



NEERJA MODI SCHOOL

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HOLIDAY ASSIGNMENT



GRADE IX EXCELLENCE PROGRAM

PHYSICS

1. Complete all the questions from text book of the topic MOTION, which has been covered in class.
2. Complete the question from module up to the portion done in class.
Question 1 to 41 from Assignment – 1
Question 1 to 14 from Assignment – 2
3. Revise the theory which has been covered in class.
4. Revised and draw all the graphs and do numerical discussed in class
5. Complete the HDPP (Holiday Daily Practice Problem)

CHEMISTRY STRUCTURE OF ATOM

Instructions:

- Do the following assignment in your Chemistry register.
- Do the work neatly and draw diagrams wherever necessary

-
- Q.1 What are cathode rays ? Give four characteristics of cathode rays.
- Q.2 What are anode rays ? Give four properties of anode rays.
- Q.3 What is the effect of nature of the gas taken in the discharge tube on $\frac{e}{m}$ value of :
- (a) Cathode ray particle (b) Anode ray particle
- Q.4 Tabulate the relative mass and charge of the three fundamental particle of an atom.
- Q.5 Describe the Rutherford's model of an atom.
- Q.6 Complete the following statements :
- (i) The sum of number of protons and neutrons in the nucleus of an atom is known as _____ of the atom.



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- (ii) Isotopes have same _____ number but different _____ number.
- (iii) Isobars have same _____ numbers but different _____ number.
- (iv) _____ contain same number of neutrons in their atoms.
- (v) $\frac{e}{m}$ value for electron is _____.
- (vi) The protons and neutrons are present together in the nucleus. They are collectively known as _____.
- (vii) Maximum number of electrons that can be accommodated in a sub shell is given by the formula _____.
- (viii) Sub shells are represented by _____ quantum number.
- (ix) The number of sub shell in a shell = _____.
- (x) The number of orbitals in a shell = _____.

Q.7 Complete the table given below :

	Symbol	Mass Number	Atomic number	Number of protons	Number of electrons	Number of neutrons
(a)	Zn	64	30	-	-	-
(b)	Te	-	-	43	-	56
(c)	-	-	13	-	-	14
(d)	-	39	19	-	-	-

Q.8 Determine the number of protons, neutrons and electrons in the following species

- (i) Na-24 (ii) C-14 (iii) ${}_{92}^{235}\text{U}$ (iv) ${}_{15}^{31}\text{P}$ (v) ${}^{39}\text{K}$

Q.9 Write an isotope, an isobar and an isotone of ${}_{6}^{14}\text{C}$.

Q.10 Complete the following table and draw using a compass the atomic diagrams of the following elements.



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Element	Atomic number	Electronic configuration				Valence shell	Valency
		K	L	M	N		
Lithium	3						
Silicon	14						
Argon	18						
Potassium	19						

Atomic Diagram :

- (i) Lithium
- (ii) Silicon
- (iii) Argon
- (iv) Potassium

MATHS

1. Memorize the following algebraic identities:

i. $(a+b)^2 = a^2 + 2ab + b^2$

ii. $(a-b)^2 = a^2 - 2ab + b^2$

iii. $a^2 - b^2 = (a - b)(a + b)$

iv. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

v. $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

vi. $(a+b)^3 = a^3 + 3ab(a+b) + b^3$
 $(a+b)^3 = a^3 + 3ab + 3ab^2 + b^3$

vii. $(a-b)^3 = a^3 - 3ab(a-b) - b^3$

$(a-b)^3 = a^3 - 3a^2b + ab^2 - b^3$

viii. $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

ix. $a^3 + b^3 + c^3 - 3abc = (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca)$

x. If $a+b+c=0$

Then $a^3 + b^3 + c^3 = 3abc$



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2. Memorize the square of first 30 natural number.
3. Memorize the cubes of first 15 natural number.
4. Memorize table upto 20.
5. Memorize the following:

