

SW - 39
Total No. of Pages : 3

Seat
No.

B.Sc. (Part - I) (Semester - II) (CBCS)
Examination, October - 2019
CHEMISTRY (Paper - III)
DSC-3B : Physical Chemistry
Sub. Code : 72844

Day and Date : Thursday, 17 - 10 - 2019
Time : 12.00 noon to 2.00 p.m.

Total Marks : 50

- 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 most correct alternative for each of the following and rewrite the sentences. [10]

- a) The unit of second order rate constant is _____.
- i) $\text{dm}^3 \text{mol}^{-1} \text{Sec}^{-1}$
 - ii) Sec^{-1}
 - iii) Sec
 - iv) $\text{dm}^{-3} \text{mol}^{-1} \text{Sec}^{-1}$
- b) If one of the reactant in a bimolecular reaction is present in large excess, the reaction becomes kinetically of _____.
- i) second order
 - ii) third order
 - iii) zero order
 - iv) first order
- c) Efficiency of heat engine is always _____.
- i) greater than one
 - ii) less than one
 - iii) equal to one
 - iv) all of these
- d) In cyclic process, a change in each state function is _____.
- i) zero
 - ii) one
 - iii) two
 - iv) three
- e) According to conventions used in chemical thermodynamics where $\Delta H = +ve$, The reaction is _____.
- i) exothermic
 - ii) endothermic
 - iii) reversible
 - iv) irreversible

P.T.O.

Q2) Solve any two of the following:

- Define second order reaction. Derive an equation for rate constant of a second order reaction with unequal concentration of reactants.
- Derive the relations between critical constant and constants of Vander Waal's equation.
- Give stepwise derivation of Carnot cycle and its efficiency.

Q3) Solve any four of the following.

[20]

- For a certain first order reaction the time for half change is 100 seconds. How long will it take for a completion of 90% of the reaction.
- Distinction between spontaneous and non-spontaneous processes.
- What is thermochemistry? Define endothermic and exothermic reaction.
- Calculate vander Waal's constants for ethane. Its critical temperature and critical pressure are 282 K and $51.41 \times 10^5 \text{ Nm}^{-2}$ respectively. ($R = 8.314 \text{ JK}^{-1} \text{ M}^{-1}$)
- Explain the effect of catalyst and inert gas on a state of chemical equilibrium.
- Show that in a first order reaction time taken to complete half of reaction is independent of initial concentration of reactant.

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