LIONS PUBLIC SCHOOL
I BLOCK PHASE- 1 ASHOK VIHAR
DELHI: 110052
(SESSION: 2025-26)

Class XI A- SCIENCE
English Assignment

Chapter: The Portrait of a Lady by Khushwant Singh

Q1. Assertion (A): The author's grandmother was a deeply religious woman. Reason (R): She spent most of her time reading scriptures and praying.

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) A is false, but R is true.

Q2. Assertion (A): The grandmother was unhappy when the narrator started going to the city school.
Reason (R): She disapproved of the subjects taught and the absence of religious education.

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) A is false, but R is true.

Q3. How does the author portray the emotional bond between himself and his grandmother despite changes in their lifestyle and routine?

Q4. What changes occurred in the narrator's relationship with his grandmother when he went abroad? How did the grandmother respond to those changes?

Q5. Paragraph Writing:
Write a paragraph (100–120 words) on "The Importance of Grandparents cultural values alive.

Poem “A Photograph” by Shirley Toulson

Q1.Assertion (A): The poet's mother found the photograph amusing when she looked at it years later.
Reason (R): She remembered the beach holiday and laughed at how they all looked back then.
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) A is false, but R is true.

Q2.Identify the poetic device in the line:
"Its silence silences"
a) Simile
b) Alliteration
c) Personification
d) Metaphor

Q3.How does the poet express the passage of time in the poem? What impact does this have on the tone?

Q4.Why do you think the poet says "there is nothing to say at all" in the end? What does this line convey about grief

Q5. Paragraph Writing:
Write a short paragraph (100–120 words) on “The Role of Photographs in Preserving Memories”, inspired by the poem A Photograph.

Chapter: The Summer of the Beautiful White Horse

Q1.Assertion (A): Mourad took the horse for a ride because he wanted to show off to the world.
Reason (R): Mourad was proud and boastful by nature.

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) A is false, but R is true.

Q2.Assertion (A): Aram was initially shocked to see Mourad with a horse. Reason (R): Stealing was considered dishonorable in their tribe.

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) A is false, but R is true.

Q3.Describe the contradiction in Mourad's character as seen in the story. How does it contribute to the plot?

Q4.Why was returning the horse so important to the boys? What does it reveal about their values and upbringing?

Q5. Diary Entry:
Imagine you are Aram. Write a diary entry describing your feelings after discovering that the horse Mourad brought was stolen, and your internal conflict about riding it.

Assignment: “We’re Not Afraid to Die… If We Can All Be Together”

A. Assertion-Based Questions (2)

1. Assertion (A): The narrator hired experienced crew members to assist in their world voyage.
Reason (R): Sailing across the Southern Indian Ocean is considered one of the most dangerous parts of the journey.

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. A is false, but R is true

2. Assertion (A): The children’s courage motivated the narrator to stay strong.
Reason (R): Sue and Jonathan remained calm and optimistic despite injuries and danger.

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. A is false, but R is true.

3.What qualities of leadership and teamwork are demonstrated by the narrator during the storm? Provide examples from the story.

4. How does the title of the story reflect the spirit of human endurance and family unity? Support your answer with reference to the text.

5. Diary Entry

Imagine you are the narrator, writing a diary entry after surviving the storm. Express your emotions, thoughts about your family’s courage, and the lessons you’ve learned.

ASSIGNMENT: WRITING SKILLS

NOTICE WRITING

(Word Limit: 50 words each)

Q1. You are Arjun Mehra, the Sports Secretary of Delhi Public School, Delhi. Draft a notice informing students about an upcoming Inter-House Football Tournament to be held on 5th June 2025.

Q2. You are Nisha Verma, the Head Girl of Delhi Public School, Delhi. Write a notice informing students about a Cleanliness Drive being organized in your locality on 1st June 2025.

Q3. You are Rohan Das, the Cultural Secretary of your school. Your school is organizing a Talent Hunt Competition on 10th June 2025. Draft a notice inviting students to participate.

Q4. You are Mrs. Neelam Roy, the Librarian of Delhi Public School, Delhi. Write a notice to inform students and staff about the closure of the library for annual stock-taking from 1st to 7th August 2025.

Q5. You are Ananya Sharma, a resident of Saket, New Delhi. Write a letter to the Editor of The Times of India expressing your concern about the increasing use of mobile phones among school children. Use the following cues:

*Rising screen time
*Impact on studies and health
*Lack of physical activity
*Role of parents and schools
*Suggestions for balanced usage

Q6. You are Rajat Malhotra, a resident of Saket, New Delhi. Write a letter to the Editor of The Hindustan Times highlighting the problem of water wastage in your locality.

