



ACADEMIC WORLD SCHOOLTM BEMETARA

SESSION: 2022-23 SUMMER VACATION ASSIGNMENT CLASS: XII

General Instructions:

1. Write in a clear and legible handwriting.
2. Complete all the homework in a separate subject Summer Vacation Homework Notebook.
3. **DO NOT COPY AND PASTE FROM THE INTERNET.** (Assignment will be rejected)
4. In case of reference from the internet, you may:
 - A. Read the content from the internet, if you wish and paraphrase (Rewrite in your own words)
 - B. Mention the source of your information by providing the link from the internet for the verification by the teachers.
5. Marks awarded will be counted in the final scores at the end of the session.
6. The Summer Vacation HW will be submitted immediately upon arrival to school after Summer Vacation.
7. For any assignment related query do post your question on E-Mail Id of respective subject teacher. List of Subject Teacher's E-Mail ID attached.

Note for the Parents:

Parents are requested to guide his/her wards to complete their assignments honestly and submit by the due date.

P.T.O

SUBJECT: ENGLISH

General Instructions:

1. Attempt all the questions as per the instructions.
2. Do not exceed the word limits.
3. Make a separate copy for English holiday homework.
4. This Homework carries 10 marks.

I. Reading Comprehension

Read any one **story** of your choice and interest and list the following:

- 1. Setting**
- 2. Characters**
- 3. Mood**
- 4. Conflict**
- 5. Plot**
- 6. Summary**

All stories are free to stream on following website:

<https://stories.audible.com/start-listen>

II. Short Composition [Attempt any 3] Advertisement/Notices/Posters/Invitations/Replies-

1. Your friend, Manish Tripathi has invited you to attend his wedding anniversary. You cannot attend it as you have a family get-together on the same day. Write a polite letter, in not more than 50 words, expressing your inability to attend the function and wish him all the happiness on this joyous occasion. You are Mita/ Mahendra Juneja of 25, Vasundra Colony, Patna
2. A poster-making competition has been announced by the school authorities during 'Health Awareness Week' to make the public aware of the wisdom of obeying simple measures people can take to slow the spread of the pandemic COVID-19 caused by the novel corona virus in your town. Draft a notice announcing about the competition creating your own details.
3. You are the cultural secretary of your school. Write a notice in about 50 words inviting the names of students who would like to participate in the variety program that you are planning in aid of an old age home in your city. Items may be in the form of solo and group singing, mono acting, magic show, dance performance, etc. Trials for the most suitable participants will be held during the zero periods every day.
4. The Rotary Club of your locality is looking for Volunteers to prepare food packets in a community kitchen to be distributed among the needy during the nationwide lockdown in Raipur. Write an advertisement on behalf of the president of the club in the classified columns of the local newspaper giving necessary details in not more than 50 words.

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III. Long Composition [Attempt any 5]

Letter writing - [Editorial, Placing Order, Complaint, Enquiry, Official, Institutional, Job Application]

1. You are Natasha, residing in Pune. Your cousin, from the same city is hosting your grandmother's eightieth birth anniversary and has extended an invite to you. He has also requested your assistance for arrangements needed. Draft a reply of acceptance, in not more than 50 words.
2. Your friend, Manish Tripathi has invited you to attend his wedding anniversary. You cannot attend it as you have a family get-together on the same day. Write a polite letter, in not more than 50 words, expressing your inability to attend the function and wish him all the happiness on this joyous occasion. You are Mita/ Mahendra Juneja of 25, Vasundra Colony, Patna
3. You are Satish/Sonali, the administrative officer of Apollo Hospital, New Delhi. You have been asked by the hospital management to place an order for masks, surgical gowns and eye gear including ventilators and personal protective equipment (PPE) for the medical staff. Write a letter to GPC Medical Ltd, Street No: 5; Kabir Nagar, Delhi, 110094 placing an order for the equipment. Invent the necessary details.
4. Public health care in the country is poor. Private health care is expensive. About a quarter of the population is illiterate and thus may not be as aware of the danger. And a massive citizenry makes social distancing nearly impossible — a big issue when around 100 million people in the country are over the age of 60. Write a letter to the Health Minister of India to provide comprehensive health coverage for all and to focus on health programs to provide good health care to every citizen of India.
5. You are Nitin/ Natasha, staying at 20, S.F.S. Flats, Worli, and Mumbai There are reports that the Owners of Fair Price Shops were found to be indulging in black marketing. Write a letter to the Commissioner of the Civil Supplies department, Mumbai to take strict actions against such shop owners as it is causing a lot of inconvenience to the people around your locality.
6. Write an application (including a resume) in 120-150 words for the post of receptionist advertised in a national newspaper by JKL Publishers, Peshwa Road, Pune. You are Karuna, M-114, Mall Road, Pune, a graduate from SNDT University and have done a Secretarial Practice Course from YWCA, Mumbai.

