SW-244

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Seat No.	

B.Sc. (Part-I) (Semester-I) Examination, November - 2019

CHEMISTRY

Physical Chemistry (Paper-I)

Sub. Code: 59676

Day and Date : Monday, 11 - 11 - 2019 **Total Marks : 50**

Time : 12.00 noon to 2.00 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Draw neat diagrams and give equations wherever necessary.**
4) **Use of Scientific calculator and logarithmic table is allowed.**

Q1) Choose the correct alternative for each of the following and rewrite the sentence: **[10]**

a) The formula $K = C_1/\sqrt{C_2}$ indicates that the solute is present as a _____ molecule in second solvent.

i) single ii) double

iii) triple iv) dissociated

b) All reversible heat engines operating between the same temperatures have _____ efficiency.

i) different ii) unequal

iii) same iv) none of these

c) In isochoric process _____.

i) $\Delta P = 0$ ii) $\Delta H = 0$

iii) $\Delta V = 0$ iv) $\Delta T = 0$

P.T.O.

d) Volume occupied by one mole of the gas at critical temperature and critical pressure is called _____.

i) critical volume ii) molar volume

iii) molal volume iv) NTP volume

e) A certain temperature at which the product PV is constant over an appreciable range of pressure is known as _____ temperature.

i) Kelvin ii) Boyle

iii) Celsius iv) Absolute

f) The number of reacting molecules whose concentration alters the rate of reaction is called as _____ of reaction.

i) molecularity ii) order

iii) rate constant iv) velocity

g) The unit of velocity constant of second order reaction is expressed in _____.

i) sec ii) sec^{-1}

iii) $dm^3\ mol^{-1}\ sec^{-1}$ iv) $mol\ dm^3$

h) Hydrolysis of methyl acetate in the presence of acid is an example of _____ reaction.

i) zero ii) first

iii) pseudo - unimolecular iv) second

i) During α - decay, atomic number decreases by _____ units.

i) 1 ii) 2

iii) 3 iv) 4

j) The radioactive disintegration is an example of _____ order reaction.

i) zero ii) first

iii) second iv) third

Q2) Solve any Two of following: **[20]**

a) Define second order reaction. Derive an expression for the velocity constant of a second order reaction with equal concentration of both reactants.

b) Discuss the applications of radioisotopes in various fields.

c) Derive Van der Waal's equation for one mole of real gas considering both correction terms.

d) Distinguish between spontaneous and non-spontaneous processes. Calculate the percentage efficiency of a steam engine operating between 323K and 653K.

Q3) Solve any Four of following: **[20]**

a) State Nernst distribution law and give its limitations.

b) For a certain first order reaction, the time for half change is 72 minutes. How much time will be required for 90% completion of reaction.

c) Show that the half life time of a first order reaction is independent of initial concentration of reactants.

d) What are the causes of deviations of real gases from its ideal behaviour.

e) Explain in brief various factors affecting the rate of a chemical reaction.

f) The activity of radioactive element reduces to 80% in 15 minutes. Calculate decay constant and half life period.

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