GURU NANAK INSTITUTE OF TECHNOLOGY

An Autonomous Institute under MAKAUT

2022-2023

CHEMISTRY-I (Backlog)

CH101

TIME ALLOTTED: 3 Hours **FULL MARKS: 70**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP – A
(Multiple Choice Type Questions)

Answer any *ten* from the following, choosing the correct alternative of each question: **10×1=10**

		Marks	CO No.
1. i)	How many different spectral emission lines are conventionally obtained in the emission spectra of H atom a) 3 b) 4 c) 5 d) 2	1	CO4
ii)	For an endothermic reaction, a) ΔH is positive b) ΔH is negative c) $\Delta H = 0$ d) ΔU is negative	1	CO2
iii)	The cell reaction is spontaneous if the cell potential is a) positive b) negative c) zero d) infinite	1	CO4
iv)	NMR spectra normally carried on a) Liquid or solution b) Gas c) Solid d) Suspension	1	CO3
v)	Absorbance of a sample is calculated from a) Raoult's Law b) Lambert-Beer's law c) Pauli's Exclusion Principle d) Golden Rule	1	CO5

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vii)	In a certain process 678J of heat is absorbed by a system while 290J of work is done on the system. What is the change in the internal energy for the process? a) 970J b) 968J c) 428J d) 972J	1	CO1
viii)	Which statement is correct? In H atom emission spectrum, a) All Balmer lines ends at n=2 level b) All Lyman lines ends at n=2 level c) All Paschen lines ends at n=2 level d) All Bracket lines ends at n=2 level	1	CO1
ix)	Atomic size of the elements in the periodic table a) decreases from left to right b) increases from left to right c) decreases down the group d) does not change down the group	1	CO1
x)	A change in internal energy of the system depends on a) Initial state and final state of the system b) The reversible path c) The irreversibility of the process d) The initial state of the system only	1	CO2
xi)	For an exothermic reaction, a) Δ H is positive b) Δ H is negative c) $\Delta H = 0$ d) Δ U is negative	1	CO2
xii)	Paracetamol used as a) Tranquilizer b) pain killer c) to reduce body temperature (fever) d) both b and c	1	CO3

GROUP – B
(Short Answer Type Questions)
(Answer any *three* of the following) 3×5 = 15

		Marks	CO No.
2. a)	State Heisenberg uncertainty principle and give the mathematical expression.	3	CO1
b)	What is eigen function and eigen value?	2	CO2
3.	Write down the chemical structure of repeating units of nylon 6, 6. The degree of polymerization is 1000. Find the molecular weight of polyethylene. What is the difference between HDPE and LDPE?	5	CO4
4.	Classify polymers according to the tacticity and thermal response.	5	CO3
5. a)	Write down the drawbacks of Bohr's Postulates.	2	CO1
b)	Explain the basic principle of IR activity.	3	CO4
6. a)	Why formic acid is stronger than acetic acid?	2	CO3
b)	Write van der Walls's equation of state for n moles of a real gas. Explain the terms involved.	3	CO4

GROUP –C
(Long Answer Type Questions)
(Answer any *three* of the following) 3×15 = 45

		Marks	CO No.
7. a)	How does orbital differ from orbit? Draw the shapes of 1s, $2p_x$, $2p_y$, $2p_z$, $3d_{xy}$, $3d_{yz}$, $3d_{zx}$, $3d_{x^2-y^2}$ and $3d_{z^2}$ orbital.	5	CO3
b)	Write down the Schrödinger wave equation in its standard form and define each term in it.	3	CO5
c)	Define ionization potential and electron affinity. Between ^{7}N and ^{8}O which one will have higher ionization potential and why?	4	CO2
d)	Calculate the entropy change for the compression of 20 gm of He from a pressure 1 to 10 atm at 20 °C.	3	CO3
8. a)	Write a comparative discussion on S_N1 and S_N2 reactions involving a) rate equation b) mechanism c) potential energy diagram d) implication of stereochemistry, if any.	8	CO5
b)	What is electrochemical corrosion? Give details reactions of the formation of rust.	4	CO3
c)	Why anodic protection is better than cathodic protection?	3	CO3
9. a)	How Paracetamol can be synthesized from p-nitrophenol. Write the synthetic pathway.	5	CO5
b)	What is inductive effect? How does it affect the physical property of a molecule?	4	CO4
c)	What is the difference between homo polymer and co-polymer? Give examples.	4	CO3
d)	What is finger print region in IR spectroscopy?	2	CO4

10.	a)	What are quantum numbers and what do they signify?	5	CO1
	b)	Though F is higher electronegative than Cl, but Cl has higher electron affinity than F. Why? Explain the oxidizing trend of the elements in the Periodic table.	5	CO1
	c)	Write down the Schrödinger wave equation in its standard form and define each term in it. An electron is in 4f orbital. What will be the possible value of n, l and m?	5	CO1
11.		Write short notes on (any three)	3×5=15	
	a)	Bio polymer	5	CO3
	b)	Red shift and blue shift	5	CO4
	c)	Stereoisomerism	5	CO4
	d)	Chemical shift in NMR spectroscopy	5	CO4
	e)	Friedel Craft reaction	5	CO4