City College

B. Sc. Semester 5 Internal Assessment (online), under C.U. 20-21

CHEMISTRY – HONOURS

Paper:CC-5-11

(Physical Chemistry-4)

Full Marks-10

Attempt all the questions

Q.1. Find the root of the equation $\cos x - xe^x = 0$ corrected to four decimal places by the Newton-Rapson method. The root is

a) 0.5280 b) 0.5180 c) 0.5004 d) none of these.

Q.2. Find the root of $x^3-2x-5 = 0$ using the False Position method up to four decimal. The root is

a) 2.0927 b) 2.0812 c) 2.0588 d) none of these.

Q.3.Evalute the $\int_0^1 1/\ 1+x^2 dx$ by the 1\3 Simpson rule :

a) 0.785396 b) 0.785000 c) 0.839001 d) none of these.

Q.4. Fit a straight line for following data using Least-Square method:

X	1	2	3	4	6	8
Y	2.4	3	3.6	4	5	6

a) y = 1.9765+0.5059x b) y = 0.19765-0.0850x c) y = 0.1097+0.4029x d) none of these.

Q.5. Consider six distinguishable molecules divided equally among three levels. Calculate its thermodynamic probability (W)

a) 80 b) 90 c) 70 d) none of these.

Q.6. For what increase in altitude is the earth's atmospheric pressure reduced to half. Assume average value of temperature 250 K and the average molar mass 0.029Kg.mol^{-1}

a) 5069.5m b) 5000 m c) 4980.56m d) none of these.

Q.7. ΔG for a reaction as a function of temperature (T) for low value of T (approaching zero kelvin) is given by $\Delta G = a + bT + cT^2$. The value of 'b' is

a) ∞ b) 0 c) – ve d) + ve

Q.8. Evaluate the root mean square distance, $r_{r.m.s.} = (\langle r^2 \rangle)^{1/2}$ of the electron from the nucleus in the H-atom :

a) $\sqrt{3}a_0$ b) $\sqrt{3}$ c) $2\sqrt{3}a_0$ d) none of these.

Q.9. For the 1s state of the Hydrogen atom, $\Psi_{1s} = b_0 e^{-r/a_0}$. Find the normalisation constant b_0

a) $1/(\Pi . a^3_0)^{1/2}$ b) $(\Pi a^3_0)^{1/2}$ c) $\frac{1}{2}\sqrt{\Pi}\, a^3_0$ d) none of these.

Q.10. The following function is a solution of Schrodinger equation for a simple harmonic oscillator $\Psi_1 = \exp^{-\alpha x2}$. Find the value of 'α' in terms of force constant (k), mass (m) and universal constant 'h'

a) ½ hν b) 0 c) 2hν d) none of these.