



## WINTER VACATION WORKOUT

**GRADE:-XI**

**SUBJECT: PHYSICS**

### GROUP 'A'

Circle the best alternative to the following question.

(5 × 1)

1. A cooking pot is coated black because -

- i) Black substances absorb more heat
- ii) Black substances reflect more heat
- iii) Black surfaces are easier to clean
- iv) The material of the pot would not be damaged

2. Solid expands on heating because

- a) K.E. of the atoms increases
- b) P.E. of the atoms increases
- c) Total energy of the atoms increases
- d) Inter atomic separation increases

3. A piece of glass is heated to a high temperature and then allowed to cool. If it cracks, a probable reason is its:

- a) High melting point
- b) High specific heat
- c) Low thermal conductivity
- d) High thermal conductivity

4. If  $\gamma_a$  and  $\gamma_r$  are the coefficient of real and apparent expansion of liquid, then.....

- a)  $\frac{\gamma_r}{\gamma_a} = 1$
- b)  $\frac{\gamma_r}{\gamma_a} > 1$
- c)  $\frac{\gamma_r}{\gamma_a} < 1$
- D) none of the above

5. During winter season, the pendulum clock.....

- a) Loses time
- b) gains time
- c) Neither loses or gains time
- d) none of the above

6. The melting point of ice.....

- a) Decreases with decrease in pressure
- b) Increases with increase in pressure
- c) is independent of pressure
- d) Decrease with increase in pressure

7. The power of teeth of person if he can chew 20gm of ice per min.

- a) 28W
- b) 56W
- c) 112W
- d) 224W

8. A bullet strikes with a 250m/s and bullet dead. The rise in temperature if 60% of energy is used as heat is (Sp. Heat capacity=0.03cal/g<sup>0</sup> C)

- a) 129<sup>0</sup> C
- b) 139<sup>0</sup> C
- c) 149<sup>0</sup> C
- d) 159<sup>0</sup> C

9. 0.5 cm<sup>3</sup> water at 80<sup>0</sup>C is mixed with 1.5 m<sup>3</sup> water at 60<sup>0</sup>C. The final temperature of mixture is.....

- a) 60<sup>0</sup> C
- b) 65<sup>0</sup> C
- c) 70<sup>0</sup> C
- d) 75<sup>0</sup> C

10. If there were no atmosphere, the earth would have been...

- a) very hot
- b) slightly hot
- c) very cold
- d) slightly cold

**Group 'B' (5× 1)**

Answer the followings questions

1. a) Why thermal expansion occur? b) Give some real life examples of thermal expansions. c) The density of silver at 0<sup>0</sup>C is 10310 kg/m<sup>3</sup> and coefficient of linear expansion is 0.000019/<sup>0</sup>C, calculate its density at 100<sup>0</sup>C.

2. a) Define specific hear capacity. b) Water is used as heating and cooling agent, explain it. c) How much steam must be passed into a mixture of ice and water at 0<sup>0</sup>C in order to melt 10g of ice?

3. a) Define triple point. b) Show it in PT diagram. c. Discuss that there is only one point at which the matter can exist simultaneously solid, liquid and gaseous state.

### Group 'C' (8× 1)

1. a) Liquid has only cubical expansion, why? b) Define terms coefficients of real and apparent expansion of liquid and prove that  $\gamma_r = \gamma_a + \gamma_g$ . c) A glass vessel is completely filled with 500 gm of mercury at  $0^\circ\text{C}$ . What weight of mercury will overflow when it is heated to  $80^\circ\text{C}$ ? [Cubical expansivity of Hg =  $18.2 \times 10^{-5}/^\circ\text{C}$ ] d) How is thermal expansion used in everyday life?
2. a) Define absolute expansivity of liquid. b) Describe Dulong and Petit's experiment to determine the coefficient of real expansion of liquid. c) A steel rod when measured with a zinc scale both being at  $25^\circ\text{C}$  appear to be one metre long. If the zinc scale is correct at  $0^\circ\text{C}$ . what is the actual length of the rod at  $25^\circ\text{C}$ . What will be the length of rod at  $0^\circ\text{C}$ ? [ $\alpha$  for steel =  $12 \times 10^{-6}/^\circ\text{C}$ ,  $\alpha$  for zinc =  $26 \times 10^{-6}/^\circ\text{C}$ ] d) Would the mercury thermometer break if the temperature went below the freezing temperature of mercury? Why or Why not?
3. Explain differential expansion and its applications. b) Describe Pullinger's method to determine coefficient of linear expansion. c) A clock which has a brass pendulum beats seconds correctly when the temperature of the room is  $30^\circ\text{C}$ . How many seconds will it gain or lose per day when the temperature of the room falls to  $10^\circ\text{C}$ ? Take  $\alpha$  for brass =  $0.000019/^\circ\text{C}$ .
4. a) Explain the principle of calorimetry. b) Describe any one standard process of determining specific heat capacity of a solid. c) A metal of mass 25kg at a temperature of  $100^\circ\text{C}$  is dropped in to a calorimeter containing 200g of water initially at  $20^\circ\text{C}$ . The final temperature is  $22^\circ\text{C}$ . Compute the specific heat capacity of the metal if the water equivalent of the calorimeter is 10g.