Use the following cues:

*Overflowing water tanks
*Leaking pipelines
*Lack of awareness among residents
*Need for regular maintenance
*Suggestions: water harvesting, public awareness, stricter rules.

Physics Assignment-1 Chapter-1 (Units and Dimensions)

Que1. Solve and fill in the blanks.

(a) The volume of a cube of side 1 cm is equal to……m^3.

(b) The surface area of a solid cylinder of radius 2.0 cm and height 10.0 cm is equal to ……..$(mm)^2$.

(c) A vehicle moving with a speed of 18 km h^{-1} covers ……. m in 1 s.

(d) The relative density of lead is 11.3. Its density is …….. g cm^{-3} or…. kg m^{-3}.

(e) 3.0 m s^{-2} = …. km h^{-2}

(f) G = 6.67 x 10^{-11} N m^2 $(kg)^{-2}$ = …. $(cm)^3$ s^{-2} g^{-1}.

[Ans (a)10^{-6} (b) 1.5×10^4 (c) 5 (d) 11.3 or 11.3×10^3 (e) 3.9×10^4 (f) 6.67×10^{-8}]

Que2. **E, m, l and G denote energy, mass, angular momentum and gravitational constant respectively. Determine the dimensions of** EL^2 / m^5G^2

Que3. The orbital velocity v of a satellite may depend on its mass m, distance r from the centre of Earth and acceleration due to gravity g. Obtain an expression for orbital velocity.

Que4.Given that the time period T of oscillation of a gas bubble from an explosion under water depends upon P, d and E where P is the static pressure, d the density of water and E is the total energy of explosion, find dimensionally a relation for T.

Que5. Deduce the dimensional formula for the following quantities (i) Gravitational constant (ii) Young's modulus (iii) Coefficient of viscosity.

Que6. a) Differentiate between dimensional and non-dimensional variable with examples.

b) Differentiate between dimensional and non-dimensional constants with examples.

Que7. Surface tension of mercury is 540 dyne/cm. What will be its value when unit of mass is 1 kg, unit of length is 1m and unit of time is 1 minute? **[Ans. 1944 new units of surface tension]**

Que8. Find the dimensions of the quantity q from the expression: $T = 2\pi\sqrt{\frac{ml^3q}{5\gamma}}$

where T is time period of a bar of length l , mass m and Young's modulus γ

Ans. q = $[M^0L^{-4}]$

Que9. Find the dimensions of $(a \times b)/c$ in the relation $y = 4 \sin at + 3 \cos bt - ct$,where t is time and y is distance.

Ans. $[L^{-1}T^{-1}]$

Que10. The period of revolution (T) of a planet around the sun depends upon (i) radius (r) of obit (ii) mass M of the sun and (iii) gravitational constant G. Prove that $T^2 \propto r^3$

Que11.Do all physical quantities have dimensions? If no,name three physical quantities which are dimensionless.

Que12. Which of the following length measurement is (i) most precise and (ii) least precise?

(a) l = 5cm (b) l = 5.00cm (c) l = 5.000 cm (d) l = 5.0000 cm

[Ans. Most precise,l = 5.0000. Least precise, l = 5]

Que13. Solve and express the result to appropriate number of significant figures.
3.84 + 0.0239 – 0.568

[Ans. 3.30]

Que14. Write down the number of significant figures in the following:

(i) 5238 N
(ii) 4200 Kg
(iii) 34.000 m
(iv) 0.02340 Nm^{-1}
(v) 1.67×10^{-27} kg

[Ans. (i) 4 (ii) 4 (iii) 5 (iv) 4 (v) 3]

Que15. State the limitations of the method of dimensional analysis.

Que16. Force F acting on a particle of mass m moving along a circular path of radius r with a constant angular velocity ω is given by $F = mr\omega^2$. Show that the equation is dimensionally correct.

Ques17. Measure of two quantities along with the precision of respective measuring instrument are $A = 2.5 \text{ m s}^{-1} \pm 0.5 \text{ m s}^{-1}$ and $B = 0.10 \text{ s} \pm 0.01 \text{ s}$. Find the value of A B.

