POLICE D.A.V. PUBLIC SCHOOL, LUDHIANA

CLASS XI (SCIENCE)

HOLIDAYS' HOMEWORK

MATHEMATICS

- All students are instructed to open the following google form link and solve the questions

https://forms.gle/3SsTJLjRsCQQxS6A8

CHEMISTRY

1. Study the inventions of last two year Nobel Laureates of chemistry and summarize their work in your own words.(compulsory for all)
2. Design a simple, safe experiment related to following topic that can be conducted at home
   - Cooking Chemistry: Investigate the effect of different baking agents on cake rise
   - Cleaning Chemistry: Compare the effectiveness of different household cleaners on various stains
   - Cosmatic Chemistry: Create simple homemade skin care products (like lip balm, face mask) and explain the chemistry behind it.

   Roll no. wise allotment

S.No.	Class (Roll no)	Topic
1.	XI medical (1-10) + XI Non Medical(31-43)	Cooking chemistry
2.	XI medical (11-20)+ XI Non Medical(16-30)	Cleaning chemistry
3.	XI medical (21-23)+ XI Non Medical(1-15)	Cosmatic chemistry

3. Read the chapters Some Basic Concepts of Chemistry and Atomic Structure
4. Worksheets of concerned chapters will be shared in the group and they must be solved along with the notes.
5. Prepare the Class presentation on the given topic.
   (With special reference the questions given in the assignment)

S.No.	Roll no	Topic
1.	XI medical (1-5)	Mole concept
2.	XI medical (6-10)	Percentage composition
3.	XI medical (11-15)	Empirical and molecular formula
4.	XI medical (16-23)	Stochiometric Calculations
5.	XI non-medical(1-5)	Molarity and molality
6.	XI non-medical(6-10)	Mole fraction and normality
7.	XI non-medical(11-15)	Mass % and ppm
8.	XI non-medical(16-20)	Laws of chemical combination
9.	XI non-medical(21-25)	Atomic models
10.	XI non-medical(26-30)	Development leading to Bohr's model of atom
11.	XI non-medical(31-35)	Bohr's Model of Hydrogen atom
12.	XI non-medical(36-40)	Quantum mechanical model of atom
13.	XI non-medical(41-43)	Shapes of orbitals
14.	XI non-medical(41-43)	Electronic configurations and exceptional configurations of various elements

BIOLOGY

1. Read the chapters morphology of flowering plants, anatomy of plants, structural organisation in animals (frog).
2. Make notes of all these chapters and they must be shown on 5th July, 2024.
3. Worksheets of concerned chapters will be shared in the group and they must be solved along with the notes.
4. Project work will be assigned for final evaluation in practicals. It must be made in the same format as the pdf shared in the group. Every student will be assigned a different project.
5. Practicals should be completed till 5th July in the format as the pdf shared. Readings should not be written. Only tables and diagrams along with the practicals should be made.

ENGLISH

- Your school is organising an Art Mela to effectively showcase and celebrate the cultural heritage of Odisha. Design a poster on an A4 size ivory sheet demonstrating your knowledge of Odisha's culture, promoting the event.
- Read the chapter Silk Road and prepare five competency based questions.
- Questions can be in the form of extracts (MCQs), short answer questions or long answer questions.

PHYSICS

Solve the given worksheet

Topicwise Questions

POSITION, DISTANCE AND DISPLACEMENT

1. A Body moves 6 m north, 8 m east and 10m vertically upwards, what is its resultant displacement from initial position

(*a*) $10\sqrt{2}$ (*b*) 10m

(*c*) $\frac{10}{\sqrt{2}}$m (*d*) 10×2m

2. A man goes 10m towards North, then 20m towards east then displacement is

(*a*) 22.5m (*b*) 25m
(*c*) 25.5m (*d*) 30m

SPEED AND VELOCITY

3. A person travels along a straight road for half the distance with velocity v_1 and the remaining half distance with velocity v_2 The average velocity is given by

(*a*) v_1v_2 (*b*) $\frac{v_2^2}{v_1^2}$

(*c*) $\frac{v_1+v_2}{2}$ (*d*) $\frac{2v_1v_2}{v_1+v_2}$

4. A car travels the first half of a distance between two places at a speed of 30 km/hr and the second half of the distance at 50 km/hr. The average speed of the car for the whole journey is

(*a*) 42.5 km/hr (*b*) 40.0 km/hr
(*c*) 37.5 km/hr (*d*) 35.0 km/hr

5. A person travels along a straight road for the first half time with a velocity v_1 and the next half time with a velocity v_2. The mean velocity V of the man is

