



**BBF-003-001103** Seat No. \_\_\_\_\_

**B. Sc. (Sem. I) (CBCS) Examination**

**July - 2021**

**Chemistry : Paper-101**

*(Old Course)*

**Faculty Code : 003**

**Subject Code : 001103**

Time :  $2\frac{1}{2}$  Hours]


[Total Marks : 70

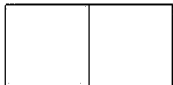
**Instructions :**

- (1) Three main questions are compulsory.
- (2) Question 1 carry 20 marks.
- (3) Questions 2 and 3 are descriptive which carry 25 marks.

**1 Answer the following : 20**

- (1) Define : Ionization Potential.
- (2) Addition of an electron to the atom results in the formation of \_\_\_\_\_.
- (3) Which hybridization in  $\text{CH}_4$  ?
- (4) Give one example having  $\text{sp}^3\text{d}^2$  hybridization.
- (5) Give electronic configuration of Sc.
- (6) \_\_\_\_\_ is Ziggler-Natta catalyst used for manufacture of polythene.
- (7) How many step in  $\text{SN}^2$  reaction ?
- (8) When alkyl halide is heated with dry  $\text{Ag}_2\text{O}$ , its product is \_\_\_\_\_.

(9) Give name of .

(10) IUPAC name of .

- (11) A system which can exchange energy but not matter with surrounding is \_\_\_\_\_.
- (12) Define : Open system.
- (13) Define : Adsorption.
- (14) Write Freundlich equation.
- (15) Define : Normality.
- (16) Define : Mole fraction.
- (17) Full form of ppm.
- (18)  $\text{pH} = \text{_____}$ .
- (19) Acetic acid is \_\_\_\_\_ electrolyte.
- (20)  $\text{pH} + \text{pOH} = \text{_____}$ .

**2** (a) Answer the following : (any three) **6**

- (1) Ionization potential of Be is greater than Li.
- (2) Electron affinities of noble gases are zero.
- (3) Define : sp hybridization.
- (4) Write structural formula of Bicyclo [3,3,0] octane and Bicyclo [4,4,0] decane.
- (5) Write the reaction of cyclo propane react with HCl and  $\text{H}_2/\text{Ni}$ .
- (6) Write the electronic configuration of Cr and Cu.

(b) Answer the following : (any three) **9**

- (1) Write a short note on Atomic radii.
- (2) What is V.B. Theory ? Write limitations of V.B. Theory.
- (3) Write atomic properties of first transition series elements.
- (4) Write a note on elimination reaction.
- (5) Preparation of cyclo pentane by Dieckmann method.
- (6) Cyclo butane from propylene dibromide by Perkin method.

- (c) Answer the following : (any two) 10
- (1) Explain  $sp^2$  hybridization with the example of ethylene molecule.
  - (2) Explain Pauling method for determination of ionic radius.
  - (3) Explain the reversal of energy in 3d and 4s for first transition series elements.
  - (4) Explain  $SN^2$  reaction with mechanism.
  - (5) Baeyer's strain theory.
- 3 (a) Answer the following : (any three) 6
- (1) Define closed system, isolated system with example.
  - (2) Define adsorbent and adsorbate.
  - (3) State any two statement of 1<sup>st</sup> law of thermodynamics.
  - (4) 25°C temperature pH of given solution is 5, calculate pOH.
  - (5) Define – Internal energy and enthalpy.
  - (6) 25°C 100 ml sample contains 0.585 gm NaCl. Calculate normality of the solution (Na = 23) (Cl = 35.5)
- (b) Answer the following : (any three) 9
- (1) Write note on (a) Intensive properties (b) Extensive properties.
  - (2) Explain Zeroth Law of thermodynamics.
  - (3) Freundlich adsorption isotherm.
  - (4) Calculate the amount of  $Na_2CO_3$  required for preparation of 1 litre of 0.1 N solution. (Na = 23, C = 12, O = 16).
  - (5) Define :
    - (a) Hydrolysis
    - (b) Degree of hydrolysis
  - (6) Calculate pH of an aqueous solution of  $CH_3COONH_4$ .  
 $[K_a = 1.75 \times 10^{-5}, K_b = 1.85 \times 10^{-5}]$

(c) Answer the following : (any two) 10

(1) Derive the equation for the pH,  $K_n$ , degree of hydrolysis of the salt of weak acid and weak base.

(2) Derive Langmuir adsorption isotherm equation.

(3) Explain mechanism of acidic and basic buffer solution.

(4) Derive an equation for work done in adiabatic

expansion of an ideal gas  $\left(\frac{V_2}{V_1}\right)^{\gamma-1} = \frac{T_1}{T_2}$ .

(5) Explain : Thermodynamic processes.

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