[Ans. (0.25 ± 0.08) m]

Physics Assignment-2 Chapter 2: (Motion in a Straight Line)

Section A: Multiple Choice Questions

1. A particle moves along a straight line such that its displacement in time t is given by $s = 4t^3 - 3t^2$. The instantaneous velocity at t = 2 s is:

a) 24 m/s b) 36 m/s c) 40 m/s d) 28 m/s

2. A body starts from rest and moves with a uniform acceleration of 2 m/s^2. The distance covered in the 5th second is:

a) 40 m b) 45 m c) 50 m d) 25 m

3. The area under a velocity-time graph represents:

a) Acceleration b) Displacement c) Distance d) Speed

4. A car is moving with uniform acceleration. If it speeds up from 10 m/s to 20 m/s in 4 s, the acceleration is:

a) 2.5 m/s^2 b) 5 m/s^2 c) 10 m/s^2 d) 15 m/s^2

5. A body thrown vertically upward with a velocity of 20 m/s will reach the maximum height in:

a) 1 s b) 2 s c) 3 s d) 4 s

6. The velocity of a particle at time t is given by $v = at + b$. Its displacement after time t is: a) $\frac{1}{2}at^2 + bt$ b) $at^2 + bt$ c) $at + b$ d) $\frac{1}{2}bt^2 + at$

7. Which of the following is a scalar quantity?

a) Displacement b) Velocity c) Acceleration d) Distance

8. A particle is moving with constant velocity. Which of the following is true?

a) Displacement is zero b) Acceleration is zero c) Distance is zero d) Speed is decreasing

9. Displacement-time graph of a particle is a straight line inclined to time axis. The motion is:

a) Uniform b) Accelerated c) Retarded d) Non-uniform

10. For a uniformly accelerated motion from rest, which of the following is correct?

a) $v = at$ b) $s = \frac{1}{2}at^2$ c) $v^2 = 2as$ d) All of the above

📚 Section B: Case Study Case:

A car travels in a straight line. The velocity-time graph of the car is shown below. The car starts from rest, accelerates uniformly for 5 seconds, travels at constant speed for 5 seconds, then decelerates uniformly and comes to rest in the next 5 seconds.

Questions:

a) What is the acceleration of the car in the first 5 seconds if it reaches a velocity of 20 m/s?

b) What is the total distance covered in 15 seconds?

c) Find the retardation during the last 5 seconds.
d) Sketch the displacement-time graph for the entire motion.

⚖️ Section C: Assertion-Reasoning 11.
A: The acceleration of a body moving with uniform velocity is zero.
R: Acceleration is the rate of change of velocity.

12.
A: Displacement is always greater than or equal to distance.
R: Displacement is a scalar, while distance is a vector.

13.
A: A body can have zero displacement and non-zero distance.
R: Displacement depends on initial and final positions.

14.
A: Slope of velocity-time graph gives displacement.
R: The area under velocity-time graph gives displacement.

15.
A: A body moving with constant acceleration has a parabolic displacement-time graph. R: The relation $s = ut + \frac{1}{2}at^2$ is a quadratic equation.

📐 Section D: Theory/Numerical Questions
16. Define average speed and average velocity. Give one example where both are different.

17. A body covers 20 m in the first 2 seconds and 60 m in the next 2 seconds. Is the motion uniformly accelerated? Justify.

18. Derive all equations of motion using graphical method.

19. A train starts from rest and accelerates uniformly at 2 m/s^2 for 10 s. Calculate the distance covered and final velocity.

20. A car is moving with an initial velocity of 15 m/s and comes to rest in 5 seconds. Find the retardation and the distance it travels.

21. Explain with diagram: difference between distance-time and displacement-time graph for uniform motion.
22. A ball is thrown vertically upwards with speed 30 m/s. How high will it go and how long will it take to return?

23. Differentiate between uniform motion and uniformly accelerated motion with one example each.

24. A particle moves along a straight line with equation $x(t) = 3t^2 + 2t + 5$. Find velocity and acceleration at t = 2 s.

25. Explain the conditions under which average velocity is equal to instantaneous velocity.

26. Plot the velocity-time graph for a body thrown upwards and explain different regions.

27. A scooter accelerates uniformly from 10 m/s to 30 m/s in 5 s. Find the distance covered.

28. Define instantaneous velocity. How is it calculated from a displacement-time graph?

29. A ball is thrown vertically upward with a velocity of 29.4 m/s . after 3 sec another ball is thrown upward from the same point with a velocity of 19.6 m/s. When and at what height will the two balls collide?

30. A stone is dropped from the top of a tower. It takes 4 s to reach the ground. Find the height of the tower and velocity with which it strikes the ground.