### Group 'D'

#### Additional Questions

1. What do you mean by statement specific heat capacity of water is  $4200\text{J}/\text{Kg.K}$
2. 10g of steam at  $100^\circ\text{C}$  is passed into a mixture of 100g of water and 5g of ice at  $0^\circ\text{C}$ . Find the resultant temperature of the mixture.
3. It takes for an electric kettle to heat a certain quantity of water from  $0^\circ\text{C}$  to boiling point  $100^\circ\text{C}$  in 15 minutes. It requires 80 minutes to turn all the water at  $100^\circ\text{C}$  into steam. Find the latent heat of steam.
4. A U tube contains a liquid and the two limbs are maintained at  $0^\circ\text{C}$  and  $100^\circ\text{C}$ . The height of the liquid in the cold limb is 60cm and that in the hot limb is 1.8cm higher. Calculate the coefficient of real expansion of liquid.



नेपाली ११

नेपाली पाठ्यपुस्तकका पाठ ९, १०, ११ र १२ को अध्ययन गरी निम्नलिखित प्रश्नहरूको उत्तर लेख्नुहोस् :

पाठ	पेज	प्र. नं.
९	१३४	७
१०	१४८	७ र ८ (क)
११	१६०	४ र ५
१२	१७२	६
१२	१७८	१ देखि ९ सम्म



## Winter vacation assignments

### Grade- XI Computer Science

2021-2022

**Solve the following programs in your copy and submit your copy after return back to school**

- 1) Enter temperature in C- Scale and convert into F- Scale and vice versa using switch-case statement.
- 2) BBSM is allowing discount based on the following table. Enter purchase amount and calculate discount amount & Paid amount.

Purchase Amount(Rs)	Discount
Upto 20000	5%
20001 to 50000	10%
More than 50000	20%

- 3) Enter a number and check whether it is palindrome or not.
- 4) Enter a number and check whether it is Armstrong or not.
- 5) Enter a number and check whether it Neon number or not. (A neon number is the sum of the digits of its square.(Ex- 9 is a Neon.  $9^2=81$ ,  $8+1=9$ )
- 6) Enter a number and check whether it is Automorphic number or not. ( An Automorphic number is a number which is present in the last digit(s) of its square. Ex- 5.  $5^2=25$ )
- 7) Enter a number and check whether it is Special or not. ( A special number is the sum of factorial of its digits. Ex-  $145= 1! + 4! + 5!= 1+24+120=145$ )
- 8) Enter a number and display its even digits(Input-3674, Output- 4,6)
- 9) Enter a number and display its prime digits(Input-8759, Output- 5,7)
- 10) Enter a number and display its greatest and lowest digits(Input-8326, Output- Greatest=8, Lowest=2)
- 11) Enter a number and arrange its digits in ascending order. (Input- 7215, Output- 1275)

12) Print the following patterns:

```
1   2   3   4   5
1   2   3   4
1   2   3
1   2
1
```

```
5
5   4
5   4   3
5   4   3   2
5   4   3   2   1
```

```
1   2   3   4   5
2   3   4   5
3   4   5
4   5
5
```

```
9
9   7
9   7   5
9   7   5   3
9   7   5   3   1
```

```
*
*   #
*   #   *
*   #   *   #
*   #   *   #   *
```

```
1
2   3
4   5   6
7   8   9   10
11  12  13  14  15
```



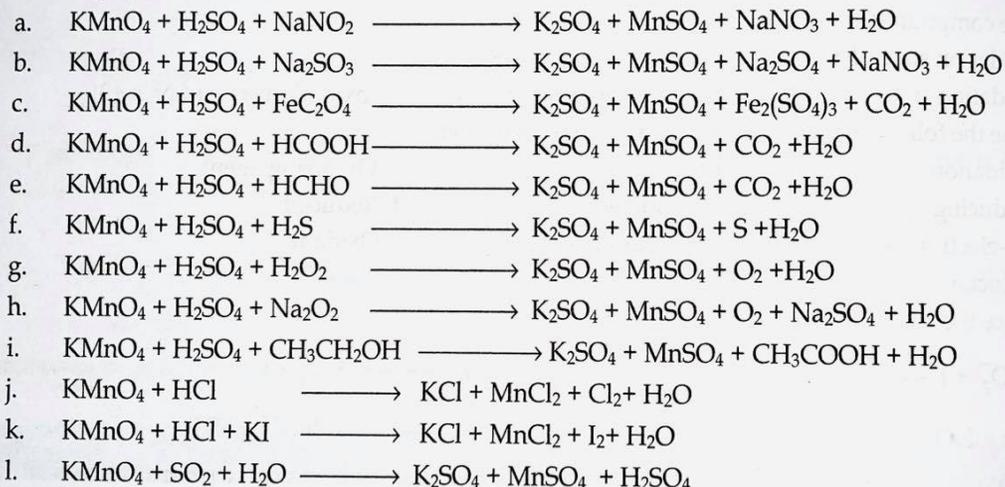
**Assignment for winter vacation**  
**Grade: XI**