(*a*) $\frac{2}{V}=\frac{1}{v_1}+\frac{1}{v_2}$ (*b*) $V=\frac{v_1+v_2}{2}$

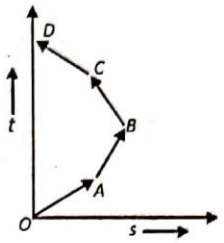
(*c*) $V=\sqrt{v_1v_2}$ (*d*) $V=\sqrt{\frac{v_1}{v_2}}$

6. If a car covers 2/5th of the total distance with v_1 speed and 3/5th distance with v_2 then average speed is

(*a*) $\frac{1}{2}\sqrt{v_1v_2}$ (*b*) $\frac{v_1+v_2}{2}$

(*c*) $\frac{2v_1v_2}{v_1+v_2}$ (*d*) $\frac{5v_1v_2}{3v_1+2v_2}$

7. Which of the following options is correct for the object having a straight line motion represented by the following graph



(*a*) The object moves with constantly increasing velocity from O to A and then it moves with constant velocity.
(*b*) Velocity of the object increases uniformly
(*c*) Average velocity is zero
(*d*) The graph shown is impossible

ACCELERATION, EQUATION OF KINEMATICS: CONSANT ACCELERATION

8. A particle experiences a constant acceleration for 20 sec after starting from rest. If it travels a distance S_1 in the first 10 sec and a distance S_2 in the next 10 sec, then

(*a*) $S_1=S_2$ (*b*) $S_1=S_2/3$
(*c*) $S_1=S_2/2$ (*d*) $S_1=S_2/4$

9. A body is moving from rest under constant acceleration and let S_1 be the displacement in the first $(p-1)$ sec and S_2 be the displacement in the first P sec. The displacement in $(p^2-p+1)^{th}$ sec. will be

(*a*) S_1+S_2 (*b*) S_1S_2
(*c*) S_1-S_2 (*d*) S_1/S_2

10. A body starts from the origin and moves along the X-axis such that the velocity at any instant is given by $(4t^3-2t)$, where t is in sec and velocity is in m/s. What is the acceleration of the particle, when it is 2 m from the origin?

(*a*) 28 m/s^2 (*b*) 22 m/s^2
(*c*) 12 m/s^2 (*d*) 10 m/s^2

11. A point moves with uniform acceleration and v_1,v_2 and v_3 denote the average velocities in the three successive intervals of time t_1, t_2 and t_3. Which of the following relations is correct

(*a*) $(v_1-v_2):(v_2-v_3)=(t_1-t_2):(t_2+t_3)$

(*b*) $(v_1-v_2):(v_2-v_3)=(t_1+t_2):(t_2+t_3)$

(*c*) $(v_1-v_2):(v_2-v_3)=(t_1-t_2):(t_1-t_3)$

(*d*) $(v_1-v_2):(v_2-v_3)=(t_1-t_2):(t_2+t_3)$

12. A motor car moving with a uniform speed of 20 m/sec comes to stop on the application of brakes after travelling a distance of 10m Its acceleration is

(a) 20 m/sec^2 (b) –20 m/sec^2

(c) –40 m/sec^2 (d) +2m/sec^2

13. Which of the following four statements is false

(a) A body can have zero velocity and still be accelerated

(b) A body can have a constant velocity and still have a varying speed

(c) A body can have a constant speed and still have a varying velocity

(d) The direction of the velocity of a body can change when its acceleration is constant

14. A car moving with a velocity of 10 m/s can be stopped by the application of a constant force F in a distance of 20 m. If the velocity of the car is 30 m/s, it can be stopped by this force in

(a) $\frac{20}{3}$m (b) 20m

(c) 60m (d) 180m

15. The position of a particle moving along the x-axis at certain times is given below:

t(s)	0	1	2	3
x(m)	–2	0	6	16

Which of the following describes the motion correctly

(a) Uniform, accelerated

(b) Uniform, decelerated

(c) Non-uniform, accelerated

(d) There is not enough data for generalization

16. A car starts from rest and moves with uniform acceleration a on a straight road from time t = 0 to t = T. After that, constant deceleration brings it to rest. In this process the average speed of the car is

(a) $\frac{aT}{4}$ (b) $\frac{3aT}{2}$

(c) $\frac{aT}{2}$ (d) aT

17. If the velocity of a particle is given by $v = (180 - 16x)^{1/2}$ m/s, then its acceleration will be

(a) Zero (b) 8 m/s^2

(c) – 8 m/s^2 (d) 4 m/s^2

18. The displacement x of a particle varies with time t, $x = ae^{-\alpha t} + be^{\beta t}$, where a, b, α and β are positive constants. The velocity of the particle will