MATHEMATICS

General Instructions

1. Attached assignments are based upon the lectures taken by the teachers before summer vacations.
 2. This assignment is part of internal assessment of Periodic Test 1.
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SECTION - A

1. Let $f: \mathbb{R} \rightarrow \mathbb{R} : f(x) = (2x + 1)$ and $g: \mathbb{R} \rightarrow \mathbb{R} : g(x) = (x^2 - 2)$. Write down the formula for $f \circ g$.
2. Check whether the function $f(x) = [x]$ is one-one or not, where $[x]$ denotes the greatest integer less than or equal to x .
3. Are f and g both necessarily onto, if $g \circ f$ is onto?
4. Let $f: \left[-\frac{\pi}{2}, \frac{\pi}{2}\right] \rightarrow A$ be defined by $f(x) = \sin x$. If f is a bijection, write set A .
5. Let $A = \{1, 2, 3, \dots, n\}$ and $B = \{a, b\}$, then write the number of surjections from A to B .
6. Show that the function $f: \mathbb{R}_+ \rightarrow \mathbb{R}_+$ defined by $f(x) = \frac{1}{x}$, is one-one and onto, where \mathbb{R}_+ is the set of all non-zero real numbers. Is the result true, if the domain \mathbb{R}_+ is replaced by \mathbb{N} with codomain being same as \mathbb{R}_+ ?
7. Consider $f: \mathbb{R}_+ \rightarrow [4, \infty)$ given by $f(x) = x^2 + 4$. Show that f is bijective, where \mathbb{R}_+ is the set of all non-negative real numbers.
8. Show that the function $f: \mathbb{R} \rightarrow \{x \in \mathbb{R} : -1 < x < 1\}$ defined by $f(x) = \frac{x}{1+|x|}$, $x \in \mathbb{R}$ is one-one and onto function.

SECTION - B

9. Discuss the continuity of the $f(x)$ at the indicated point: $f(x) = |x - 1| + |x + 1|$ at $x = -1$ & 1 .
10. For what value of λ the function defined by $f(x) = \begin{cases} \lambda(x^2 + 2), & \text{if } x \leq 0 \\ 4x + 6, & \text{if } x > 0 \end{cases}$ is continuous at $x=0$? Hence check the differentiability at $x=0$.
11. Find the value of k , so that the function $f(x)$ defined below is continuous at $x = 0$, Where

$$f(x) = \begin{cases} \left(\frac{1 - \cos 4x}{8x^2} \right), & \text{if } x \neq 0 \\ k, & \text{if } x = 0 \end{cases}.$$

12. If $f(x) = \begin{cases} \frac{1 - \cos 4x}{x^2}, & \text{when } x < 0 \\ a, & \text{when } x = 0 \\ \sqrt{x}, & \text{when } x > 0 \end{cases}$ Find the value of **a** when $f(x)$ is continuous at $x = 0$.

