SHAHEEN GROUP OF INSTITUTIONS
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Class : NEET Repeaters   Sub: Physics   Worksheet–50   Date: 18-03-2019

Thermodynamics-2 & Kinetic Theory of Gases

1. According to the second law of thermodynamics
   (A) heat energy cannot be completely converted to work.
   (B) work cannot be completely converted to heat energy.
   (C) for all cyclic processes we have dQ/T < 0.
   (D) the reason all heat engine efficiencies are less than 100% is friction, which is unavoidable.

2. A Carnot engine takes 3×10^6 cal of heat from reservoir at 627^oC and gives it to a sink at 27^oC. Then work done by the engine is
   (A) 42×10^6J (B) 84×10^6J (C) 168×10^6J (D) zero

3. A Carnot engine shows efficiency of 40% on taking energy at 500K. To increase the efficiency to 50%, at what temperature it should take energy?
   (A) 400 K (B) 700 K (C) 600 K (D) 800 K

4. A Carnot engine, whose efficiency is 40% takes in heat from a source maintained at a temperature of 500K. It is desired to have an engine of efficiency 60% then, the intake temperature for the same exhaust (sink) temperature must be
   (A) 750 K
   (B) 600 K
   (C) Efficiency of Carnot engine cannot be made larger than 50%
   (D) 1200 K

5. A refrigerator works between temperature -10^oC and 27^oC, the coefficient of performance is
   (A) 7.1 (B) 1 (C) 8.1 (D) 15.47

6. The translation kinetic energy of molecules of one mole of monoatomic gas is U=3NKT/2. The value of atomic specific heat of gas under constant pressure will be
   (A) $\frac{3}{2}$R (B) $\frac{5}{2}$R (C) $\frac{7}{2}$R (D) $\frac{9}{2}$R

7. The $\left(\frac{W}{Q}\right)$ of a Carnot-engine is $\frac{1}{6}$, now the temperature of sink is reduced by 62^oC, then this ratio becomes twice, therefore the initial temperature of the sink and source are respectively
   (A) 33^oC, 67^oC (B) 37^oC, 99^oC
   (C) 67^oC, 33^oC (D) 97 K, 37 K

8. When 1kg of ice at 0^oC melts to water at 0^oC, the resulting change in its entropy, taking latent heat of ice to be 80 Cal/g, is
(A) 273 Cal/K (B) 8×10^4 Cal/K (C) 80 Cal/K (D) 293 Cal/K

9. The molar specific heats of an ideal gas at constant pressure and volume are denoted by C_P and C_V respectively If $\gamma = \frac{C_P}{C_V}$ and R is the universal gas constant, then C_v is equal to :
(A) γR (B) $\frac{1+\gamma}{1-\gamma}$ (C) $\frac{R}{(\gamma-1)}$ (D) $\frac{(\gamma-1)}{R}$

10. A refrigerator transfer 180 joule of energy in one second from temperature -3^oC to 27^oC. Calculate the average power consumed, assuming no energy losses in the process
(A) 18 W (B) 54 W (C) 20 W (D) 120 W

11. The mean free path of molecules of a gas, (radius 'r') is inversely proportional to
(A) r^3 (B) r^2 (C) r (D) $\sqrt{r}$

12. A gas is equilibrium at T Kelvin if mass of one molecule is m and its component of velocity in x-direction is v_x. Then mean of its v_x^2 is
(A) $\frac{3kT}{m}$ (B) $\frac{2k}{m}$ (C) $\frac{kT}{m}$ (D) zero

13. A Carnot engine, is used as a refrigerator $\eta = \frac{1}{10}$ as heat engine, is used as a refrigerator. If the work done on the system is 10J, the amount of energy absorbed from the reservoir at lower temperature is
(A) 99 J (B) 90 J (C) 1 J (D) 100 J

14. The molecules of a given mass of a gas have r.m.s. velocity of 200 ms^{-1} at 27^oC and 1.0×10^5 Nm^{-2} pressure. When the temperature and pressure of the gas are respectively, 127^oC and 0.05×10^5 Nm^{-2}, the r.m.s velocity of its molecules in ms^{-1} is
(A) $\frac{100\sqrt{2}}{3}$ (B) 100/3 (C) $100\sqrt{2}$ (D) $\frac{400}{\sqrt{3}}$

15. The temperature inside a refrigerator is t_2^oC and the room temperature is t_1^oC. The amount of heat delivered to the room for each joule of electrical energy consumed ideally will be
(A) $\frac{t_1}{t_1-t_2}$ (B) $\frac{t_1+273}{t_1-t_2}$ (C) $\frac{t_2+273}{t_1-t_2}$ (D) $\frac{t_1+t_2}{t_1+273}$

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1-A	**2-B**	**3-C**	**4-A**	**5-A**	**6-B**	**7-B**	**8-D**	**9-C**	**10-C**	**11-B**	**12-C**	**13-B**	**14-D**	**15-B**