Test Booklet No. _____

This booklet consists of 100 questions and 12 printed pages.

RGUCET/____/___

Series NIL

RGUCET 2023

Masters in Chemistry

Full Marks: 100 **Time: 2 Hours**

Roll No. | | | | | | | | |

Day and Date of Examination : _____

Signature of Invigilator(s) : _____

Signature of Candidate : _____

General Instructions:

PLEASE READ ALL THE INSTRUCTIONS CAREFULLY BEFORE MAKING ANY ENTRY.

1. DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO.
2. Candidate must write his/her Roll Number on the space provided.
3. This Test Booklet contains 100 Multiple Choice Questions (MCQs). Each question carries 1 mark. There shall be negative marking of 0.25 against each wrong attempt.
4. Please check the Test Booklet to verify that the total pages and total number of questions contained in the test booklet are the same as those printed on the top of the first page. Also check whether the questions are in sequential order or not.
5. Candidates are not permitted to enter into the examination hall 15 minutes after the commencement of the entrance test or leave the examination hall before 30 minutes of end of examination.
6. Making any identification mark in the OMR Answer Sheet or writing Roll Number anywhere other than the specified places will lead to disqualification of the candidate.
7. Candidates shall maintain silence inside and outside the examination hall. If candidate(s) is/are found violating the instructions mentioned herein or announced in the examination hall, they will be summarily disqualified from the entrance test.
8. In case of any dispute, the decision of the Entrance Test Committee, RGU shall be final and binding.
9. The OMR Answer Sheet consists of two copies, the Original copy and the Student's copy.

1	If MNPQWXFG stand for the word LOVE, then IJBCUVFG stands for?				b)	HATE
	a) HOME	b) HATE	c) KITE	d) WIFE		
2	An elevator has the capacity of 12 adults or 20 children. How many adults can board the elevator with 15 children?				b)	3
	a) 4	b) 3	c) 5	d) 6		
3	Find the odd one-				c)	Time
	a) Hour	b) Day	c) Time	d) Second		
4	1 Gigabyte (GB) is equal to				c)	1024 MB
	a) 1000 MB	b) 1022 MB	c) 1024 MB	d) 996 MB		
5	Look at this series: 7, 10, 8, 11, 9, 12, ... What number should come next?				b)	10
	a) 7	b) 10	c) 12	d) 13		
6	The treaty resulted from the first Anglo-Burmese war is-				c)	Treaty of Yandaboo
	a) Treaty of Burma	b) Treaty of Peace	c) Treaty of Yandaboo	d) Treaty of Myanmar		
7	Halley's comet appears once in a period of-				c)	76 years
	a) 56 years	b) 46 years	c) 76 years	d) 66 years		
8	Who regulates the insurance trade in the country?				c)	IRDAI
	a) SEBI	b) RBI	c) IRDAI	d) LIC		
9	Which of the following colours has the longest wavelength?				a)	Red
	a) Red	b) Green	c) Blue	d) Yellow		
10	Which Mountain is also called as Roof of the World?				a)	The Pamirs
	a) The Pamirs	b) Kangchenjunga	c) Mount Kinabalu	d) Mt Kilimanjaro		
11	Who invented the computer mouse?				a)	Douglas

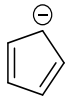
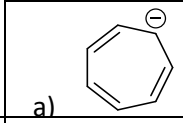
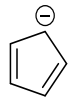
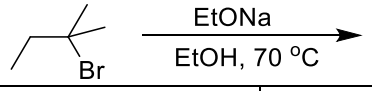
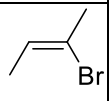
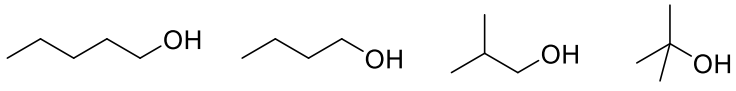
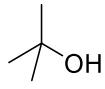
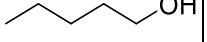
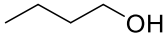
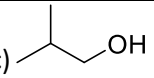
	a) Douglas Engelbart	b) Steve Jobs	c) Bill Gates	d) Sundar Pichai		Engelbart
12	Which institution released the 'Promoting Millets in Diets' Report?				b)	NITI Aayog
	a) FCI	b) NITI Aayog	c) FSSAI	d) NABARD		
13	Select the antonym of the underlined word as per the context: The guilty appealed to the jury to <u>condone</u> his punishment.				d)	condemn
	a) forgive	b) accept	c) praise	d) condemn		
14	Select the most appropriate word for the blank space: I _____ you to be at the party this evening.				b)	expect
	a) hope	b) expect	c) look forward to	d) think		
15	The art of making maps and charts is called				b)	cartography
	a) calligraphy	b)cartography	c) chromatics	d) mensuration		
16	Fill in the blank: She jumped _____ the well.				d)	into
	a) in	b) to	c) at	d) into		
17	I ____ never seen such a picture before.				a)	have
	a) have	b) did	c) has	d) was		
18	Antonym of Safeguard?				d)	Imperil
	a) Protect	b) Hazard	c) Defend	d) Imperil		
19	Choose the correctly spelt word				c)	Consensus
	a) Consencus	b) Consansus	c) Consensus	d) Cocensus		
20	Synonym of Biennial is-				b)	Every two years
	a) Twice in a year	b) Every two years	c) Quickly	d) Every two weeks		