13. Find the value of k , so that the function $f(x)$ defined below is continuous at $x = 0$, Where

$$f(x) = \begin{cases} \frac{\sqrt{1+kx} - \sqrt{1-kx}}{x}, & \text{if } -1 \leq x < 0 \\ \frac{2x+1}{x-1}, & \text{if } 0 \leq x < 1 \end{cases}$$

14. Find the value of a and b if the given function $f(x)$ is continuous at $x = 0$

$$f(x) = \begin{cases} 3ax + b, & \text{if } x > 1 \\ 11, & \text{if } x = 1 \\ 5ax - 2b, & \text{if } x < 1 \end{cases}$$

15. Find all points of discontinuity of $f(x)$, where $f(x)$ is defined by:

$$f(x) = \begin{cases} |x| + 3, & x \leq -3 \\ -2x, & -3 < x < 3 \\ 6x + 2, & x \geq 3 \end{cases}$$

PHYSICS

(Chapter No.-1&2)

General Instructions

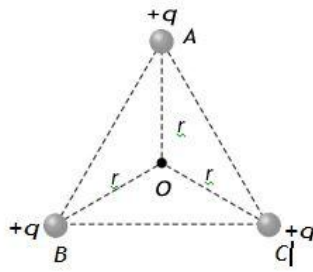
1. Attempt all the Questions.
2. Write answers of theoretical questions in ~~points~~

Very Short Answer Type Question

- 1) If $q_1 q_2 > 0$, what is the nature of force between the two charges?
- 2) How does the force between two point charges change if the dielectric constant of the medium in which they are kept increase?
- 3) Which physical quantity has its S.I unit (1) Cm (2) N/C.?
- 4) In which orientation, a dipole placed in uniform electric fields is in (i) stable, (ii) unstable equilibrium?
- 5) Give two properties of electric charge.
- 6) Draw an equipotential surface for a system, consisting of two charges $Q, -Q$ separated by a distance ' r ' in air.
- 7) Why must electric field be normal to the surface at every point of a charged conductor?
- 8) Two copper spheres of same radii, one hollow and other solid are charged to same potential. Which, if any, of the two will have more charges?
- 9) Does the electric potential increase or decrease along the electric line of force?
- 10) What will be the electric field strength due to a point charge of $5\mu\text{C}$ at a distance of 80 cm from the charge?

Short Answer Type Question

- 1) A charge is placed at the center of cube. What is the electric flux passing through one of its face?
- 2) Three point charges ($+q$) are placed at three vertices of equilateral triangle of side a . Find the magnitude of Electrostatic force on any charge due to other two.
- 3) An electric dipole when held at with respect to a uniform electric field of 10^4 N/C experienced a Torque of $9 \times 10^{-26} \text{ Nm}$. Calculate dipole moment of the dipole?
- 4) ABC is an equilateral triangle. Charges $+q$ are placed at each corner. What will be the electric intensity at O ?



- 5) Electric charges $-10 \mu\text{C}$, $5 \mu\text{C}$, $3 \mu\text{C}$ and $-8 \mu\text{C}$ are placed at the corners of a square of side $\sqrt{2} \text{ m}$. What will be the potential at the center of a square?
- 6) Two point charges $+q$ and $+9q$ are separated by a distance of $10a$. Find the point on the line joining the two charges where electric field is zero?
- 7) A sphere of radius r_1 encloses a charge Q . If there is another concentric sphere S_2 of Radius r_2 ($r_2 > r_1$) and there is no additional charge between S_1 and S_2 . Find the ratio of electric flux through S_1 and S_2 .
- 8) Draw a plot showing the variation of electric field (E) and electric potential (V) with distance r due to a point charge Q . Also compare both the graphs.
- 9) A polythene piece rubbed with wool is found to have a negative charge of $3 \times 10^{-7} \text{ C}$
 - a. Estimate the number of electrons transferred (from which to which?)
 - b. Is there a transfer of mass from wool to polythene?
- 10) Consider a uniform electric field $E = 3 \times 10^3 \hat{i} \text{ N/C}$.
 - a. What is the flux of this field through a square of 10 cm on a side whose plane is parallel to the yz plane?
 - b. What is the flux through the same square if the normal to its plane makes a angle 60° with the x -axis?