i.	$2^1 = 2$	ii.	$3^1 = 3$	iii.	$4^1 = 4$
	$2^2 = 4$		$3^2 = 9$		$4^2 = 16$
	$2^3 = 8$		$3^3 = 27$		$4^3 = 64$
	$2^4 = 16$		$3^4 = 81$		$4^4 = 256$
	$2^5 = 32$		$3^5 = 243$		$4^5 = 1024$
	$2^6 = 64$		$3^6 = 729$		$4^6 = 4096$
	$2^7 = 128$		$3^7 = 2187$		
	$2^8 = 256$		$3^8 = 6561$		
	$2^9 = 512$				
	$2^{10} = 1024$				
	$2^{11} = 2048$				
	$2^{12} = 4096$				
iv.	$5^1 = 5$	v.	$6^1 = 6$	vi.	$7^1 = 7$
	$5^2 = 25$		$6^2 = 36$		$7^2 = 49$
	$5^3 = 125$		$6^3 = 216$		$7^3 = 343$
	$5^4 = 625$		$6^4 = 1296$		$7^4 = 2401$
	$5^5 = 3125$				
	$5^6 = 15625$				

6. Memorize the following laws of indices

(A) i. $a^m \times a^n = a^{m+n}$ **or** $a^{m+n} = a^m \times a^n$

ii. $a^m \div a^n = \frac{a^m}{a^n} = a^{m-n} = \frac{1}{a^{n-m}}$

iii. $a^m \times b^m = (a \times b)^m$

in general $a_1^m \times a_2^m \times a_3^m \dots a_n^m = (a_1 \times a_2 \times \dots \times a_n)^m$

iv. $a^0 = 1$, $a \neq 0$

v. $\frac{a^m}{b^m} = \left(\frac{a}{b}\right)^m$

vi. $(a^m)^n = (a^n)^m = a^{mn} = a^{nm}$



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vii. $\left(\frac{a}{b}\right)^{-m} = \left(\frac{b}{a}\right)^{-m}$

viii. $a^{-m} = \frac{1}{a^m}$

- (B) I. n^{th} root of a is written as $\sqrt[n]{a}$
→ Square root of $a = \sqrt{a}$
→ Cube root of $a = \sqrt[3]{a}$
→ Fourth root of $a = \sqrt[4]{a}$
→ Tenth root of $a = \sqrt[10]{a}$ & so. On.

II. $\sqrt[n]{a} + (a)^{\frac{1}{n}}$

Eg. $\sqrt[3]{a} = a^{\frac{1}{3}}$, $\sqrt[7]{a} = a^{\frac{1}{7}}$

$$\sqrt[4]{\frac{3}{2}} = \left(\frac{3}{2}\right)^{\frac{1}{4}}$$

III. $\sqrt[n]{a} \times \sqrt[n]{b} \times \sqrt[n]{c} = \sqrt[n]{a \times b \times c}$

Eg. $\sqrt[3]{a} \times \sqrt[3]{b} \times \sqrt[3]{c} = \sqrt[3]{a \times b \times c}$

$$\sqrt[5]{x} \times \sqrt[5]{yz} \times \sqrt[5]{37} = \sqrt[5]{37xyz}$$

IV. $\sqrt[n]{a^m} = \sqrt[n \times m]{a^m}$

or $\sqrt[n \times m]{a^m} = \sqrt[n]{a}$

E.g.:- 1. $\sqrt[3]{6} = \sqrt[12]{6^4}$, 2. $\sqrt[5]{11} = \sqrt[10]{11^2}$

3. $\sqrt[6]{8} = \sqrt[6]{2^3} = \sqrt{2}$

4. $\sqrt[10]{36} = \sqrt[10]{6^2} = \sqrt[5]{6}$

7. Memorize all the concepts of number system done in April month and practice module questions.



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HOLIDAY DAILY PRACTICE PROBLEM (HDPP)

MOTION

- 1 A car covers half of the distance with speed 10m/sec. & next half with speed 20m/sec. What is its average speed?
- 2 A car travels with speed 20m/sec per half the time & then with speed 10m/sec. find the average speed of the car for whole journey.
- 3 A person is leaving at an average speed of 4.8 m/sec and he covers half of the distance with speed 4m/sec. Then find what will be his speed for the next half.
- 4 What do you mean by uniform motion? Write the equation for distance, time & speed. Also draw the diagrams.
- 5 A walks 10 meters in front and 10 meters to the right. Then every time turning to his left, he walks 5, 15 and 15 meters respectively. How far is he now from his starting point?