(a) Go on decreasing with time

(b) Will be independent of α and β

(c) Drop to zero when $\alpha = \beta$

(d) Go on increasing with time

19. A car, starting from rest, accelerates at the rate f through a distance S, then continues at constant speed for time t and then decelerates at the rate $\frac{f}{2}$ to come to rest. If the total distance traversed is 15 S, then

(a) $S = \frac{1}{2}ft^2$ (b) $S = \frac{1}{4}ft^2$

(c) $S = \frac{1}{72}ft^2$ (d) $S = \frac{1}{6}ft^2$

20. A body is starts from rest with acceleration 2 m/s^2 till it attains the maximum velocity then retards to rest with 3 m/s^2. If total time taken is 10 second then maximum speed attained is

(a) 12 m/s (b) 8 m/s

(c) 6 m/s (d) 4 m/s

Topicwise Questions

UNIT AND DIMENSIONS

Units, System of Units

1. A unit less quantity
   (*a*) never has a nonzero dimension
   (*b*) always has a nonzero dimension
   (*c*) may have a nonzero dimension
   (*d*) does not exit

2. Which of the following is not the name of a physical quantity?
   (*a*) kilogram (*b*) impulse
   (*c*) energy (*d*) density

3. PARSEC is a unit of
   (*a*) Time (*b*) Angle
   (*c*) Distance (*d*) Velocity

4. Which of the following system of units is NOT based on the unit of mass, length and time alone
   (*a*) FPS (*b*) SI (*c*) CGS (*d*) MKS

5. In the S.I. system the unit of energy is-
   (*a*) erg (*b*) calorie
   (*c*) joule (*d*) electron volt

6. The SI unit of the universal gravitational constant G is
   (*a*) $Nm\,kg^{-2}$ (*b*) Nm^2kg^{-2} (*c*) $Nm^2\,kg^{-1}$ (*d*) $Nmkg^{-1}$

7. Surface tension has unit of-
   (*a*) $Joule.m^2$ (*b*) $Joule.m^{-2}$ (*c*) $Joule.m^{-1}$ (*d*) $Joule.m^3$

8. The specific resistance has the unit of-
   (*a*) ohm/m (*b*) ohm/m^2 (*c*) $ohm.m^2$ (*d*) ohm.m

9. The unit of magnetic moment is-
   (*a*) $amp\,m^2$ (*b*) $amp\,m^{-2}$ (*c*) amp m (*d*) $amp\,m^{-1}$

10. The SI unit of the universal gas constant R is:
    (*a*) $erg\,K^{-1}\,mol^{-1}$ (*b*) $watt\,K^{-1}\,mol^{-1}$
    (*c*) $newton\,K^{-1}\,mol^{-1}$ (*d*) $joule\,K^{-1}\,mol^{-1}$

11. The SI unit of Stefan's constant is:
    (*a*) $Ws^{-1}\,m^{-2}\,K^{-4}$ (*b*) $J\,s\,m^{-1}\,K^{-1}$
    (*c*) $J\,s^{-1}\,m^{-2}\,K^{-1}$ (*d*) $W\,m^{-2}\,K^{-4}$

Dimension, Finding Dimensional Formula

12. In SI unit the angular acceleration has unit of-
    (*a*) $Nmkg^{-1}$ (*b*) ms^{-2}
    (*c*) $rad.s^{-2}$ (*d*) Nkg^{-1}

13. The angular frequency is measured in rad s^{-1}. Its exponent in length are:
    (*a*) -2 (*b*) -1
    (*c*) 0 (*d*) 2

14. $[M\,L\,T^{-1}]$ are the dimensions of-
    (*a*) power (*b*) momentum
    (*c*) force (*d*) couple

15. What are the dimensions of Boltzmann's constant?
    (*a*) $MLT^{-2}K^{-1}$ (*b*) $ML^2T^{-2}K^{-1}$
    (*c*) M^0LT^{-2} (*d*) $M^0L^2T^{-2}K^{-1}$

16. A pair of physical quantities having the same dimensional formula is:
    (*a*) angular momentum and torque
    (*b*) torque and energy
    (*c*) force and power
    (*d*) power and angular momentum

17. Which one of the following has the dimensions of $ML^{-1}T^{-2}$?
    (*a*) torque (*b*) surface tension
    (*c*) viscosity (*d*) stress

