

ST. COLUMBUS SCHOOL
DAYAL BAGH, FARIDABAD
CLASS – XI (SCIENCE)
HOLIDAY HOMEWORK (2024-25)

General Instructions:-

1. Holiday Homework of English, Chemistry, Physics, Biology, Music and Math should be done in the respective class work register.
 2. Holiday Homework of Artificial Intelligence should be done in a separate Notebook
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SUBJECT - ENGLISH

1. Revise the syllabus covered.
2. Design the poster for your school fete. You may use slogans.
3. Design a poster on the importance of education.
4. Our past is not with us and the future is yet to come. The present is before us. Students postpone their work thinking that they will do it tomorrow. But tomorrow never comes. In the end they repent, but it is no use crying over spilt milk. Write a speech on “The Importance of Time”.
5. Fill in the blanks with the Simple Present or the Present Continuous forms of the verbs given in the brackets.
 - i) He usually to a hill station during holidays but this year he (go, not go)
 - ii) My brotherhere come tomorrow, he generally (come, not come)
 - iii)I generally to my school but today I in my brother’s car. (walk, go)
 - iv) Why are you noise? He Don’thim. (make, sleep, disturb)
 - v) I to play with my class fellows. (love)
 - vi) Be silent. Candidates their examinations. (write)
 - vii) Be quick! My brother is (wait)
 - viii) She lessons in classical music. She with harmonium. (take , practice)
 - ix) I cannot tolerate it; I (leave)
 - x) My car servicing. I it to the service station. (need, take)
6. Bring out the contrast between the school education in the village and in the city.
7. The chapter ‘The Portrait of a Lady’ displays the sad reality of old age. Old people face loneliness and seclusion. It gets you thinking about the pain of old age. Write a story about ‘The pain of old age’ in 150-200 words.
8. Give a brief character-sketch of Khushwant Singh’s grandmother on the basis of The Portrait of a Lady.

9. Give a brief account of the scene of Van Mahotsava Celebration
10. Why do you think people undertake adventurous journey in spite of the risks involved?
11. Bring out some of the notable traits of the Mourad's character.
12. The hurdle of life can be challenged if we have confidence to make optimum use of our potential. Explain.
13. In today's materialistic world, where greed and money are the most important things, the example of Garoghlanian Tribe can teach us many things. According to you what qualities must a society have?
14. Happy moments are short-lived but provide a lifetime memory. They provide a cushion to bear the difficulties. Comment in the light of poem 'A Photograph'.
15. Make a project file on any one chapter already explained in the class.

SUBJECT – PHYSICS

Do all the questions in Physics notebook meant for question answers.

1. A motorboat is racing towards north at 25 km/h and the water current in that region is 60° east of south. Find the resultant velocity of the boat.
2. A position vector r of a particle located in a plane with reference to the origin of an x-y reference frame is given by $r = x\hat{i} + y\hat{j}$. What do you understand by x and y values. Also show the vector representation diagrammatically.
3. Define velocity of an object. Give the formula (in terms of vector) to find the velocity. Also give the vector diagram showing how you will determine the velocity using vector diagram.
4. Define average acceleration of an object in terms of vectors. Also give the vector diagram representing the same.
5. Explain briefly how you will determine the acceleration of an object using vector diagrams. Also state what difference that you will find in determining the velocity and acceleration of motion of an object in two or three dimensions.
6. The position of a particle is given by $r = 3.0t\hat{i} + 2.0t^2\hat{j} + 5.0t\hat{k}$ where t is in seconds and the coefficients have the proper units for 'r' to be in meters. (a) Find $v(t)$ and $a(t)$ of the particle. (b) Find the magnitude and direction of $v(t)$ at $t = 1.0s$.
7. Derive the equations for finding the motion of an object moving with constant acceleration in a Plane. Also what conclusions can you draw from the equations?
8. A particle starts from origin at $t = 0$ with a velocity $5.0\hat{i}$ m/s and moves in x-y plane under action of a force which produces a constant acceleration of $(3.0\hat{i} + 2.0\hat{j})$ m/s².
 (a) What is the y-coordinate of the particle at the instant its x-coordinate is 84 m?
 (b) What is the speed of the particle at this time?
9. Give an expression for finding the relative velocity in two dimensions.
10. Rain is falling vertically with a speed of 35ms^{-1} . A woman rides a bicycle with a speed of

12 m s^{-1} in east to west direction. What is the direction in which she should hold her umbrella?

