DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : PHYSICS**
Date : **DPP No. : 7**

Topic :- KINETIC THEORY

1. The temperature at which protons in proton gas would have enough energy to overcome. Coulomb barrier of $4.14 \times 10^{-14} J$ is (Boltzman constant $= 1.38 \times 10^{-23} JK^{-1}$)
   a) $2 \times 10^{9} K$ b) $10^{9} K$ c) $6 \times 10^{9} K$ d) $3 \times 10^{9} K$

2. KE per unit volume is E. The pressure exerted by the gas is given by
   a) $\frac{E}{3}$ b) $\frac{2E}{3}$ c) $\frac{3E}{2}$ d) $\frac{E}{2}$

3. Two cylindrical conductors A and B of same metallic material have their diameters in the ratio 1 :2 and lengths in the ratio2 :1. If the temperature difference between their ends is same, the ratio of heat conducted respectively by A and B per second is
   a) 1 : 2 b) 1 : 4 c) 1 : 16 d) 1 : 8

4. A gas is collected over the water at 25°C. The total pressure of moist gas was 735 mm of mercury. If the aqueous vapour pressure at 25°C is 23.8 mm. Then the pressure of dry gas is
   a) 760 mm b) 758.8 mm c) 710.8 mm d) 711.2 mm

5. Two moles of oxygen is mixed with eight moles of helium. The effective specific heat of the mixture at constant volume is
   a) 1.3 R b) 1.4 R c) 1.7 R d) 1.9 R

6. Mean kinetic energy (or average energy) per g molecule of a monoatomic gas is given by
   a) $\frac{3}{2} RT$ b) $\frac{1}{2} kT$ c) $\frac{1}{2} RT$ d) $\frac{3}{2} kT$

7. A cylinder of fixed capacity 44.8 $litre$ contains a monoatomic gas at standard temperature and pressure. The amount of heat required to cylinder by 10°C will be (R = universal gas constant)
   a) R b) $10R$ c) $20R$ d) $30R$

8. Air is pumped into an automobile tube upto a pressure of 200 kPa in the morning when the air temperature is 22°C. During the day, temperature rises to 42°C and the tube expands by 2%. The pressure of the air in the tube at this temperature, will be approximately
   a) 212 kPa b) 209 kPa c) 206 kPa d) 200 kPa

9. The volume of a gas at pressure $21 \times 10^4 N/m^2$ and temperature 27°C is 83 $litres$. If $R = 8.3$ $J/mol\ K$, then the quantity of gas in g - $mole$ will be
a) 15 b) 42 c) 7 d) 14

10. What is an ideal gas?
a) One that consists of molecules
b) A gas satisfying the assumptions of kinetic theory
c) A gas having Maxwellian distribution of speed
d) A gas consisting of massless particles

11. The relation between the gas pressure P and average kinetic energy per unit volume E is
a) $P = \frac{1}{2}E$ b) $P = E$ c) $P = \frac{3}{2}E$ d) $P = \frac{2}{3}E$

12. For a gas $\gamma = 7/5$. The gas may probably be
a) Helium b) Hydrogen c) Argon d) Neon

13. When a vander waal's gas undergoes free expansion then its temperature
a) Decreases
b) Increases
c) Does not change
d) Depends upon the nature of the gas

14. If the oxygen (O_2) has root mean square velocity of $C\ ms^{-1}$, then root mean square velocity of the hydrogen (H_2) will be
a) $C\ ms^{-1}$ b) $\frac{1}{C} ms^{-1}$ c) $4C\ ms^{-1}$ d) $\frac{C}{4} ms^{-1}$

15. A gas at the temperature 250 K is contained in a closed vessel. If the gas is heated through 1 K, then the percentage increase in its pressure will be
a) 0.4% b) 0.2% c) 0.1% d) 0.8%

16. To what temperature should the hydrogen at room temperature (27°C) be heated at constant pressure so that the R.M.S. velocity of its molecules becomes double of its previous value
a) 1200°C b) 927°C c) 600°C d) 108°C

17. Consider a collection of a large number of particles each with speed v. The direction of velocity is randomly distributed in the collection. What is the magnitude of the relative velocity between a pairs in the collection
a) $2V/\pi$ b) V/π c) $8V/\pi$ d) $4V/\pi$

18. A pressure cooker contains air at 1 atm and 30°C. If the safety value of the cooler blows when the inside pressure ≥ 3 atm, then the maximum temperature of the air, inside the cooker can be
a) 90°C b) 636°C c) 909°C d) 363°C

19. The value of $\frac{pV}{T}$ for one mole of an ideal gas is nearly equal to

a) 2 J mol^{-1} K^{-1} b) 8.3 J mol^{-1} K^{-1} c) 4.2 J mol^{-1} K^{-1} d) 2 cal mol^{-1} K^{-1}

20. $CO_2(O - C - O)$ is a triatomic gas. Mean kinetic energy of one gram gas will be (If N-Avogadro's number, k-Boltzmann's constant and molecular weight of $CO_2 = 44$)
a) $(3/88)NkT$ b) $(5/88)NkT$ c) $(6/88)NkT$ d) $(7/88)NkT$