21	Charges levied for normal UPI payments as per NPCI is-				a)	0.0%
	a) 0.0%	b) 0.2%	c) 0.5%	d) 1.0%		
22	In 2022, which state got its second railway station after a gap of 100 years?				c)	Nagaland
	a) Arunachal Pradesh	b) Manipur	c) Nagaland	d) Mizoram		
23	Which of the following is not a host for 2026 FIFA World Cup football?				d)	Brazil
	a) Canada	b) Mexico	c) United States	d) Brazil		
24	What is the unique feature of the plant named '*Utricularia furcellata*', which was recently found in the news?				c)	Carnivorous plant
	a) Poisonous plant	b) Medicinal plant	c) Carnivorous plant	d) Herbivorous		
25	What is the official slogan of the 2024 Paris Olympics?				a)	Games Wide Open
	a) Games Wide Open	b) Global Partnership	c) Brotherly and Beautiful	d) Inclusive and Impressive		
26	The compressibility factor, *z* is given by-					
	(a) $z = \frac{PV}{RT^2}$	(b) $z = \frac{PV}{2RT}$	(c) $z = \frac{PV}{RT}$	(d) $z = \frac{2PV}{RT}$	(c)	$z = \frac{PV}{RT}$
27	Gas 'A' diffuses twice as fast as another gas 'B'. if the vapour density of the gas 'A' is 2, the molecular mass of gas 'B' is-					
	(a) 2	(b) 4	(c) 8	(d) 16	(d)	16
28	In L atm K^{-1} mol^{-1}, the numerical value of *R*, the gas constant is-					
	(a) 0.821	(b) 0.0821	(c) 0.00821	(d) 0.000821	(b)	0.0821
29	In van der Waals' equation of the state of the gas, the constant '*b*' is a measure of-					

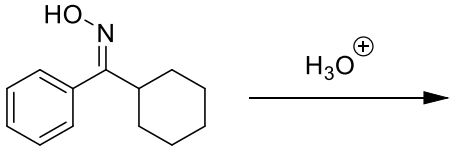
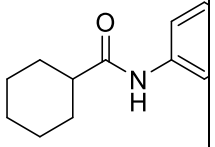
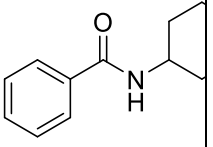
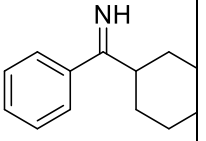
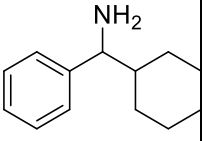
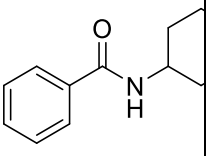
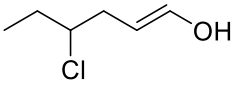
	(a) intermolecular repulsions	(b) intermolecular attractions	(c) volume occupied by the molecules	(d) intermolecular collisions per unit volume	(c)	volume occupied by the molecules
30	The pressure at which equilibrium constant in terms of pressure is found to be equal to that in terms of mole fraction for the equilibrium: $PCl_5(g) \rightleftharpoons PCl_3(g)+Cl_2(g)$ is-					
	(a) 10.0 atm	(b) 1.0 atm	(c) 0.1 atm	(d) 2.0 atm	(b)	1.0 atm
31	A salt of weak acid and strong base on hydrolysis yields a solution which is-					
	(a) slightly acidic	(b) slightly basic	(c) neutral	(d) highly acidic	(b)	slightly basic
32	If '*s*' is the solubility of CaF_2 in water, the solubility product is given by -					
	(a) $K_{sp} = s^2$	(b) $K_{sp} = s^3$	(c) $K_{sp} = 4s^3$	(d) $K_{sp} = 4s^2$	(c)	$K_{sp} = 4s^3$
33	The process of solvation of NH_4Cl in water is-					
	(a) Endothermic, non-spontaneous	(b) Exothermic, spontaneous	(c) Exothermic, non-spontaneous	(d) Endothermic, spontaneous	(d)	Endothermic, spontaneous
34	In an adiabatic process……. can flow into or out of the system.					
	(a) no heat	(b) heat	(c) matter	(d) no matter	(a)	No heat
35	A gas expands from 10 litres to 20 litres against a constant external pressure of 10 atm. The pressure-volume work done by the system is-					
	(a) 100 lit atm	(b) –100 lit	(c) 10 lit atm	(d) –10 lit atm	(b)	–100 lit atm

