## 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) $\left(2 \mathrm{k}_{\mathrm{B}} \mathrm{T} / \mathrm{m}\right)^{1 / 2}$
b) $\left(3 \mathrm{k}_{\mathrm{B}} \mathrm{T} / \mathrm{m}\right)^{1 / 2}$
c) $\left(8 \mathrm{k}_{\mathrm{B}} \mathrm{T} / \mathrm{m} \pi\right)^{1 / 2}$
d) zero
2. At high temperature, the molar heat capacity $\left(\mathrm{C}_{\mathrm{p}, \mathrm{m}}\right)$ at constant pressure for a nonlinear triatomic perfect gas is
a) $6 R$
b) $7 R$
c) 6.5 R
d) 7.5 R
3. If a gas follows Berthelot's equation of state, then the Boyle temperature for that gas is
a) $a / b R$
b) $(a / b R)^{1 / 2}$
c) $(a / b R)^{2 / 3}$
d) None of the above
4. If a gas (one mole) obeys $\mathrm{P}(\mathrm{V}-\mathrm{b})=\mathrm{RT}$, then
a) Always $Z>1$
b) Always $\mathrm{Z}<1$
c) At low pressure $\mathrm{Z}<1$
d) Always $\mathrm{Z}=1$

Z is the compressibility factor of the gas
5. Which of the following statement is true for an ideal gas
a) Mean free path $\propto \mathrm{T}$ (if p is constant)
b) Mean free path $\propto 1 / \mathrm{p}$ (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 $2 \mathrm{HI} \rightarrow \mathrm{H}_{2}+\mathrm{I}_{2}$, values of rate constant K are $1.2 \times 10^{-3}$ and $3.0 \times$ $10^{-5} \mathrm{dm}^{3} \mathrm{~mol}^{-1} \mathrm{sec}^{-1}$ at 700 K and 629 K respectively. Estimate activation energy $\mathrm{E}_{\mathrm{a}}$
a) 190.145 KJ
b). 150.01 KJ
c) 200.52 KJ
d) 188.25 KJ
Q.7. $\mathrm{A}+\mathrm{B} \rightarrow \mathrm{C}+\mathrm{D}, 2 \mathrm{C} \rightarrow \mathrm{F}, \mathrm{F}+\mathrm{B} \rightarrow 2 \mathrm{~A}+\mathrm{G}$, 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 $45^{0}$ with $\log$ 'a' axis. What id the order of the reaction?
a) 1 st
b) $2^{\text {nd }}$
c) Zero
d) Fractional
Q.9. Find out the effective $\mathrm{t}_{1 / 2}$ for A in the following radioactive change

a) 6 hrs .
b) 8 hrs .
c) 2 hrs .
d) 4 hrs .
Q.10. The plot of ' $\log \mathrm{K}$ ' 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.