SUBJECT: CHEMISTRY

A. Make a investigatory project on any one of the following topic:

- 1) On green chemistry- Bio-diesel and bio-petrol
- 2) On sterilization of water using bleaching powder
- 3) On analysis of fertilizers
- 4) On measuring the amount of Acetic acid in vinegar
- 5) On determination of contents of cold drinks
- 6) To study the quantity of casein in milk
- 7) On presence of insecticides and pesticides in fruits and vegetables
- 8) On preparation of soyabean milk
- 9) On study of rate of fermentation of juices
- 10) Determination of caffeine in tea samples
- 11) Determination of content of toothpaste
- 12) Dyeing of wool, silk and cotton in malachite green
- 13) Effect of Potassium Bisulphite as a food preservatives
- 14) Study the rates of fermentation of fruit or vegetable juices
- 15) To Study and Analyse the Foaming Capacity of the Soap
- 16) To Determine which Antacid could Neutralize the most Stomach Acid
- 17) To Study the Various Effects of Dye on Different Types of Fabric
- 18) To Study the Power of Enzymes and Biotechnological Applications
- 19) Does Water Temperature Cause Metal to Expand and Contract
- 20) To Investigate the Methods of Preparation of Toilet Soaps

Things should be mentioned:

- a) Aim
- b) Apparatus required
- c) Chemicals used
- d) Principle
- e) Procedure
- f) Observation table
- g) Result
- h) Precautions
- i) Bibliography

B. Solve the following worksheet according to the marks given below.

CH-2: SOLUTIONS

VSA QUESTIONS (1 - MARK QUESTIONS)

1. Define the following terms:
 - a) Mole fraction
 - b) Isotonic solutions
 - c) Ideal solution.
 - d) Colligative properties
 - e) Molality
2. Why it is better to find molality of a solution than its molarity?
3. What is Normality? Explain what you understand by 0.5N H₂SO₄.
4. What is vapour pressure? How it is related with boiling of a solution.
5. Define Henry's law and write two of its application.
6. Define Azeotropes and explain how they are classified?

SA (I) TYPE QUESTIONS (2 – MARK)

7. A mixture of chlorobenzene and bromobenzene is a nearly an ideal solution but a mixture of chloroform and acetone is not Explain?
8. Suggest the most important type of intermolecular attractive interaction in the following pairs.
 - (i) n-hexane and n-octane
 - (ii) and
 - (iii) and water
 - (iv) methanol and acetone
 - (v) acetonitrile and acetone
9. Based on solute-solvent interactions, arrange the following in order of increasing solubility in n-octane and explain. Cyclohexane, KCl.
10. The vapour pressure of solvent gets lowered, when a non- volatile solute is added to it. Why?

SA (II) TYPE QUESTIONS (3 – MARK)

11. Explain the following
 - (a) Hypertonic Solution
 - (b) Hypotonic Solution
 - (c) Maximum Boiling Azeotropes with Example

NUMERICALS

12. Give reasons for the following:

- (i) Measurement of osmotic pressure method is preferred for the determination of molar masses of macromolecules such as proteins and polymers.
- (ii) Aquatic animals are more comfortable in cold water than in warm water.
- (iii) Elevation of boiling point of 1M KCl solution is nearly double than that of 1 M sugar solution.

13. A 10% solution (by mass) of sucrose in water has freezing point of 269.15 K. Calculate the freezing point of 10% glucose in water, if freezing point of pure water is 273.15 K.

Given: (Molar mass of sucrose = 342 g mol^{-1} , Molar mass of glucose = 180 g mol^{-1})

14. State the formula relating pressure of a gas with its mole fraction in a liquid solution in contact with it. Name the law and mention its two applications.

15. Two liquids A and B boil at 145°C and 190°C respectively. Which of them has a higher vapour pressure at 80°C ?

16. (a) Why is the vapour pressure of a solution of glucose in water lower than that of water?