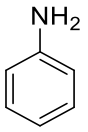
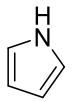
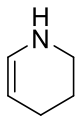
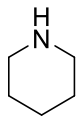
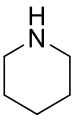
		atm				
36	The entropy of a system increases in the order-					
	(a) gas<liquid<solid	(b) solid<liquid<gas	(c) gas<solid<liquid	(d) none of these	(b)	solid<liquid < gas
37	On increasing pressure, melting point of ice-					
	(a) decreases	(b) increases	(c) remains unchanged	(d) changes in regular manner	(a)	decreases
38	The highest osmotic pressure will be observed in-					
	(a) 0.1 M urea	(b) 0.1 M glucose	(c) 0.1 M NaCl	(d) 0.1 M $Al_2(SO_4)_3$	(d)	0.1 M $Al_2(SO_4)_3$
39	Radioactive decay follows …….. order kinetics.					
	(a) zero	(b) first	(c) second	(d) third	(b)	first
40	The rate law related the rate of a chemical reaction to-					
	(a) the temperature	(b) the concentration of reactants	(c) the activation energy	(d) the concentration of products	(b)	the concentration of reactants
41	For strong electrolytes, the degree of dissociation is-					
	(a) nearly equal to zero	(b) nearly equal to 0.5	(c) nearly equal to 1	(d) nearly equal to 2	(c)	nearly equal to 1
42	On dilution, the specific conductance of a solution of an electrolyte–-					
	(a) increases	(b)	(c) does not vary with	(d) cannot be	(b)	decreases

		decreases	dilution	predicted		
43	Water has three phases-ice, water and vapours. The number of components in the system is-					
	(a) one	(b) two	(c) three	(d) four	(a)	one
44	A photochemical reaction takes place by the absorption of-					
	(a) visible and ultraviolet radiations	(b) infrared radiations	(c) heat energy	(d) microwave radiation	(a)	visible and ultraviolet radiations
45	What type of decay process might ^{214}Pb convert to ^{214}Bi-					
	(a) beta decay	(b) alpha decay	(c) gamma decay	(d) electron capture	(a)	beta decay
46	The continuous rapid zig-zag movement executed by a colloidal particle in the dispersion medium is called-					
	(a) Tyndall effect	(b) Brownian movement	(c) electrophoresis	(d) peptization	(b)	Brownian movement
47	Which of the following is not a colloidal solution-					
	(a) brine solution	(b) fog	(c) smoke	(d) butter	(a)	brine solution
48	If uncertainty in the measurement of the position of an electron is 7.26×10^{-18} m then uncertainty in the measurement of velocity is-					
	(a) 6.96×10^{8} m/s	(b) 7.98×10^{12} m/s	(c) 7.98×10^{14} m/s	(d) 7.98×10^{-12} m/s	(b)	7.98×10^{12} m/s
49	What is the maximum number of orbital's that can be identified with the quantum numbers: $n = 3$, $l = 1$, $m_l = 0$ -					

	(a) 1	(b) 2	(c) 3	(d) 4	(a)	1
50	When water is cooled to ice, its entropy-					
	(a) increases	(b) decreases	(c) remains the same	(d) becomes zero	(b)	decreases
51	The correct order of acidity for the following compounds is- CH_3-CH_2-CH_3 (A) H_3C-C≡CH (B) H_3C-HC=CH_2 (C)				d)	**A<C<B**
	a) A<B<C	b) C<B<A	c) B<C<A	d) A<C<B		
52	Among the following anionic compounds, the compound which is aromatic is-				b)	
	a) 	b) 	c) 	d) 		
53	Consider the reaction given below. The major product of the following reaction is- 				b)	
	a) 	b) 	c) 	d) 		
54	The stability of 1°, 2°, 3° and methyl carbocations is of the order-				d)	3°>2°>1°>methyl
	a) 1° >2° > 3° > methyl	b) 2° > 1° > 3° > methyl	c)methyl> 1° >2° > 3°	d) 3° >2° > 1° > methyl		
55	Among the following alcohols, the alcohol with the lowest boiling point is- 				d)	
	a) 	b) 	c) 	d) 		
56	Oximes are formed by the reaction of ketones with-				c)	hydroxylamine
	a) aldehyde	b) acid	c) hydroxylamin	d) Na metal		

