

# NEW STANDARD ACADEMY

06-01-2025

CLASS : 11<sup>TH</sup>

Marks: 60  
Time: 3 HRS

## PHYSICS

- At what temperature will the root mean square velocity of oxygen molecules be sufficient so as the escape from the earth?
- The pressure of an ideal gas is written as  $P = \frac{2}{3} \frac{E}{V}$ . Here E refers to ?
- At what temperature does the average translational kinetic energy of a molecule in a gas equal to the kinetic energy of an electron accelerated from rest through a potential difference of 5 volt?
- Two ideal gases at temperature  $T_1$  and  $T_2$  are mixed. There is no loss of energy. If the masses of molecules of the two gases are  $m_1$  and  $m_2$  and number of their molecules are  $n_1$  and  $n_2$  respectively, the temperature of the mixture will be?
- The temperature of an ideal gas is increased from 120 K to 480 K. If at 120 K the root mean square velocity of the gas molecules is  $V$ , at 480K it becomes?
- Certain perfect gas is found obey  $PV^{3/2} = \text{const.}$  during adiabatic process. If such a gas at initial temperature  $T$  is adiabatically compressed to half the initial volume, then final temperature will be?
- In a certain process the pressure of one mole ideal gas varies with volume according to the relation  $P = \frac{a}{\left[1 + \left(\frac{V}{b}\right)^2\right]}$ , where a, b are constants, when the volume of gas  $V = b$ , then temperature of the gas will be?
- When an ideal diatomic gas is heated at constant pressure, the fraction of the heat energy supplied which increases the internal energy of the gas is?
- A gas is filled in a container at pressure ' $P_0$ '. If the mass of each molecule is halved and speeds are double, then resulting pressure will be?
- If the pressure of a gas contained in a closed vessel is increased by 0.5% when heated by  $2^\circ\text{C}$ , then the initial temperature must be?

## CHEMISTRY

- What are reaction intermediates? Discuss the structure and relative stabilities of carbocation, carbanion and free radicals.
- What is hyperconjugation? How does it differ from resonance?
- Write short note on the following isomerism:
  - Chain isomerism
  - Metamerism
- Explain the following:
  - Homolytic fission
  - Heterolytic fission
- What is the difference between carbocation and carbanion?
- Write the orbital structure of carbocation carbanion and alkyl free radical.
- What type of hybridization is present on the following carbon atoms  
 $\begin{array}{c} + \quad - \quad \cdot \\ \text{CH}_4 \quad \text{CH}_3 \quad \text{CH}_3 \end{array}$
- Write short note on
  - Inductive effect
  - Mesomeric effect
- Write IUPAC Name of:
  - Glycerol
  - Succinic acid
- Write short note on
  - Carbenes
  - Nitrenes

## BIOLOGY

- Which are the target organs and target tissues of the posterior pituitary hormones?
- What is the physiological cause of acromegaly?
- What is diabetes mellitus?
- What are the hormones secreted by the adrenal medulla? What are their respective functions?
- Explain the mechanism of steroid hormone action.
- Why vasopressin is named antidiuretic hormone? Explain its physiological role.

7. Why is the dietary obtainment of iodine so important for thyroid functioning?
8. What is the thymus gland? Explain its functioning.
9. Name the three hormones which secreted from pancreas also give the function.
10. What would child suffer from if there was hypo secretion from his thyroid?

### MATHS

1. Solve  $\frac{|x|-1}{(x-2)} \geq 0$
2. The solution set of the inequation  $\log_{1/3}(x^2+x+1)+1 > 0$  is
3.  $(|x|+1)(x^2+2x+4)(x-2) \leq 0$  then x is
4. If 1,  $\log_3(3^{1-x}+2)$ ,  $\log_3(4, 3^x-1)$  are in A.P then x equals .
5. The sum of the infinite series  $1 + \frac{2}{3} + \frac{7}{3^2} + \frac{12}{3^3} + \frac{17}{3^4} + \frac{22}{3^5} + \dots$  is equal to:
6. If m arithmetic (A.Ms) and three geometric means (G.Ms) are inserted between 3 and 243 such that 4<sup>th</sup> A.M. is equal to 2<sup>nd</sup> G.M., then m is equal to
7. If the arithmetic mean and the geometric mean of the p<sup>th</sup> and q<sup>th</sup> terms of the sequence -16, 8, -4, 2, .... satisfy the equation  $4x^2 - 9x + 5 = 0$ , then p+q is equal to \_\_\_\_\_
8. Let x and y be positive real number such that  $x+y=1$  .then the minimum value if  $\frac{1}{x} + \frac{1}{y}$  is
9. If sum of the first 21 terms of the series  $\log_{9^{1/2}} + \log_{9^{1/3}} + \log_{9^{1/4}} x + \dots$  where  $x > 0$  is 504 ,then x is equal to
10. The domain of the definition of the function  $f(x) = \frac{1}{4-x^2} + \log_{10}(x^3-x)$  is

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