31. A balloon start rising from the ground with an acceleration of 2m/s2. After 5 sec, a stone is released from the balloon. Find the time taken by the stone to reach the ground after its release and total height attained by balloon when stone reaches the ground. [g=10m/s2]

32. An object moving with a speed of 6.25 m/s is decelerated at a rate given by $\frac{dv}{dt} = -2.5\sqrt{v}$ where v is the instantaneous speed. What is the time taken by the object to come to rest.

c) Retardation = 4 m/s²

✓ Answer Key Section

A:

1. d 3. b 2. b 4. a

Section B:

a) a = 4 m/s²

b) Distance = 200 m

11. A 12. D 13. A 14. D 15. A

Section C:

5. b 7. d 9. a

6. a 8. b 10. d

d) Displacement-time graph is concave, linear, then concave

Section D:

16.To be Explained with example

17.Not uniform

18.Graphical derivation
19.v = 20 m/s, s = 100 m
20.a = -3 m/s², s = 37.5 m
21.Graphs to be explained
22.H = 45.9 m, T = 6 s
23.Examples provided
24.v = 14 m/s, a = 6 m/s²
25.When motion is uniform
26.Graph explained
27.s = 100 m
28.Slope of displacement-time graph
29.19.3 m
30.h = 78.4 m, v = 39.2 m/s 31. 71.4 m 32. 2 sec.

Physics Assignment-3 Chapter 3 (Motion in a Plane)

Section A: Multiple Choice Questions

1. The horizontal and vertical components of velocity of a projectile at maximum height are:
   a) both zero
   b) horizontal zero, vertical maximum
   c) horizontal constant, vertical zero
   d) horizontal maximum, vertical maximum

2. The time of flight of a projectile depends on:
   a) horizontal velocity only
   b) vertical velocity only
   c) initial speed and angle of projection
   d) mass of the projectile

3. At what angle will a projectile have the maximum horizontal range on a horizontal plane?

   a) 30°
   b) 45°
   c) 60°
   d) 90°

4. The path of a projectile is:

   a) linear
   b) parabolic
   c) circular
   d) elliptical

5. The velocity of a projectile at the highest point is:
   a) zero
   b) vertical component zero
   c) horizontal component zero
   d) maximum

6. When a projectile is launched horizontally from a height, the time of flight depends on: a) initial horizontal velocity only
   b) height only
   c) horizontal velocity and height
   d) angle of projection
7. The vertical component of velocity of a projectile changes due to: a) gravity
   b) air resistance
   c) horizontal velocity
   d) initial velocity

8. The range of a projectile on an inclined plane depends on:
   a) speed only
   b) angle only
   c) speed, angle, and angle of incline
   d) speed and mass

9. The ratio of the maximum height to the range of a projectile is: a) $\tan\theta$
   b) $\tan\theta/2$
   c) $1/2\tan\theta$
   d) $\cot\theta$

10. Which of the following quantities remains constant throughout the projectile motion (ignoring air resistance)? a) vertical velocity
    b) horizontal velocity
    c) speed
    d) acceleration

📚 Section B: Case Study

A rescue drone is deployed to drop medical supplies across a river. The drone moves horizontally at a speed of **40 m/s** at an altitude of **80 m** above the ground. It releases the package which follows a projectile trajectory. Ignore air resistance and assume **$g = 10\ m/s^2$**.The target on the opposite bank is stationary and must be hit precisely. This practical

scenario is an advanced example of projectile motion involving relative motion, kinematic equations, and vector decomposition.

11. Time taken by the package to hit the ground is:

a) 2 s
b) √8 s
c) 4 s
d) √(16/5) s

12. Horizontal range of the package is:

a) 80 m
b) 160 m
c) 200 m
d) 240 m

13. Magnitude of velocity when package hits ground:

a) 40 m/s
b) 50 m/s
c) √3200 m/s
d) 60 m/s

14. Angle of impact with horizontal when package hits ground:

a) 30°
b) 45°
c) 60°
d) 75°

⚖️ Section C: Assertion-Reasoning

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, R is false.
d) A is false, R is true.

15. Assertion (A): The horizontal velocity of a projectile remains constant throughout its flight.
Reason (R): Gravity acts only vertically and does not affect horizontal motion.

16. Assertion (A): The time of flight of a projectile depends on the horizontal velocity.
Reason (R): Horizontal and vertical motions are independent of each other.

17. Assertion (A): Maximum range of a projectile on a horizontal surface is obtained at 45°.
Reason (R): The range is proportional to sin 2θ, which is maximum at 90°.

18. Assertion (A): The vertical component of velocity at the highest point of a projectile is zero.
    Reason (R): Gravity acts downward throughout the motion.

19. Assertion (A): The trajectory of a projectile is symmetric about the highest point. Reason (R): Time to rise equals time to fall under uniform gravity.