Tick the correct choice amongst the following:-

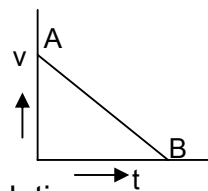
- 6 Unit of acceleration is
a. m/s b. ms c. m/s^2 d. none
- 7 A body goes from A to B with a velocity of 20m/s and comes back from B to A with a velocity of 30m/s. The average velocity of the body during the whole journey is
a. zero b. 25 m/s c. 24 m/s d. none
- 8 A body covers half the distance with a speed of 20 m/s and the other half with a speed of 30 m/s. The average velocity of the body during the whole journey is
a. zero b. 24 m/s c. 25 m/s d. none
9. In the equation of motion, $S = ut + \frac{1}{2} at^2$, S stands for
a. distance in t seconds b. maximum height reached
c. distance in the t^{th} second d. none



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10. Choose the wrong statement
- retardation is a vector quantity
 - acceleration due to gravity is a vector quantity
 - average speed is a vector quantity
 - displacement is a vector quantity
11. In the equation of motion, $x = at + bt^2$, the units of a and b are respectively
- $m/s^2, m/s$
 - $m/s, m/s^2$
 - $m/s, m/s$
 - none
12. A body is thrown up with an initial velocity u and covers a maximum height of h , then h is equal to
- $\frac{u^2}{2g}$
 - $\frac{u}{2g}$
 - $2ug$
 - none
13. The second's hand of a watch is 2 cm long. The speed of the tip of this hand is
- 0.21 cm/s
 - 2.1 cm/s
 - 21.0 cm/s
 - none
14. A body is thrown vertically upwards and rises to a height of 10 m. The velocity with which the body was thrown upward is ($g = 9.8 \text{ m/s}^2$)
- 10 m/s
 - 20 m/s
 - 14 m/s
 - none
15. In problem no. 14, the time taken by the body to reach the highest point is
- 1.43 s
 - 4.1 s
 - 1.24 s
 - none
16. If the time-displacement graph of a particle is parallel to the time-axis, the velocity of the particle is
- infinity
 - unity
 - equal to acceleration of the body
 - none
17. Velocity-time graph AB shows that the body has
- a uniform acceleration
 - a non-uniform acceleration
 - uniform speed
 - initial velocity OA and is moving with uniform retardation

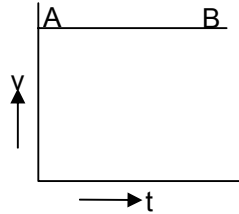




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18. Velocity-time graph AB shows that the body has
- uniform acceleration
 - uniform retardation
 - uniform velocity throughout its motion and has zero initial velocity
 - none



19. The distance traveled by a freely falling body is proportional to:-
- the mass of the body
 - the square of the acceleration due to gravity
 - the square of the time of fall
 - the time of fall
20. The rate of change of displacement with time is
- speed
 - acceleration
 - retardation
 - velocity
21. A body strikes the floor vertically with a velocity u and rebounds at the same speed. The change in speed would be
- u
 - $3u$
 - $2u$
 - none
22. The moon is 4×10^8 m from the earth. A radar signal transmitted from the earth will reach the moon in about
- 5.2 s
 - 1.3 s
 - 2.6 s
 - 0.70 s
23. A and B are arguing about uniform acceleration. A states that acceleration means “the longer you go,” B states that acceleration means “the further you go” who is right?
- A
 - B
 - both
 - none
24. A particle experiences constant acceleration for 20 s after starting from rest. If it travels a distance X_1 , in the first 10 s and distance X_2 , in the remaining 10 s , then which of the following is true?
- $X_1 = 2X_2$
 - $X_1 = X_2$
 - $X_1 = 3X_2$
 - none