			e			
57	Ethers can generally be prepared industrially by-				b)	Williamson synthesis
	a) Fermentation	b) Williamson synthesis	c) Wittig reaction	d) Aldol condensation		
58	The industrially prepared vinegar is a dilute aqueous solution-				d)	Acetic acid
	a) Lactic acid	b) Tartaric acid	c) Citric acid	d) Acetic acid		
59	The reagent capable of producing carboxylic acid by pouring on dry ice is-				c)	Grignard reagent
	a) Gilman reagent	b) Tebbe reagent	c) Grignard reagent	d) Braddy's reagent		
60	The instrument used to detect and measure the optical activity of a compound is-				b)	Polarimeter
	a) Ammeter	b) Polarimeter	c) pH meter	d) Potentiometer		
61	The compounds given below are an example of- 				a)	Functional isomerism
	a) Functional isomerism	b) Position isomerism	c) Chain isomersim	d) Tautomersim		
62	pH is defined by the equation-				d)	$-\log [H^+]$
	a) $-\log K_a$	b) $-\log K_b$	c) $-\log [OH^-]$	d) $-\log [H^+]$		
63	The organic compound which shows a positive silver mirror test with Tollens' reagent is-				b)	Benzaldehyde
	a) 2-Naphthol	b) Benzaldehyde	c) Benzoic acid	d) *p*-Toluidine		
64	Among the following, the rearrangement reaction which involves an isocyanate intermediate is-				a)	Curtuis
	a) Curtuis	b) Fries rearrangement	c) Claisen	d) Cope		

	rearrangement		rearrangement	rearrangement		rearrangement
65	The correct product of the following reaction is- 					
	a) 	b) 	c) 	d) 	b)	
66	Identify the least aromatic compound-					
	a) furan	b) pyrrole	c) thiophene	d) pyridine	a)	furan
67	Among the following molecules, the molecule with the greatest dipole moment is-					
	a) CH_3F	b) CH_3Cl	c) CH_3Br	d) CH_3I	a)	CH_3F
	The aldehyde which is most likely to undergo Cannizaro reaction is-					
68	The addition of saturated Na_2CO_3 to a solution of carboxylic acid results in rapid effervescence which is due to evolution of.					
	a) CO	b) CO_2	c) O_2	d) N_2	b)	CO_2
69	The correct IUPAC nomenclature of the following compound is 					
	a) (*E*)-3-chlorohex-5-en-6-ol	b) (*Z*)-3-chlorohex-5-en-6-ol	c) (*E*)-4-chlorohex-1-en-1-ol	d) (*Z*)-4-chlorohex-1-en-1-ol	c)	(*E*)-4-chlorohex-1-en-1-ol
70	Among the following, the compound which is most basic is.					

	a) 	b) 	c) 	d) 	d)	
71	The distinction between primary, secondary and tertiary amines can be carried out by-					
	a) Lucas test	b) Iodoform test	c) Hinsberg test	d) Tollens' test	c)	Hinsberg test
72	Which of the following is not an reducing agent?					
	a) $NaBH_4$	b) $LiAlH_4$	c) PDC	d) Zn/Hg, HCl	c)	PDC
73	Peptide bond is a-					
	a) Hydrogen bond	b) Metallic bond	c) Ionic bond	d) Covalent bond	d)	Covalent bond
74	The number of isoprene units contained in sesquiterpenes is-					
	a) 1	b) 2	c) 3	d) 4	C	3
75	Which of the following is a non-reducing sugar?					
	a) Sucrose	b) Glucose	c) Galactose	d) Fructose	a)	Sucrose