📐 Section D: Theory/Numerical Questions

20. Derive the equation of trajectory of a projectile and show it is a parabola.
21. A projectile is fired at an angle of 45° from the ground and passes through a point at height H at two instants separated by time T. Prove that the maximum height is $H_{max} = H + \frac{gT^2}{8}$

22. A projectile is aimed at a wall at distance R and height h. Find the condition for the projectile to just clear the wall.

23. A stone is thrown from the top of a cliff of height h with velocity u at angle θ. Derive the time to hit the ground and horizontal distance covered.

24. Show that the range of a projectile is maximum at 45°. Explain physically why.

25. Two stones are thrown simultaneously from the top of a 100 m tower — one horizontally and one vertically upwards — both with same initial speed. Show they hit the ground simultaneously under certain conditions.

26. A projectile is launched from an inclined plane. Find the condition for maximum range along the incline.

27. A ball is projected with speed v and has a range R on a horizontal surface. Find the time of flight in terms of R and v.

28. A body projected at 30° with speed 40 m/s clears a wall 20 m high at 60 m distance. Find time to reach the wall and verify clearance.

29. Two projectiles are launched with the same speed at complementary angles. Prove their ranges are equal but times of flight differ.

30. A missile is launched from ground level with speed v to hit a target at height H and distance R. Derive the relation for the angle of projection θ. **Answer Key MCQs:**

1. c 3. b 5. b 7. a 9. c
2. c 4. b 6. b 8. c 10. b

Case Study MCQs:

11. c 12. b 13. c 14. b

Assertion-Reasoning:

15. a 16. c 17. a 18. a 19. a

Theory/Numerical Questions

22. $h = R\tan\theta - \dfrac{gR^2}{2u^2\cos^2\theta}$

23.

$$t = \frac{u\sin\theta + \sqrt{(u\sin\theta)^2 + 2gh}}{g}, \quad R = u\cos\theta \times t$$

24. Range is maximum at $\theta = 45^\circ$

25. Times equal if $v = \sqrt{2gh}$

26. Maximum range on incline at $\theta = 45^\circ + \dfrac{\alpha}{2}$

27. $T = \dfrac{2v\sin\theta}{g}$ (expressible in terms of R and v)

28.

$$t \approx 1.73\,s, \quad y \approx 19.6\,m \quad \text{(just clears wall)}$$

29. Ranges equal for complementary angles; times of flight differ.

30.

$$\tan\theta = \frac{u^2 \pm \sqrt{u^4 - g(gR^2 + 2Hu^2)}}{gR}$$

CLASS 11 CHEMISTRY ASSIGNMENT CHAPTER 1 - SOME BASIC CONCEPTS OF CHEMISTRY

Q1. Calculate the mass percent of calcium, phosphorus and oxygen in calcium phosphate $Ca_3(PO_4)_2$

Q2. Boron occurs in nature in the form of two isotopes having atomic mass 10 and 11. What are the percentage abundances of the two isotopes in a sample of boron having average atomic mass 10.8?

Q3. How much marble of 96.5% purity would be required to prepare 100 litres of carbon dioxide at NTP when marble is acted upon by dil. HCl?

Q4. An organic compound containing carbon, hydrogen and oxygen having following percentage composition: C=40.68%, H=5.08%. The vapour density of the compound is 59. Calculate the molecular formula of the compound.

Q5. Calculate the number of Cl^- in 100ml of 0.001M HCl solution.

Q6. How many moles of $Mg_3(PO_4)_2$ will contain 0.25 moles of oxygen atoms?

Q7. Define the law of multiple proportions. Give two examples. How does this law point to the existence of atoms?

Q8. A box contains some identical red-coloured balls, labelled as A, each weighing 2 grams. Another box contains identical blue-coloured balls, labelled as B, each weighing 5 grams. Consider the combinations AB, AB_2, A_2B and A_2B_3, and show that a law of multiple proportions is applicable.

Q9. The reactant which is entirely consumed in the reaction is known as a limiting reagent.

In the reaction $2A + 4B \rightarrow 3C + 4D$, when 5 moles of A react with 6 moles of B, then (i)

Which is the limiting reagent?

(ii) Calculate the amount of C formed?

Q10. In a laboratory, a reaction between 5 g of hydrogen gas (H_2) and 40 g of oxygen gas (O_2) is carried out to produce water using the reaction:

$$2H_2+O_2 \rightarrow 2H_2O$$

The chemist wants to find out which reactant is limiting and how much water will be produced.

a) What is the number of moles of H_2 in 5 g? (Molar mass =2 g/mol)

b) What is the number of moles of O_2 in 40 g? (Molar mass = 32 g/mol)

c) Which is the limiting reagent and how many moles of water are formed?