11. What is a projectile? Derive the equation of path of a projectile.
12. Galileo, in his book Two new sciences, stated that “for elevations which exceed or fall short of 45° by equal amounts, the ranges are equal”. Prove this statement.
13. Derive the equations of motion for uniformly accelerated motion using velocity-time graph.
14. Obtain equations of motion for constant acceleration using method of calculus.
15. Define instantaneous velocity. Give the formula for finding the instantaneous velocity.
16. The position of an object moving along x-axis is given by $x = a + bt^2$ where $a = 8.5\text{m}$, $b = 2.5\text{ms}^{-2}$ and t is measured in seconds. What is its velocity at $t=0\text{s}$ and $t= 2.0\text{s}$. What is the average velocity between $t=2.0\text{s}$ and $t=4.0\text{s}$? Give your conclusion. Plot the position-time graphs for motion of an object moving with positive, negative and zero acceleration.

SUBJECT – CHEMISTRY

1. Show the distribution of electrons in an oxygen atom (atomic number 8) using an orbital diagram.
2. The arrangement of orbitals on the basis of energy is based upon their $(n+1)$ value. Lower the value of $(n+1)$, the lower is the energy. For orbitals having the same values of $(n+1)$, the orbital with a lower value of n will have lower energy.

(i) Based upon the above information, arrange the following orbitals in the increasing order of _____ energy

- (a) 1s, 2s, 3s, 3p
- (b) 4s, 3s, 3p, 4d
- (c) 5p, 4d, 5d, 4f, 6s
- (d) 5f, 6d, 7s, 7p

(ii) Based upon the above information, solve the questions given below :

- (a) Which of the following orbitals has the lowest energy?
4d, 4f, 5s, 5p
- (b) Which of the following orbitals has the highest energy?
5p, 5d, 5f, 6s, 6p

3. Wavelengths of different radiations are given below:

$\lambda(A) = 300 \text{ nm}$, $\lambda(B) = 300 \mu\text{m}$, $\lambda(C) = 3 \text{ nm}$, $\lambda(D) = 30 \text{ \AA}$
Arrange these radiations in the increasing order of their energies.

- The Balmer series in the hydrogen spectrum corresponds to the transition from $n_1 = 2$ to $n_2 = 3, 4, \dots$. This series lies in the visible region. Calculate the wave number of the line associated with the transition in the Balmer series when the electron moves to $n = 4$ orbit.
- According to de Broglie, the matter should exhibit dual behaviour, that is, both particle and wave like properties. However, a cricket ball of mass 100 g does not move like a wave when it is thrown by a bowler at a speed of 100 km/h. Calculate the wavelength of the ball and explain why it does not show wave nature.
- Chlorophyll present in green leaves of plants absorbs light at 4.620×10^{14} Hz. Calculate the wavelength of radiation in nanometer. Which part of the electromagnetic spectrum does it belong to?
- What is the difference between the terms orbit and orbital?
- Table-tennis ball has a mass of 10 g and a speed of 90 m/s. If speed can be measured with an accuracy of 4% what will be the uncertainty in speed and position?
- Match the following species with their corresponding ground state electronic configuration.

| Atom / Ion | Electronic configuration |
|------------------------|---|
| (i) Cu | (a) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10}$ |
| (ii) Cu^{2+} | (b) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3$ |
| (iii) Zn^{2+} | (c) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$ |
| (iv) Cr^{3+} | (d) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9$ |

10. Match the quantum numbers with the information provided by these.

| Quantum number | Information provided |
|-------------------------------|--------------------------------|
| (i) Principal quantum number | (a) orientation of the orbital |
| (ii) Azimuthal quantum number | (b) energy and size of orbital |
| (iii) Magnetic quantum number | (c) spin of electron |
| (iv) Spin quantum number | (d) shape of the orbital |

11. Calculate the energy and frequency of the radiation emitted when an electron jumps from $n = 3$ to $n = 2$ in a hydrogen atom.

