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.

<u>Tick (\checkmark) the most appropriate option on the OMR SHEET</u>.

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.

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1.	A real gas which obeys van der Waals equation v (a) a is large, b is small		will approach ideal behavior if (b) a is small, b is large			
	(c) a and b both ar	e large		(d) a and b	both are negligibly small.	
2.	At constant volume, for a fixed number of moles of a gas the pressure increases with rise temperature due to					vith rise of
	(a) Increase in average molecular speed(c) Increase in molecular attraction		(b) Decreased rate of collisions amongst molecules(d) Decrease in mean free path			
3.	For the following reaction, equilibrium constant K _p changes with					
	$H_2(g) + I_2(g) \implies 2HI(g)$					
	(a) Total pressure			(b) Catalyst		
	(c) The amount of	H ₂ and I ₂ present		(d)Temper	ature	
4.	Spontaneous adsorption of a gas on solid surface					
	(a) is an exotherm	is an exothermic process (b) may be exothermic or endothermic.				
	(c) is an endotherm	nic process.	(d) neither	endo or exc	othermic as enthalpy does no	t change
5.	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					
(a) Y will oxidize X and not Z (b) Y		(b) Y will	Y will oxidize Z and not X			
	(c) Y will oxidize both X and Z			(d) Y will reduce both X and Z		
6.	Half-life period of a radioactive element is 140 days. After 560 days, one gram of the element w reduce to				lement will	
	(a) $\frac{1}{2}g$	(b) $\frac{1}{4}g$	(c) $\frac{1}{8}$	g	(d) $\frac{1}{16}g$	
7.	The overall order of (a) 1	of the reaction correction (b) 2	esponding to (c) 3	o rate consta	ant k = $1.63 \times 10^{-4} \text{ mol}^{-2} \text{ lit}^{2}$ (d) 0	s ⁻¹ is
8.	Which is true for a	cyclic process?				
	(a) q, w are zero, c(c) q,w, du all are	lu may not be zero zero		(b) d (d) q	lu is zero, but q,w may not be ,w, du all may not be zero	e 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 :



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) CH3COCH3b) CH3OCH3c) PhOHd) CH3NH2

15. Which of the followings is known as Brady's reagent :
(a) 2,4-Dinitophenyl hydrazine
(b) Br₂ in water
(c) Br₂ /NaOH in water
(d) Alkaline KMnO₄

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



17. Which of the following molecules is most acidic in nature :



- 18. If a solution of pH = 2 is mixed with an equal volume of a solution of pH = 5, the pH of the resulting solution will be a) 3.5 b) 2.3 c) 7.0 d) None of these
- 19. The dark purple colour of $KMnO_4$ is due to

a) $\sigma \rightarrow \pi^*$ transition.	b) Charge transfer transition
c) d-d transition	d) Ligand field transition.

- 20. The expected spin-only magnetic moments for $[Fe(CN)_6]^{4-}$ and $[FeF_6]^{3-}$, respectively are a) 1.73 and 1.73 BM b) 0.0 and 5.92 BM c) 0.0 and 1.73 BM d) 1.73 and 5.92 BM
- 21. The photoelectric work function of a metal is 2.0 eV, the threshold wavelength will be -

a) 3108Å	b) 6216 Å	c) 12432 Å	d) 1554 Å
/	/	/	,

22. Molecular weight of KMnO₄ is 158 gm. Equivalent weight of KMnO₄ at pH 4 and 7, respectively-

a) 52.66 and 31.6 gm	b) 31.6 and 52.66 gm
c) 31.6 and 158 gm	d) 158 and 32.66 gm

- 23. If indium is added in small quantity of Ge metal, we get –
 a) n- type semiconductor
 b) p- type semiconductor
 c) Rectifier
 d) Insulator
- 24. The correct order of the O-O bond length in O_2 , H_2O_2 and O_3 is
 - a) $O_3 > H_2O_2 > O_2$ c) $H_2O_2 < O_3 < O_2$ b) $O_2 < O_3 < H_2O_2$ d) $O_2 > H_2O_2 > O_3$

25. The correct order of hybridisation of the central atom in the following species NH_3 , $[PtCl_4]^{2-}$, PCl_5 and BCl_3 is —