Q11. A chemist is working with a sample of carbon dioxide gas. She takes exactly 176 g of CO_2 and wants to determine the number of molecules present in the sample. She knows the

molar mass of CO_2 is 44 g/mol, and Avogadro's number is 6.022×10^{23} mol^{-1}. She plans to use this information to carry out further stoichiometric calculations.

a) What is the number of moles of CO_2 in the sample?

b) How many molecules of CO_2 are present in the sample?

c) How many atoms of carbon and oxygen are present in the sample?

ANSWERS TO NUMERICAL PROBLEMS:

Ans 1. Ca- 38.71%, O – 41.29%

Ans 2 - Percentage abundance of B - 10 isotope = 20 % Percentage abundance of B - 11 isotope = 80 %.

Ans 3 - 462.6 grams.

Ans 4. C4H6O4 Ans 5.

6.022×10^{19} ions

Ans 6. 3.125×10^{-2}

Ans 9. (ii) 4 mol

Ans 10. A) 2.5 mol B) 1.25 mol C) 2.5 mol

Ans 11. A) 4 mol B) 24.088×10^{23} molecules C) 24.088×10^{23} atoms of C, 48.176×10^{23} atoms of O

CLASS 11 CHEMISTRY ASSIGNMENT CHAPTER 2 – STRUCTURE OF ATOM

Q1. Table tennis ball has a mass 10 g and a speed of 90 m/s. If speed can be measured within an accuracy of 4% what will be the uncertainty in speed and position?

Q2. Answer the following questions:

(a) Why are 2d and 4f orbital not possible?

(b) Chlorophyll present in green leaves of plants absorbed light at 4.620×10^{14}Hz. Calculate the wavelength of radiation in nanometer. Which part of the electromagnetic spectrum does it belongs to?

(c) How many sub shells are associated with n=4?

Q3. a) Which is more stable a) Mn^{2+} or Mn^{3+} b) Fe^{2+} or Fe^{3+}? Give reason.

b) Which rule is disobeyed while writing electronic configuration of carbon as $1s^2$,$2s^2$,$2p_x^2$? State the rule and write the correct configuration.

c) Electronic configuration in Copper is [Ar] $4s^1$ $3d^{10}$ and not [Ar] $4s^2$ $3d^9$ .Why?

d) Among the following pairs of orbitals which orbital will experience the larger effective nuclear charge? (i) 2s and 3s, (ii) 4d and 4f, (iii) 3d and 3p.

Q4. A) Explain why the uncertainty principle is significant only for subatomic particles, but not for macroscopic object.

b) Can we apply Heisenberg's uncertainty principle to a stationary electron? Why or why not?

Q5. An atom has 2 electrons in K shell, 8 electrons in L shell and 2 electrons in M shell. The number of s-electrons present in that element is:

(a) Give its electronic configuration:
(b) Find out its atomic number
(c) Total number of principle quantum numbers
(d) Total number of subshells, s-orbital, p-orbital

Q6. The arrangement of orbitals on the basis of energy is based upon their (n+l) value. Lower the value of (n+l), lower is the energy. For orbitals having same values of (n+l), the orbital with 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, 2p

(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

Q7. Which of the following orbitals are degenerate? $3d_{xy}$ $4d_{xy}$ $3d_{yz}$ $4d_{yz}$ $3d_z$ $4d_z^2$

Q8. In a physics lab, students observe two different experiments. One is J.J. Thomson's cathode ray experiment, which led to the discovery of the electron, and the other is Goldstein's canal ray experiment, which led to the identification of protons. Both experiments showed that atoms are not indivisible, as believed by Dalton. A) How were the cathode rays detected?

B) What did Thomson summarize about the cathode rays? Support with the help of a suitable representation of the experiment.

C) What was the mathematical outcome of Thomson's experiment?

D) List the characteristics of positively charged particles.

Q9. Rutherford performed an alpha particle scattering experiment by bombarding a thin gold foil with alpha particles. Most particles passed through, but some were deflected at large angles. This led to a nuclear model of the atom where a dense, positively charged nucleus was present at the center and electrons revolved around it.

A) What was the key conclusion from Rutherford's experiment?

B) What caused the deflection of alpha particles in Rutherford's experiment?

C) Which drawback of Rutherford's model led to the need for Bohr's model?

D) What was the nuclear model proposed by Rutherford?

Q10. Ionization energies of five elements in kcal/mol are given below:

Atom	I	III	IV
P	300	549	920
Q	99	734	1100
R	118	1091	1652
S	176	347	1848
T	497	947	1500

A) Which element is a noble gas?