12. Arrange s, p and d sub-shells of a shell in the increasing order of effective nuclear charge (Z_{eff}) experienced by the electron present in them
13. Table-tennis ball has a mass of 10 g and a speed of 90 m/s. If speed could be measured with the accuracy of 4%, what will be the uncertainty in speed and position?
14. Which orbital would experience the larger effective nuclear charge among the following pairs of orbitals?
 (a) 2s and 3s,
 (b) 4d and 4f,
 (c) 3d and 3p
15. Indicate the number of unpaired electrons in:
 (a) P (b) Si (c) Cr (d) Fe (e) Kr
16. How many sub-shells are associated with the $n = 4$?
17. How many electrons would be present in the sub-shells having an m_s value of $-1/2$ for $n = 4$?
18. Match the following rules with their statements:

| Rules | Statements |
|---|--|
| (i) Hund's Rule | (a) No two electrons in an atom can have the same set of four quantum numbers. |
| (ii) Aufbau Principle | (b) In the ground state of atoms, orbitals are filled in the order of their increasing energies. |
| (iii) Pauli Exclusion Principle | (c) Pairing of electrons in the orbitals belonging to the same subshell does not take place until each orbital is singly occupied. |
| (iv) Heisenberg's Uncertainty Principle | (d) It is impossible to determine the exact position and exact momentum of a subatomic particle simultaneously. |

19. Assertion (A): All isotopes of a given element show the same type of chemical behavior.
 Reason (R): The chemical properties of an atom are controlled by the number of electrons in the atom.
- (a) Both A and R are true and R is the correct explanation of A.
 (b) Both A and R are true but R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) Both A and R are false.

20. Assertion (A): It is impossible to determine the exact position and exact momentum of an electron simultaneously.

Reason (R): The path of an electron in an atom is clearly defined.

- (a) Both A and R are true and R is the correct explanation of A.
- (b) Both A and R are true and R is not the correct explanation of A.
- (c) A is true and R is false.
- (d) Both A and R are false.

SUBJECT – MATHEMATICS

1. Find the value of $\cos C - \cos D$.
2. Find the value of $\sin 8x$.
3. Find the value of $1 - \cos 2x$.
4. Find the value of $\tan 4x$.
5. Find the value of $2 \sin A \cos B$.
6. Find the $\lim_{x \rightarrow 0} x \tan x$.
7. Find the $\lim_{x \rightarrow 0} \operatorname{cosec}^n x$.
8. Find the value of $\sin 270^\circ + \cos 120^\circ$.
9. Find the value of $\cos 3x - \cos 5x$.
10. Find the $\lim_{x \rightarrow 0} \frac{\sin x}{x}$.
11. If $\cos(x+y) = m \cos(x-y)$, then prove that $\tan x = \frac{1-m}{1+m} \cot y$.
12. Find the value of $\sin(\pi + x) \cdot \sin(\pi - x) \cdot \operatorname{cosec}^2 x$.
13. Find the value of $\frac{\sin 50^\circ}{\sin 130^\circ}$.
14. Find the angle subtended by an arc of length 20cm at the centre of circle when radius is 14 cm.
15. Find the radian measure of an angle $-22^\circ 30'$.
16. Express each of the following as product : i) $\sin 9x - \sin 2x$ ii) $\cos 5x - \cos 11x$
17. Prove that $\sin 10^\circ \sin 50^\circ \sin 60^\circ \sin 70^\circ = \frac{\sqrt{3}}{16}$.
18. Prove that $\sin^3 x + \sin^3\left(\frac{2\pi}{3} + x\right) + \sin^3\left(\frac{4\pi}{3} + x\right) = -\frac{3}{4} \sin 3x$.
19. Find the value of $\tan \frac{\pi}{8}$.
20. Prove that $\cos x \cos 2x \cos 4x \cos 8x = \frac{\sin 16x}{16 \sin x}$.

