 KNU/2025/BSCCEMMN401

UG 4th Semester Examination - 2025 (Under NCCF)
Award: - B.Sc
Discipline : Chemistry
Course Type : MNC-4
Course Code : BSCCEMMN401
Course Name : Organic & Physical Chemistry

Full Marks : 35 (Regular) **Time - 2 hours**

1. Answer any five questions: **1×5=5**

a) What is the value of entropy of a perfectly crystalline substance at absolute zero ?

b) Write the name of the monomer of natural rubber.

c) What is the usual colour observed when Ninhydrine reacts with amino acids ?

d) Van't Hoff isober relates the equilibrium constant with (Choose the correct alternative)

i) Volume ii) Pressure iii) Temperature iv) Degree of advancement

e) What is the inversion temperature ?

f) State the first law of thermo dynamics.

g) Joule-Thomson effect deals with (Choose the correct alternative)

i) Pressure change during expansion ii) Enthalpy change at constant volume

iii) Temperature change during expansion iv) Entropy change in closed systems

h) A reaction is spontaneous at all temperatures if (Choose the correct alternative)

i) $\Delta H > 0, \Delta S < 0$ ii) $\Delta H < 0, \Delta S > 0$

iii) $\Delta H > 0, \Delta S > 0$ iv) $\Delta H < 0, \Delta S < 0$

2. Answer any five questions: **5×2=10**

a) Differentiate between homopolymer and copolymer with example.

b) What is denaturation of protein ? What changes occurs in a protein during denaturation ?

c) Calculate the work done in a reversible isothermal expansion of 2moles of an ideal gas from 5L to 15L at 300K (R= 8.314J/mol.K)

d) Write the reaction of phenylmagnesium bromide with carbon dioxide followed by hydrolysis. What is the final product ?

e) State the effect of catalyst on equilibrium of a chemical reaction.

f) What do you mean by essential amino acid ?

g) Write Carnot theorems.

h) Write the Van't Hoff equation used under constant pressure.

3. Answer any two questions for the students appearing for their regular courses: **5×2=10**

a) Write Hess's law and write its two applications. 2+3

b) Write zwitterion of alanine. Draw the structure of dipeptide formed from glycine and alanine. 2+3

c) How picric acid is synthesized starting from phenol ? Write the type of reaction involved. 2+3

d) Compare the isothermal and adiabetic work done graphically and explain the observation. 2+3

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e) i) Write the chemical recation involved in synthesis of Nylon-66.

ii) Differentiate condensation polymerisation and addition polymerisation. 3+2

4. Answer any one question: 10×1=10

a) i) Give examples of one path and one state thermodynamic function.

ii) Derive an expression for the isothermal reversible workdone.

iii) 1 mole of an ideal gas, maintained at 4. 1 atm and at a certain temperature, absorbs heat 3710J and expands to 2 litres. Calculate the entropy change in this expansion process.

iv) State and explain Le Chatelier's principle with an example involving pressure change. 2+2+3+3

b) i) Draw the carnot cycle in P-V diagram clearly illustrating all the steps involved. Calculate the work done in different steps and hence efficiency of the cycle.

ii) Derive the Van't Hoff reaction iso bar. 2+4+4

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