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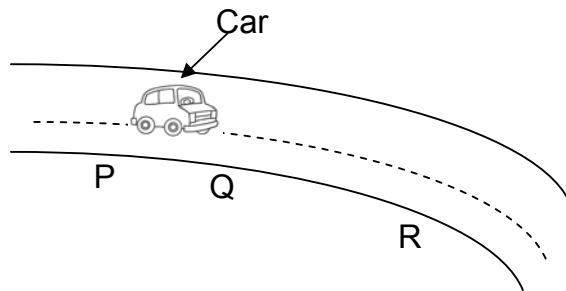
25. If a trolley starts from rest with an acceleration of 2 m/s^2 , the velocity of the body after 4 s would be
a. 2 m/s b. 8 m/s c. 4 m/s d. 6 m/s
26. A train passes over a 400 m long bridge. If the speed of the train is 30m/s and the train takes 20 s to cross the bridge, find the length of the train.
a. 400 m b. 600 m c. 800 m d. 200 m
27. The SI unit for the average velocity is
a. m/s b. km/s c. cm/s d. mm/s
28. The SI unit for the resultant velocity is
a. m/s b. km/s c. cm/s d. mm/s
29. A train 50 m long passes over a bridge at a velocity 30km/h, if it takes 36 s to cross the bridge, the length of the bridge will be
a. 100 m b. 200m c. 250 m d. 300 m
30. The SI unit for angular velocity is
a. m/s b. rad c. rad/s d. m/rad
31. N kg^{-1} is the unit of
a. retardation b. acceleration
c. rate of change of velocity d. all the above
32. A ball is thrown up with a certain velocity. It attains a height of 40 m and comes back to the thrower. Then the
a. total distance covered by it is 40 m
b. total displacement covered by it is 80 m
c. total displacement zero
d. total distance covered by it is zero
33. The acceleration of a body projected upwards with a certain velocity is
a. 9.8 m/s^2 b. -9.8 m/s^2
c. zero d. insufficient data



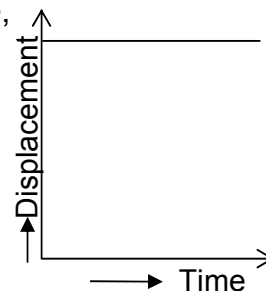
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34. A driver is driving his car along a road is shown in figure. The driver makes sure that the speedometer reads exactly 40km/h. What happens to the speed of the car from P to Q?



35. In the above question, what happens to the velocity of the car from P to Q?
- velocity remains constant
 - velocity first increases then decrease
 - velocity first decrease then increase
 - nothing can be decided
36. In question 34. the driver should say that
- the average speed is 40 km/h
 - the average speed is 80 km/h
 - the average speed is 80 km/h
 - the average velocity is 80 km/h
37. A stone tied to a string is whirled in a circle. As it is revolving, the rope suddenly breaks. Then
- the stone flies off tangentially
 - the stone moves radially inward
 - the stone moves radially outward
 - the motion of the stone depends upon its velocity
38. In the following graph of displacement versus time,
- the body is at rest
 - the body has some initial speed
 - the body moves with constant speed
 - the body moves with constant velocity

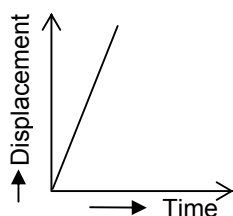




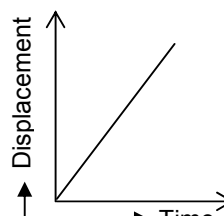
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39. Figure shows the displacement-time graphs (a) and (b) for a body moving in a straight path drawn on the same scales. Then