**Chemistry**

- Calculate the molecular mass of the following:  
HCl, CaCO<sub>3</sub>, Na<sub>2</sub>CO<sub>3</sub>, NaOH, Mg(OH)<sub>2</sub>, H<sub>2</sub>SO<sub>4</sub>, H<sub>3</sub>PO<sub>4</sub>, NaCl, MgO, Mg, H<sub>2</sub>O, CaCl<sub>2</sub>, NH<sub>3</sub>.
- State the law of reciprocal proportion and law of multiple proportion.
- An hydride of nitrogen contains its own volume of nitrogen and its vapour density is 16. Determine the molecular formula of hydride of nitrogen.
- An oxide of nitrogen contains half of its own volume of nitrogen and its vapour density is 15. Determine the molecular formula of the oxide of nitrogen.
- The cost of common salt and table sugar(C<sub>12</sub>H<sub>22</sub>O<sub>11</sub>) are Rs 2 per kg and Rs 6 per kg respectively. Calculate their cost per mole.
- Which one has higher mass, 6 gm of hydrogen or 3.011 × 10<sup>23</sup> H-atom?
- A gas X diffuses five times as rapidly as another gas Y. calculate the ratio of molecular mass of X to Y.
- Given equation is  

$$4\text{NH}_3(\text{g}) + 5\text{O}_2(\text{g}) \qquad 4\text{NO}(\text{g}) + 6\text{H}_2\text{O}(\text{g})$$
  - How many moles of NH<sub>3</sub> must react to produce 5 moles of NO?
  - How many moles of O<sub>2</sub> will react to produce 5 moles of NO?
  - How many litres of NH<sub>3</sub> and O<sub>2</sub> must react to produce 100 litres of NO?
  - How many litres of O<sub>2</sub> will react with 100gm of NH<sub>3</sub>?
  - How many litres of NO are formed by reacting 10 moles of NH<sub>3</sub> with 10 moles of O<sub>2</sub>?
- Define electronic concept of oxidation and reduction with example.
- Define oxidizing agent and reducing agent with example.
- Oxidation and reduction reactions always go side by side. Explain it.
- Calculate the oxidation number of underlined element.
 

a. K <sub>2</sub> <u>Cr</u> O <sub>4</sub>	b. H <sub>2</sub> <u>O</u> <sub>2</sub>	c. <u>P</u> O <sub>4</sub> <sup>3-</sup>	d. <u>N</u> H <sub>3</sub>	e. Na <sub>2</sub> <u>S</u> <sub>2</sub> O <sub>3</sub>	f. <u>S</u> O <sub>2</sub> Cl <sub>2</sub>
g. ( <u>N</u> H <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	h. <u>C</u> <sub>6</sub> H <sub>12</sub> O <sub>6</sub>	i. <u>N</u> H <sub>4</sub> NO <sub>3</sub>	j. K <sub>2</sub> <u>Cr</u> <sub>2</sub> O <sub>7</sub>	k. K <sub>4</sub> [ <u>Fe</u> (CN) <sub>6</sub> ]	l. <u>Cr</u> <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>
m. <u>C</u> <sub>2</sub> H <sub>2</sub> O <sub>4</sub>	n. <u>Ti</u> Cl <sub>4</sub>				
- Balance the following redox reaction by oxidation number method or ion electron method and indicate the oxidizing and reducing reagent in these reactions.



