CITY COLLEGE B.SC Semester 1 Internal Assessment (online), under CU 2020-21

CHEMISTRY- HONOURS Paper: CEMA-CC-1-2 (Physical Chemistry-1) Full Marks – 10

Attempt all the questions.

- 1. The rms speed of an ideal gas moving in a plane is
 - a) $(2k_BT/m)^{1/2}$
 - b) $(3k_BT/m)^{1/2}$
 - c) $(8k_BT/m\pi)^{1/2}$
 - d) zero
- 2. At high temperature, the molar heat capacity $(C_{p,m})$ at constant pressure for a nonlinear triatomic perfect gas is
 - a) 6R
 - b) 7R
 - c) 6.5R
 - d) 7.5R
- 3. If a gas follows Berthelot's equation of state, then the Boyle temperature for that gas is
 - a) a/bR
 - b) (a/bR)^{1/2}
 - c) (a/bR)^{2/3}
 - d) None of the above
- 4. If a gas (one mole) obeys P(V-b) = RT, then
 - a) Always Z > 1
 - b) Always Z < 1
 - c) At low pressure Z < 1
 - d) Always Z = 1

Z is the compressibility factor of the gas

- 5. Which of the following statement is true for an ideal gas
 - a) Mean free path \propto T (if p is constant)
 - b) Mean free path $\propto 1/p$ (if T is constant)
 - c) Mean free path \propto p (if T is constant)
 - d) Both a and b

Q.6. For the gas phase reaction $2HI \rightarrow H_2 + I_2$, values of rate constant K are 1.2×10^{-3} and 3.0×10^{-5} dm³mol⁻¹sec⁻¹ at 700K and 629K respectively. Estimate activation energy E_a

a)190.145KJ b). 150.01KJ c) 200.52KJ d)188.25KJ

Q.7. A+B \rightarrow C+D, 2C \rightarrow F, F+B \rightarrow 2A+G, which one is catalyst and product?

a) A, catalyst and D,G are product.

b) C, catalyst and F,B product.

c) G, catalyst and F,B product

d) None of these.

Q.8. For a reaction the plot of $t_{1/2}$ vs log 'a' turns out to be a straight line with positive slope and intercept, which makes an angle 45⁰ with log 'a' axis. What id the order of the reaction?

a) 1st b) 2nd c) Zero d) Fractional

Q.9. Find out the effective $t_{1/2}$ for A in the following radioactive change



Q.10. The plot of ' log K' vs ' pH' of an acid catalyst reaction gives a straight line with a

a) negative slope b) Positive slope c) Cannot determine d) None of these.