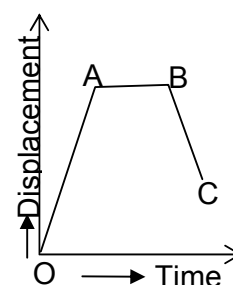


(a)

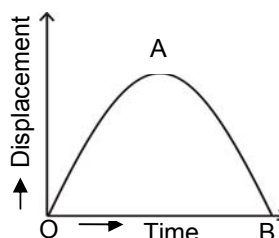


(b)

- a. slope of line in (a) is greater than the slope of line in (b)
b. slope of line (b) is greater than the slope of line in (a)
c. slope of line in (a) is equal to the slope of line in (b)
d. nothing can be said about the slopes
40. It follows from Q. 39 that the velocity in case of (b) is
- a. more than the velocity in case of (a)
b. less than the velocity in case of (a)
c. equal to the velocity in case of (a)
d. square of the velocity in case of (a)
41. In fig. BC represents a body moving
- a. backward with uniform velocity
b. forward with uniform velocity
c. backward with non-uniform velocity
d. forward with non-uniform velocity



42. In figure the velocity of the body at A is
- a. zero b. unity
c. maximum d. infinite

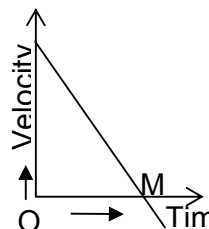




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43. In the above question, the velocity
- increase between point O and A
 - increase between point A and B
 - decrease between points A and B
 - is zero throughout
44. A body moving along a circular path has
- a constant speed
 - a constant velocity
 - no tangential velocity
 - no radial acceleration
45. In figure
- retardation is uniform
 - velocity is decreasing with time
 - beyond M, the body has negative velocity
 - all the above are incorrect





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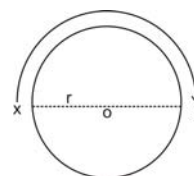
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49. A cyclist from a certain point X and goes round a circle of radius 'r' and reaches Y, exactly at the other side of the point X, as shown the displacement of the cyclist would be

- a. πr
- b. $2 \pi r$
- c. $2 r$
- d. $2\pi / r$

50. In the above problem, the distance covered by the cyclist would be

- a. πr
- b. $2 \pi r$
- c. $2r$
- d. $2\pi / r$



51. Which of the following relations represents the relationship between the average speed, time and distance correctly?

- a. Average speed = distance \times time
- b. Average speed = $\frac{\text{total distance}}{\text{total time}}$
- c. Time = average speed + distance
- d. Distance = average speed - time

52. When a graph between two physical quantities is a straight line, the two quantities are:

- a. both constant
- b. independent of each other
- c. directly proportional
- d. inversely proportional

53. A man walks 8 m towards East and then 6 m towards North. His magnitude of displacement is

- a. 10 m
- b. 14 m
- c. 2
- d. zero

54. Area under a velocity-time graph gives

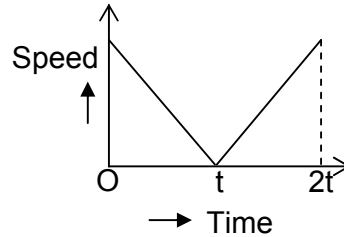
- a. the time taken by a moving object
- b. the distance traveled by a moving object
- c. the acceleration of moving object
- d. the retardation of a moving object



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64. In the following speed – time graph. The shaded portion gives
- a. distance travelled
 - b. average speed
 - c. average velocity
 - d. displacement traveled



65. A car increases its speed from 20 km/h to 50 km/h in 10 seconds. Its acceleration is
- a. 30 ms^{-2}
 - b. 3 ms^{-2}
 - c. 18 ms^{-2}
 - d. none of these
66. If the velocity of a body does not change with time, its acceleration is
- a. zero
 - b. infinite
 - c. unity
 - d. none of these