14. State Boyle's law and Charles' law.
15. On the basis of Boyle's law, explain why do mountaineers carry oxygen cylinders with them.
16. Draw a PV versus P graph.
17. Define ideal gas equation and derive  $PV=nRT$ .
18. What is universal gas constant. Calculate the value of R in  $\text{L.atm.mol}^{-1}\text{K}^{-1}$ .
19. State Dalton's law of partial pressure.
20. State and explain Graham's law of diffusion and list its application.
21. A saturated hydrocarbon having molecular formula  $\text{C}_n\text{H}_{2n+2}$  diffuses through a porous membrane twice as fast as  $\text{SO}_2$ . Determine the molecular formula of hydrocarbon.
22. Through the two end of a glass tube of length 2 meters, hydrogen chloride (HCl) and ammonia ( $\text{NH}_3$ ) gases are allowed to enter. At what distance ammonium chloride will first appear?
23. How long will it take for 500 ml of hydrogen gas to diffuse through a partition, if 250 ml oxygen diffuse in 500 minutes under the similar condition?
24. An evacuated glass vessel weighs 50gm, when empty and 148 gm when filled with a liquid of density 0.98 g/ml and 50.5 gm when filled with an ideal gas at 760mmHg at  $27^\circ\text{C}$ . Determine the molecular mass of the gas.
25. Give reason:
  - a) liquid droplets are spherical.
  - b) Its easy to wash clothes with hot water.
  - c) Glycerol is more viscous than water.
  - d) Gases molecules do not settle down at the bottom of a container.
  - e) Mountaineers carry oxygen cylinder with them.

THE END



## WINTER VACATION WORKOUT

**Subject: Mathematics**

**Grade: XI**

**Q.1** If  $p$  and  $q$  be the statements, prove that

- a)  $p \vee \sim(p \wedge q)$  is a tautology
- b)  $\sim(p \vee q) \wedge q$  is a contrapositive
- c)  $\sim q \wedge (p \Rightarrow q) \Rightarrow \sim p$  is a tautology
- d)  $[(p \wedge q) \Rightarrow p] \Rightarrow (q \wedge \sim q)$  is a contradiction

**Q.2** Let  $U = \{\text{natural numbers from 1 to 20}\}$ ,  $A = \{\text{multiple of 2 from 1 to 20}\}$ ,  $B = \{\text{multiple of 3 from 1 to 20}\}$ ,  $C = \{\text{even numbers from 1 to 10}\}$  and  $D = \{\text{odd numbers from 1 to 15}\}$ . Perform the followings indicated operations

- a)  $A \cup (B \cap C)$
- b)  $\overline{(A \cup B)} \cap C$
- c)  $A - C$
- d)  $A - (B \cup C)$

**Q.3** Show that A.M., G.M. and H.M. of any two unequal positive numbers satisfy the given relations:

- a)  $(\text{G.M.})^2 = (\text{A.M.}) \times (\text{H.M.})$
- b)  $\text{A.M.} > \text{G.M.} > \text{H.M.}$

**Q.4** If  $a, b, c$  are in H.P., prove that

- a)  $\frac{bc}{b+c}, \frac{ca}{c+a}, \frac{ab}{a+b}$  are in H.P.
- b)  $2a-b, b, 2c-b$  are in G.P.
- c)  $a(b+c), b(c+a), c(a+b)$  are in A.P.

**Q.5 a.** If  $a^x = b^x = c^x$  and  $a, b, c$  are in G.P., prove that  $x, y, z$  are in H.P.

**b.** If one G.M. 'G' and two H.M.'s  $p$  and  $q$  are inserted between two given positive numbers, prove that  $G^2 = (2p-q)(2q-p)$

**Q. 6 a.** The sum of infinity of a geometric series is 15, and the first term is 3. Find the common ratio.

**b.** The sum of an infinite number of terms in G.S. is 15, and the sum of their squares is 45, find the series.

**Q. 7** Find the sum of the followings geometric series:

a.  $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \dots$

b)  $3^{-1} + 3^{-2} + 3^{-3} + \dots$

c)  $\frac{a}{x} + \frac{b}{x^2} + \frac{a}{x^3} + \frac{b}{x^4} + \dots$  ( $|x| > 1$ )

d)  $16 - 8 + 4 - \dots$

**Q.8** If  $x = \frac{1}{1+y}$ ,  $y > 0$ , prove that  $x + x^2 + x^3 + \dots \infty = \frac{1}{y}$ .

**Q.9** If  $A = \begin{pmatrix} 4 & -5 \\ 3 & 6 \end{pmatrix}$  and  $A = \begin{pmatrix} 1 & 3 \\ -1 & -2 \end{pmatrix}$  find  $A^T$ ,  $B^T$ ,  $(AB)^T$  and show that  $(AB)^T = (BA)^T$ .

**Q.10** If  $A = \begin{pmatrix} 0 & -1 & 3y + 5 \\ 5z - 9 & 0 & y - 1 \\ x - 2 & 2x - 3 & 0 \end{pmatrix}$  and  $A = A^T$ , find the value of  $x, y, z$ .

**Q.11** If  $A = \begin{pmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{pmatrix}$  find  $A^{-1}$  and verify that  $AA^{-1} = I$ .

**Q.12** If  $z_1, z_2$  and  $z_3$  are three complex numbers then they satisfy the commutative, associative and distributive laws of addition and multiplication.