B) Which element form stable unipositive ion?

C) The element has most stable oxidation state +2?

D) Which is a non-metal (excluding noble gas)?

E) Which of the following pair represents elements of same group? (P,Q), (Q,R), (Q,S), (P,S)

Q11. Potash is any potassium mineral that is used for its potassium content. Most of the potash produced in the United States goes into fertilizer. The major sources of potash are potassium chloride (KCl) and potassium sulphate (K_2SO_4). Potash production is often reported as the potassium oxide (K_2O) equivalent or the amount of K_2O that could be made from a given KCl costs Rs. 50 per kg.

A) What is the cost of KCl per mole of the KCl sample?

B) What mass (in kg) of K_2O contains the same number of moles of K atoms as 1.00 kg KCl?

Q12. Calcium lactate is used in the food and beverage industries. It has also been used medicinally for treatment of various allergies, for treatment of muscular leg cramps, and as an antidote for a variety of poisons, including lead, arsenicals and carbon tetrachloride. A 0.8274 g sample of anhydrous calcium lactate is found by analysis to contain 0.2732 g of C, 0.0382 g H, 0.1520 g Ca and 0.3640 g O. Each mole of calcium lactate is found to contain one mole of calcium ions. Calcium lactate can be crystallised from water as pentahydrate salt.

A) Simplest formula of the calcium lactate is?

B) What is the formula weight of calcium lactate?

C) How many grams of calcium lactate pentahydrate would be recovered from 1 g of anhydrous salt?

ANSWERS TO NUMERICAL PROBLEMS:

Ans 1. Uncertainty in speed (Δv) = 3.6 m/s

- Uncertainty in position (Δx) $\approx 1.46 \times 10^{-29}$ m

Ans 11. A) Rs. 3.73/mol, B) 1.262 kg

Ans 12 - A) $CaO_6C_6H_{10}$ B) 218 g/mol C) 141g

MATHEMATICS ASSIGNMENT-

SETS

1. Let A={1,2,3},B={3,4,5},C={5,6} Find: □ a) A∪B

- b) A∩B
- c) A−B □ d) B−A
- e) (A∪B)∩C

2. If $U=\{1,2,3,4,5,6\}, A=\{2,4,6\}$, find A'(complement of A).

3. If $A=\{x \in N: x<10\}$, verify:

   - a) $B \subset A$
   - b) P(A)(Power set of A)

4. In a group of 50 students:

   - 30 like Maths
   - 25 like Physics
   - 10 like both

   Find how many students like:

   - a) Only Maths
   - b) Only Physics
   - c) Neither Maths nor Physics

5. Using Venn diagrams, show the following identities:

   a) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

   b) $(A \cup B)' = A' \cap B'$

6. Let $A=\{x: x=2n, n \in N\}$, $B=\{x: x=3n, n \in N\}$. Find:
   - a) $A \cap B$
   - b) First five elements of $A \cup B$

7. Let A,B be two sets such that $n(A)=10$, $n(B)=15$ and $n(A \cup B)=20$. Find $n(A \cap B)$.

ASSIGNMENT-COMPLEX NUMBERS

If $z_1 = 2 + 3i$ and $z_2 = 1 - 2i$, find:

- a) $z_1 + z_2$
- b) $z_1 - z_2$
- c) $z_1 \cdot z_2$
- d) $\frac{z_1}{z_2}$

Find the multiplicative inverse of:

- a) $3 - 4i$
- b) $2 + i$

Simplify:

- a) $(1 + i)^4$
- b) $\frac{1+i}{1-i}$
- c) $\left(\frac{1-i}{1+i}\right)^2$

Represent the following complex numbers on the Argand plane:

- a) $3 + 4i$
- b) $-2 + 5i$
- c) $-3 - 2i$

Find the distance between the complex numbers:

- a) $z_1 = 1 + i, z_2 = 4 + 5i$
- b) $z_1 = -2 + 3i, z_2 = 1 - i$

ASSIGNMENT- SEQUENCE AND SERIES

1. Find the 20th term of an A.P. whose first term is 5 and common difference is 3.

2. Find the sum of the first 25 terms of the A.P.: 7, 10, 13, ...
3. In an A.P., the 5th term is 12 and the 12th term is 33. Find the first term and the common difference.
4. The sum of the first n terms of an A.P. is 3n2+2n. Find the A.P.
5. Find the 8th term of a G.P. whose first term is 2 and common ratio is 3.
6. Find the sum of the first 6 terms of a G.P. if the first term is 5 and the common ratio is 2.
7. If the 4th term of a G.P. is 16 and the 7th term is 128, find the first term and the common ratio.
8. The sum of the infinite G.P. 3/2,3/4,3/8,… is?
9. Find the sum:

