

RAMAKRISHNA MISSION VIDYAMANDIRA

Belur Math, Howrah – 711 202

ADMISSION TEST – 2023

CHEMISTRY

Date :15-07-2023

Full Marks : 50

Time: 11·00 a.m – 12·00 noon

Instructions for the Candidate

Answer all the questions given below. Each question carries **2 marks**.

Tick (✓) the most appropriate option on the **OMR SHEET**.

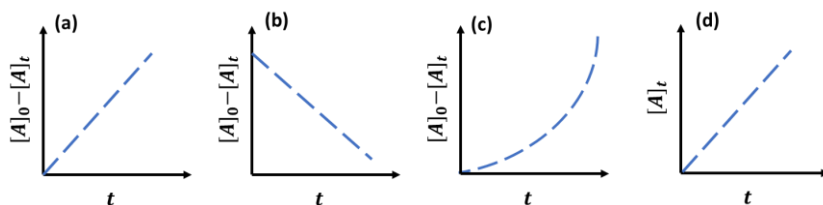
The tick must be very clear — if it is smudgy or not clear, no marks will be awarded.

Any rough work must be done in the supplied rough sheet(s).

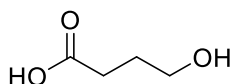
Candidates must return the rough sheet(s) along with the OMR SHEET.

- A real gas which obeys van der Waals equation will approach ideal behavior if
 - a is large, b is small
 - a is small, b is large
 - a and b both are large
 - a and b both are negligibly small.
- At constant volume, for a fixed number of moles of a gas the pressure increases with rise of temperature due to
 - Increase in average molecular speed
 - Decreased rate of collisions amongst molecules
 - Increase in molecular attraction
 - Decrease in mean free path
- For the following reaction, equilibrium constant K_p changes with
$$\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$$
 - Total pressure
 - Catalyst
 - The amount of H_2 and I_2 present
 - Temperature
- Spontaneous adsorption of a gas on solid surface
 - is an exothermic process
 - may be exothermic or endothermic.
 - is an endothermic process.
 - neither endo or exothermic as enthalpy does not change
- The gas X at 1 atm is bubbled through a solution containing a mixture of 1M Y and 1M Z at 25°C. If the order of the reduction potential is $Z > Y > X$, then
 - Y will oxidize X and not Z
 - Y will oxidize Z and not X
 - Y will oxidize both X and Z
 - Y will reduce both X and Z
- Half-life period of a radioactive element is 140 days. After 560 days, one gram of the element will reduce to
 - $\frac{1}{2}$ g
 - $\frac{1}{4}$ g
 - $\frac{1}{8}$ g
 - $\frac{1}{16}$ g
- The overall order of the reaction corresponding to rate constant $k = 1.63 \times 10^{-4} \text{ mol}^{-2} \text{ lit}^2 \text{ s}^{-1}$ is
 - 1
 - 2
 - 3
 - 0
- Which is true for a cyclic process?
 - q, w are zero, du may not be zero
 - du is zero, but q,w may not be zero
 - q,w, du all are zero
 - q,w, du all may not be zero

9. Correct mathematical form of the First Law of Thermodynamics is
 (a) $du = q+w$ (b) $du = dq+dw$ (c) $u = dq+dw$ (d) $du = w-q$
 (u : internal energy , q : heat withdrawn by system, w : work done on the system)
10. For a zero-order reaction $A \rightarrow P$, which of the following plot is right. ($[A]_0$ and $[A]_t$ are concentrations at $t=0$ and $t=t$ time.)



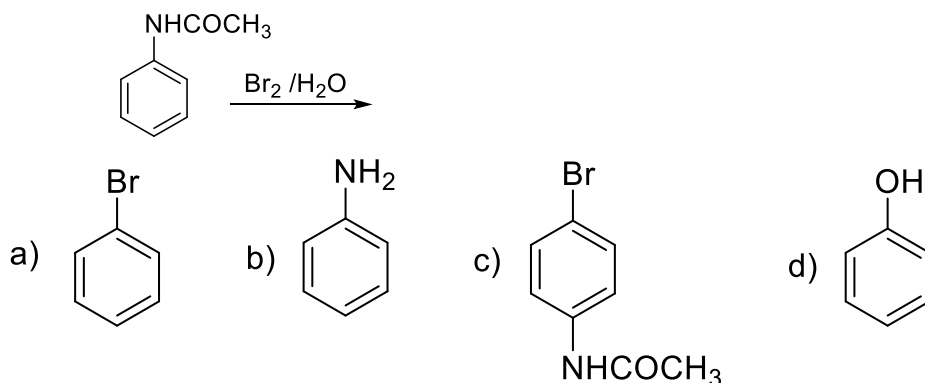
11. Correct IUPAC name for the following molecule is :



- (a) 4-Hydroxybutanoic acid (b) Ketobutan-1,2-diol
 (c) Butane-4-carboxylic acid (d) 4-Carboxylic acid butanol
12. Which of the followings is not an example of electrophile?

- (a) BF_3 (b) H_3O^+ (c) Cl^+ (d) CH_3CO^+

13. Predict the major product for the following reaction:



14. $RMgX$ should not react with :

- (a) CH_3COCH_3 (b) CH_3OCH_3 (c) $PhOH$ (d) CH_3NH_2

15. Which of the followings is known as Brady's reagent :

- (a) 2,4-Dinitrophenyl hydrazine (b) Br_2 in water
 (c) $Br_2 / NaOH$ in water (d) Alkaline $KMnO_4$

16. Identify the product 'P' in the following reaction