76	The element having tetra atomicity is-					
	a) He	b) N	c) P	d) Cl	c)	P
77	What is the shape of SF_4 as per VSEPR?					
	a) Square planar	b) Tetrahedral	c) See-Saw	d) Pyramidal	c)	See-Saw
78	Which of the following is the most reducing?					
	a) K	b) Na	c) Mg	d) Br_2	a)	K
79	If an electron and proton have the same de Broglie wavelength, then the kinetic energy of the electron is-					

	a) Zero	b) less than that of a proton	c) more than that of proton	d) Equal to that of proton	c)	more than that of proton
80	*Ortho*- and *para*-hydrogen differ in-					
	a) atomic number	b) mass number	c) nuclear spin	d) all of these	c)	nuclear spin
81	The quantum number not obtained from the Schrödinger wave equation is-					
	a) n	b) l	c) m_l	d) m_s	d)	m_s
82	Which of the following pairs represents isobars?					
	(a) $^{40}_{19}\mathrm{K}$ and $^{40}_{20}\mathrm{Ca}$	(b) $^{3}_{2}\mathrm{He}$ and $^{4}_{2}\mathrm{He}$	(c) $^{24}_{12}\mathrm{Mg}$ and $^{25}_{12}\mathrm{Mg}$	(d) $^{40}_{19}\mathrm{K}$ and $^{39}_{19}\mathrm{K}$	(a)	$^{40}_{19}\mathrm{K}$ and $^{40}_{20}\mathrm{Ca}$
83	Which of the following elements has the highest value of electron affinity-					
	a) O	b) S	c) Se	d)Te	b)	S
84	The outermost electronic configuration of the most electronegative element is-					
	a) $ns^2\ np^3$	b) $ns^2\ np^4$	c) $ns^2\ np^5$	d) $ns^2\ np^6$	c)	$ns^2\ np^5$
85	The hybridization of Br in BrF_3 is-					
	a) sp^2	b) sp^3	c) sp^3d	d) sp^3d^2	c)	sp^3d
86	The spin-only magnetic moment in BM for $[FeF_6]^{3-}$ is-				b)	5.92
	a) 0	b) 5.92	c) 4.47	d) 6.92		
87	Covalent molecules are held together in a crystal structure by-					
	a) hydrogen bond	b) electrostatic attraction	c) van der Waal's attraction	d) dipole-dipole attraction	c)	van der Waal's attraction
88	Chemical formula of Buckminsterfullerene is-					
	a) C_{40}	b) C_{50}	c) C_{60}	d) C_{70}	c)	C_{60}

89	The number of OH group in phosphorous acid, H_3PO_3 is-				b)	2
	a) 1	b) 2	c) 3	d) 4		
90	The manufacture of nitric acid is carried out by-				a)	Ostwald process
	a) Ostwald process	b) Solvay process	c) Haber process	d) Mond process		
91	Inorganic benzene is -				c)	$B_3H_6N_3$
	a) $B_3H_3N_3$	b) BH_3NH_3	c) $B_3H_6N_3$	d) $H_3B_3N_6$		
92	The correct electronic configuration of Gd^{3+} is-				a)	$[Xe]4f^7$
	a) $[Xe]4f^7$	b) $[Rn]4f^6$	c) $[Xe]4f^5$	d) $[Rn]4f^7$		
93	The bonding in boranes is				c)	3c-2e bond
	a) 3c-4e bond	b) 3c-4e bond	c) 3c-2e bond	d) 2c-3e bond		
94	Transition metals are generally coloured because-				c)	of d-d transition
	a) they absorb electromagnetic radiations	b) their penultimate d-subshells are fully filled	c) of d-d transition	d) of L-M transition		
95	Which of the following is Baeyer's reagent-				b)	alkaline $KMnO_4$
	a) acidified $KMnO_4$	b) alkaline $KMnO_4$	c) acidified $K_2Cr_2O_7$	d) aqueous $KMnO_4$		
96	Transition metals complexes act as-				a)	Lewis acid
	a) Lewis acid	b) Lewis base	c) free radicals	d) Bronsted base		
97	Which one of the following is false about ferrocene-				d)	it resist electrophilic substitution
	a) it obeys 18 electron rule	b) it is diamagnetic	c) it is orange in color	d) it resist electrophilic substitution		
98	The isomerism shown by the complexes $[Cu(NH_3)_4][PtCl_4]$ and $[Pt(NH_3)_4][CuCl_4]$ is-				c)	Coordination isomerism
	a) Linkage	b) Ionization	c)	d) Geometric		

	isomerism	isomerism	Coordination isomerism	isomerism		
99	The crystal field stabilization energy for a high spin d^6 system such as $[CoF_6]^{3-}$ is-				b)	4 Dq
	a) 0 Dq	b) 4 Dq	c) 6 Dq	d) 12 Dq		
100	Mercury and its compounds are toxic due to their-				a)	high affinity for thiols
	a) high affinity for thiols	b) interference with oxygen transport	c) binding to histidine	d) inhibition of vitamin B_{12} synthesis		