Principle of Homogeneity of Dimension

18. Force F is given in terms of time t and distance x by $F = A\sin Ct + B\cos Dx$ Then the dimensions of $\frac{A}{B}$ and $\frac{C}{D}$ are given by
    (*a*) MLT^{-2}, $M^0L^0T^{-1}$
    (*b*) MLT^{-2}, $M^0L^{-1}T^0$
    (*c*) $M^0L^0T^0$, $M^0L^1T^{-1}$
    (*d*) $M^0L^1T^{-1}$, $M^0L^0T^0$

19. $\int\frac{xdx}{\sqrt{2ax-x^2}} = a^n\sin^{-1}\left[\frac{x}{a}-1\right]$. The value of n is:
    You may use dimensional analysis to solve the problem.
    (*a*) 0
    (*b*) -1
    (*c*) 1
    (*d*) None of these

20. The equation for the velocity of sound in a gas states that $v = \sqrt{\gamma k_b \frac{T}{m}}$. Velocity v is measured in m/s. γ is a dimensionless constant, T is temperature in kelvin (K), and m is mass in kg. What are the units for the Boltzmann constant, k_b ?

(*a*) $kg \cdot m^2 \cdot s^{-2} \cdot K^{-1}$ (*b*) $kg \cdot m^2 \cdot s^2 \cdot K$

(*c*) $kg \cdot m/s \cdot K^{-2}$ (*d*) $kg \cdot m^2 \cdot s^{-2} \cdot K$

21. A wave is represented by
$y = a \sin (At - Bx + C)$
where A, B, C are constants and t is in seconds & x is in metre. The Dimensions of A, B, C are-

(*a*) $T^{-1}, L, M^0L^0T^0$ (*b*) $T^{-1}, L^{-1}, M^0L^0T^0$

(*c*) T, L, M (*d*) T^{-1}, L^{-1}, M^{-1}

22. If $v = \sqrt{\frac{\gamma p}{\rho}}$, then the dimensions of γ are (p is pressure, ρ is density and v is speed of sound has their usual dimension) -

(*a*) $M^0L^0T^0$ (*b*) $M^0L^0T^{-1}$

(*c*) $M^1L^0T^0$ (*d*) $M^0L^1T^0$

23. Consider the equation $\frac{d}{dt}\left[\int \vec{F} \cdot d\vec{s}\right] = A\left[\vec{F} \cdot \vec{P}\right]$. Then dimension of A will be (where $\vec{F} \equiv$ force, $d\vec{s} \equiv$ small displacement, $t \equiv$ time and $\vec{P} \equiv$ linear momentum).

(*a*) $M^oL^oT^o$ (*b*) $M^1L^oT^o$

(*c*) $M^{-1}L^oT^o$ (*d*) $M^oL^oT^{-1}$

Application of Dimensional Analysis: Deriving New Relation

24. The velocity of water waves may depend on their wavelength λ, the density of water ρ and the acceleration due to gravity g. The method of dimensions gives the relation between these quantities aswhere k is a dimensionless constant

(*a*) $v^2 = k\lambda^{-1} g^{-1} \rho^{-1}$ (*b*) $v^2 = k g \lambda$

(*c*) $v^2 = k g \lambda \rho$ (*d*) $v^2 = k \lambda^3 g^{-1} \rho^{-1}$

25. Force applied by water stream depends on density of water (ρ), velocity of the stream (v) and cross–sectional area of the stream (*a*). The expression of the force should be

(*a*) ρAv (*b*) ρAv^2 (*c*) $\rho^2 Av$ (*d*) $\rho A^2 v$

Application of Dimensional Analysis: To Convert from one System of Unit

26. One watt-hour is equivalent to

(*a*) 6.3×10^3 Joule (*b*) 6.3×10^{-7} Joule

(*c*) 3.6×10^3 Joule (*d*) 3.6×10^{-3} Joule

27. The pressure of 10^6 dyne/cm^2 is equivalent to

(*a*) 10^5 N/m^2 (*b*) 10^6 N/m^2 (*c*) 10^7 N/m^2 (*d*) 10^8 N/m^2

28. $\rho = 2$ g/cm^3 convert it into MKS system-

(*a*) $2 \times 10^{-3} \frac{kg}{m^3}$ (*b*) $2 \times 10^3 \frac{kg}{m^3}$

(*c*) $4 \times 10^3 \frac{kg}{m^3}$ (*d*) $2 \times 10^6 \frac{kg}{m^3}$

29. The density of mercury is 13600 kg m^{-3}. Its value of CGS system will be:

(*a*) 13.6 g cm^{-3} (*b*) 1360 g cm^{-3}

(*c*) 136 g cm^{-3} (*d*) 1.36 g cm^{-3}