km/h each. At certain instant, when the distance AB is equal to AC, both being 1 km, B decides to overtake A before C does. What minimum acceleration of car B is required to avoid an accident?
12. Two trains A and B each of length 100m are running on parallel tracks. One overtakes the other in 20s and one crosses the other in 10s. Calculate the velocities of each train.
13. A motorboat covers the distance between the two spots on the river in 8h and 12h downstream and upstream respectively. Find the time required by the boat to cover this distance in still water.
14. The displacement of a particle is given by $x = (t- 2)^2$ where x is in metres and t in seconds. What is the distance covered by the particle in first 4 seconds?

15. Give examples of a one-dimensional motion where

    (a) the particle moving along positive *x*-direction comes to rest periodically and moves *forward*.

    (b) the particle moving along positive *x*-direction comes to rest periodically and moves *backward*.

CHEMISTRY

1. Do NCERT exercise of chapter 1 & 2.
2. Complete Investigatory Project (Writing Part).

BIOLOGY

1. Prepare a herbarium (10 sheets) on medicinal plants or different types of corolla in plants.
2. Write the practicals in the practical file which are already performed for meal.
3. Do NCERT exercise of Chapter 8 & 10.

ECONOMICS

1. Complete the worksheets of Unit – 2 of Micro Economics.
2. Complete the Project file on Economics issues. (As per instructions given in the class)

COMPUTER SCIENCE

Write the code of any five programs which you have compiled in the lab.

PSYCHOLOGY

1. **Complete Project Work** – Survey research or observational research.
2. Do worksheet 1 and 2.
3. Complete Question Answer of chapter 2- Methods of enquiry from NCERT.

PHYSICAL EDUCATION

1. Write the difference between jump, throw and running in 100-120 words.
2. What is your observation about the opening and closing of National and International competition ceremonies? Write your response in 150-200 words in your Physical Education notebook.

PROJECT ON FINANCIAL LITERACY SKILLS

1. What are the different types of ITR?
2. Consider yourself to be an individual (salaried or business man) and determine which type of ITR form will be used to file ITR. File returns using hypothetical figures to see how much revenue your services or business generates for the ex-Chequer.
3. Explain in brief the sections for different types of Tax Exemptions for salaried/business person.