SUBJECT – BIOLOGY

1. Name the phases of meiosis in which:
 - (a) The amount of DNA is reduced to haploid stage.
 - (b) The chromosome number is reduced to haploid stage.
2. Why deuteromycetes are called imperfect fungi?
3. Thermoacidophiles are different from true bacteria. Justify.
4. Which division of plantae is called ‘amphibians of the plant kingdom’?
5. How does transportation of gasses take place in human beings?
6. Name endomembranous cell organelles. Why they are called so?
7. Give reasons:
 - i. Mushrooms are not regarded as plants.
 - ii. Viruses are not included in any system of classification.
8. Give outline classification of connective tissue of animals with help of flowchart only.
9. How do neutral solutes move across the plasma membrane? Can polar molecules also move across it in same way? If not, then how are these transported across the membrane?
10. Why do we call mitochondria and plastid as semiautonomous cell organelles?
11. Write with example any two cofactors of enzyme.
12. How do nucleoside and nucleotide differ from each other? Substantiate your answer citing an example.
13. Do all the questions given at the end of the chapters- 1 – 4 in notebook and learn thoroughly .
14. Draw all the diagrams marked in the notebook.
15. Prepare a Herbarium with at least five flowering plants.

SUBJECT – ARTIFICIAL INTELLIGENCE

1. What is self-awareness?
2. Write difference between interest and abilities.
3. What are the guidelines of grooming?
4. Write any two of your strength and weakness.
5. What is personal hygiene? What is the need of personal hygiene?
6. What is team work and also write the benefits of working in a team?
7. Define self- motivation and its types.
8. Write few qualities of self-motivated person.
9. Explain SMART technique for goal setting
10. What is the need of time management? What are the steps for effective time management?
11. Write two to three lines you would use to introduce yourself.

12. Write down the habits you want to create or the one's you want to drop.
13. Write down the routine you will follow over a month before your final exams.

SUBJECT – MUSIC

1. नाद, श्रुति, स्वर और सप्तक की परिभाषा याद करें।
2. अपनी पसंद का कोई भी भक्ति गीत तैयार करें।
3. आरोही व अवरोही क्रम सहित सात अलंकारों का निर्माण करें।
4. पाठ्यक्रम के राग 'राग भैरवी' पर आधारित फिल्मी गीतों की सूची तैयार करें व उनमें से कोई एक गीत के गायन का अभ्यास करें।
5. हिंदुस्तानी शास्त्रीय संगीत में 'वाद्यों के विभिन्न प्रकार' पर एक रिसर्च प्रोजेक्ट तैयार करें। प्रत्येक श्रेणी के अंतर्गत एक वाद्य का परिचय देते हुए उसके चित्र सहित एक ऐसा गीत का नाम लिखें जिसमें उस वाद्ययंत्र का प्रयोग हुआ है ।

Be Happy By Doing Good

1. Spare some time and help your mother in household work, Talk to your parents and elders and learn values.
2. Adopt the habit of reading newspaper and learn new words and expressions.
3. Read at least two books (Hindi & English) apart from prescribed syllabus.
4. Respect flora and fauna (Plants and Animals). Keep your home and surroundings clean. Plant at least 5 saplings.
5. Keep water for birds and stray animals outside your house or in balcony.
6. Food is equal to God. So avoid wasting of food.
7. Try to share your knowledge and donate old books and notebooks to the underprivileged and deprived children of your locality.
8. Maintain a diary in English & Hindi and write your experience along with daily routine during summer break. It will help you in enriching your vocabulary and writing skills.

ENJOY YOUR SUMMER BREAK.....

