A.T.K.T. 2015-16 Chemistry-I

Q.P. Code - SC1CH010316X F.Y. BSC - Chemistry I sem-II PG-2 200

Note : 1) All the questions are compulsory.
2) Figures to right indicate full marks.
3) Use of non-programmable calculator / log table is allowed.

Q. 1 **Answer Any Four :** 20

1) State and explain first law of thermodynamics.
2) Define order and molecularity of reaction.
3) Derive integrated rate equation for first order reaction.
4) Calculate q, w and ΔE for 2.5 mole of an ideal gas at 2 atm expands isothermally to 2.5 times of its initial volume against external pressure of 1atm at 300 k.
5) Derive integrated rate equation for second order reaction.
6) State and explain zeroth law of thermodynamics.
7) What is system ? Explain types of systems with suitable example.
8) Define Enthalpy. Derive equation for heat change at constant pressure.

Q. 2 **Answer Any Four :** 20

1) How silk is obtained ? Give a brief account with its uses.
2) Give classification of polymers based on structure with examples.
3) Calculate :
   i) Wave number ii) Frequency and
   iii) Energy of one quantum of radiation of wavelength 10^4 nm in joule.
4) Give applications of analytical chemistry.
5) Explain any two properties of electromagnetic radiation.
6) Give advantages of instrumental methods and chemical methods.
7) Define the following terms :
   i) Wave numbers ii) Wavelength
   iii) Frequency
   and Give relationship between them.
8) Distinguish between Homopolymer and Co-Polymer with example.

Q. 3 **Answer Any Four :** 20

1) Define the following terms :
   i) Molarity ii) Formality iii) Normality
   iv) Molality v) ppb
2) How many significant figures are present in each of the following numbers.
   i) 1.420 ii) 1.00141 iii) 1.214×10^{-3}
   iv) 0.00143 v) 12345
3) 10g of Urea (M.W. 60) is dissolved in 200g of water. Calculate its molality and mole fraction of each component.

P.T.O.

4) Perform the following arithmetic operations. Express your answers with the correct numbers of significant figures.
   i) $1.0123 - 0.002 =$ ii) $123.69 - 20.1 =$ iii) $463.231 - 14.0 =$
   iv) $1.421 + 0.4372 =$ v) $0.0241 + 0.11 =$
5) What are the significant numbers and rules for writing significant figures.
6) Calculate the molality and mole fraction of a solute in a solution made by dissolving 18.0g of glucose in 500g of water.
7) When 80g of NaOH is dissolved in water to prepare 1 litre of its solution. What is the molarity of resulting solution.
8) 14.0g of Na_2CO_3 is dissolved in 100 ml of the solution. Calculate :
   i) Formality ii) Molarity of Na+ and CO^{2-}_3 ions.

Q. 4 Answer Any Three :

1) Perform the indicated operations. Express your answers with the correct number of significant figures.
   i) $42.3 \times 2.61 =$ ii) $0.61 + 42.1 =$
   iii) $46.1 / 1.21 =$ iv) $23.2 / 4.1 =$
   v) $41.1 \times 3.01 =$
2) Define system, surrounding. Boundary. Explain types of boundaries with suitable examples.
3) Calculate the normality of each of the following solutions.
   i) 7.889 of HNO_3 per litre of solution.
   ii) 26.5 g of Na_2CO_3 per litre of solution.
4) Discuss cannot cycle with diagram.
5) Explain the following terms.
   i) Data Collection ii) Date processing
   iii) Presentation and interpretation of results.
6) Give structure of a wool and explain it's properties.

—— The End ——