a) $1 + 2 + 3 + \ldots + 50$

b) $1^2 + 2^2 + 3^2 + \ldots + 20^2$

c) $1^3 + 2^3 + 3^3 + \ldots + 10^3$

COMPUTER SCIENCE
ASSIGNMENT: 1

1. Briefly explain the basic architecture of a computer.
2. What are various categories of software? Explain.
3. Which are the basic gate? Draw diagrams and truth tables for all gates?
4. State DE Morgan's first theorem. Draw its logic diagram. Prove the theorem using truth table.

PYTHON FUNDAMENTAL

1. What is the difference between a keyword and an identifier?
2. What factors guide the choice of identifiers in programs?
3. What is advantage of decomposition in problem solving?
4. What is the difference between logical operator and & or?
5. Why indentation is important in python program?
6. What is the difference between / and // operator?
7. What is the difference between * and ** operator?
8. What is expression and a statement?
9. What are variables? How are they important for a program?

COMPUTER SCIENCE

ASSIGNMENT: 2 (PYTHON FUNADMENTALS)

1. Define modulus operator (%) operator with example.
2. How floor division (//) calculates the value?
3. How exponent (**) calculates the value?
4. What is dynamic typing feature of python?
5. What is an algorithm?
6. What is a flow chart?
7. What do you mean by pseudocode?
8. What is the error in following code : a,b=9 ?
9. What would the following code do: A=B=C=35 ?
10. Predict the output:

```
a,b,c=3,7,9
a,b,c=a*a,a*b,a*c
print(a,b,c)
```

11. What is the use of id( ) in python?
12. What is the output of following statement?

```
print(ord('A'))
```

13. What is the output of following statement?

```
print(chr('a'))
```

14. What is type ( ) function in python?
15. What is interactive mode in python?

COMPUTER SCIENCE

ASSIGNMENT: 3 (PYTHON OPERATORS)

1. Write the output of the given Python code :

```
print (3 + 4)
print (3 – 4)
print (3 * 4) print
(3/4)
print (3 % 2)
print (3**4) #3 to the fourth power
print (3 // 4) #floor division
```

2. Which Operator is used for assigning a value into a variable?
3. What is the use of "~" operator?
4. What is the use of "%" operator? 5. What is the use of "//" operator?
6. What will be the output of the following code :

i. a = 1
ii. a, b = a+1, a+1
iii. print a
iv. print b

7. Write syntax for "greater than or equal to" operator. 8. Why we use "<" operator?
9. How many types of operations are supported by the Python language?
10. How many types of errors are supported by the Python language?

COMPUTER SCIENCE
ASSIGNMENT: 4 (Operators)

1. The following code is not giving desired output. We want to input value as 20 and obtain output as 40.Identifiy the problem and do the required correction in the code
   a. x =input (“Enter number :”)
   b. y = x*5
   c. print(y)
2. What will be the output of the following code?

```
x, y =2, 5
x, y =y,
x+2  print(x, y)
```

3. Predict the output? x =15 x= x+10

```
x=x-5
print(x)
x,y = x-2 , 22
```

4. Write the equivalent python expression for the following expressions.
   i) √a2+b2+c2
   ii) (p + q) / (r+s)4

5. Write the output of the given Python code :

```
>>>12 | 13
>>> 12 ^ 13
```

5. What would the following code do: x=y=7?
6. Write the difference between / and //.
7. What will be the output produced by the following code?

```
A=5-4-3

B=3**2**3

print(A,B)
```

ASSIGNMENT: 5 (Flow of Control)

1. Write a program to check if a number is even or odd.
2. Write a program to check if a number is positive, negative, or zero.

COMPUTER SCIENCE

3. Input three numbers and print the greatest among them.
4. Input marks and print the grade according to the following:

    - Marks >= 90: Grade A
    - 80-89: Grade B
    - 70-79: Grade C
    - 60-69: Grade D
    - <60: Grade F

5. Write a program to print the table of a number (e.g., 5 × 1 = 5 to 5 × 10 = 50).
6. Write a program to find the sum of the first 10 natural numbers.
7. Write a program to display all even numbers between 1 and 50.
8. Write a program to find the factorial of a number.
9. Write a program to count digits of a given number.
10. Write a program to reverse a number.
11. Write a program that asks the user to enter numbers until they enter zero. Print the sum of all entered numbers.

    Write a program to check whether a number is a palindrome.