(b) A 6.90 M solution of KOH in water contains 30% by mass of KOH. Calculate the density of the KOH solution? (molar mass of KOH = 56 g/mol)

BIOLOGY

Dear students,

Please remember always, “Science operates on the edge of what is known,, to discover more about what is not... we have to be a person of what we can do to explore being young scientists.....

You can increase your knowledge of the world around you by listening to others, reading books, watching scientific television channels and surfing the Internet... However, one of the most exciting ways of increasing your knowledge is to put on the shoes of the scientist and conduct your own experimental investigations....

So, now let me tell you the meaning of research projects,

Investigatory projects are meant to be a pleasure-cum-work-cum-knowledge gathering exercise of senior students of you all. It is a type of experimental exercise performed with a scientific attitude by the students of senior level....

P.T.O

1. Selection of topic:

Select the topic of your choice from the suggested topics list given below for the project, or you work and read different chapters of your syllabus and also consults scientific literature, magazines, newspapers, go and use search engines of internet, etc.

2. Planning of the project:

Collect all possibly available information about the topic of the project. Prepare a rough outline of the experimental work of the project.

3. Experimentation for the project:

Plan and conduct the experimental work/survey/collecting information 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.

1. Collect data with honesty and utmost care. Record only your observations and data.
2. Repeat the experiment (if experimental based) several times and take average of the results of all the experiments.
3. Compare your results with those available in the reference books.
4. Discuss your results in the light of available information about the project and draw out meaningful conclusion.
5. Make use of histograms, graphs, photographs, diagrams or models to support your observations and conclusions.
6. Give a list of books, magazines/journals and internet sites you have consulted during the course of your project.
7. 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.

How to write:

Students are required to get their hand written project report on bond paper sheets and represent in the best possible manner. The project report should be written in the following sequence : (Can be changed as per the need)

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

Suggested Topics

[I] Biology Investigatory Projects on Genetics

1. To Study the DNA the mysterious molecule
2. To Study the Chromosomes and DNA Packaging
3. To Study the Structure of the RNA and Its Functions

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4. To Study the Genetic Mutation: Types and its Causes
5. To Study the Isolation of DNA from Animal Cell
6. Study of the Developments in the Rice Genome Research
7. To Study the Hemophilia: Types, Symptoms, and Treatment
8. To Study DNA Fingerprinting: Principles, Methods, and Applications

[II] Biology Investigatory Projects on Human Welfare

1. To Study the Classification of the Drugs
2. To Study the effects of the Drug Addiction
3. To Study and determined the pH Tolerance of Microbes
4. To Study and Investigate Prevention Methods of Different types of Viral Human Diseases

[III] Biology Investigatory Projects on Reproduction

1. To Study the Growing Yeast: Sugar Fermentation
2. To Study on the Infertility and its Causes and Treatment
3. To Study the Development of the Human Embryogenesis

[IV] Biology Investigatory Projects on Biotechnology

1. To Study the Various new Biotechnological Researches
2. To Study the Pharmacogenomics of Anti-Cancer Drugs
3. To Study the Transgenic Animals: Production and Applications
4. To Study the Nanotechnology Applications to the DNA Genotyping
5. To Study the Human Reproductive Cloning and Biotechnology
6. To Investigate the Nanotechnology Methods for DNA Isolation
7. To Identify and Classify the Gene Shape Plant Response to salinity and drought
8. Producing the Ethanol by using the molasses and its effluent Treatment
9. To Study Biotechnology and its applications: Biology Investigatory Project for Class 12
10. To Investigate methods to Production of the Human Insulin by using the Genetic Engineering

[V] Biology Investigatory Projects on Ecology and environment

1. To Study the Impact of the Ozone layer Depletion on Environment
2. To Study the Effect of the Oil Spills on the Oceans
3. To Study the Agricultural wastewater treatment
4. To Study the Large Scale Forest Fragmentation Experiment
5. To Study the Antarctic Peninsula Palaeontology Project
6. To Study the Methods to Improvement of the Biogas Production
7. To Study the Impact of Global Warming on the Environment

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