VCD/ 6/12/23 FYBSC SEM I SUBJECT - CHEMISTRY I 2 ½ HRS 75 marks

Note: i) All the questions are compulsory.
ii) Figures to right indicate full marks.
iii) Use of non-programmable calculator/log table is allowed.

Q.1 A) Multiple Choice Questions.(Any 9) (9M)

1) Internal energy is _____function.
a) State b) Path c) Both d) Neutral

2) _____ is an intensive property.
a) Density b) Volume c) Mass d) Enthalpy

3) Kirchhoff's equation gives the variation between _____ and _____ of a reaction.
a) Enthalpy and Temperature b) Pressure and Temperature c) Volume and Pressure d) Entropy and Temperature

4) The ideal gas equation is given by
a) PV = nRT b) PR = nVT c) PT = nRV d) Pn = VRT

5) The horizontal rows of long periodic table are called as ___.
a) groups b) periods c) elements d) electrons

6) The shape of s orbital is ___.
a) dumb bell b) spherical c) square d) triangle

7) The fine spectra of hydrogen is explain by ____ theory.
a) Bohr's b) Rutherford's c) Pauli's d) Mulliken

8) The circular path around a nucleus in which electron revolve is called as_____.
a) spin b) orbit c) atom d) quantum number

9) Propane has ___ carbon.
a) 1 b) 2 c) 3 d) 4

10) Sigma bond is ____ than pi bond.
a) Strong b) Weak c) very weak d) moderate

11) Whenever carbon is unsaturated having a triple bond, it is ___ hybridized.
a) Sp b) Sp^2 c) Sp^3 d) Sp^3d

12) Ammonia has a ___ shape.
a) Pyramidal b) Tetrahedral c) Linear d) Hexagonal

B. Match the following. (3M)

1) ppm.	a) C_3H_8O
2) 3s orbital	b) 10^6
3) Methoxyethane	c) 2 nodes

C. True or False (3M)

1) The acidity of NaOH is 2.
2) In periodic table across the period from left to right atomic size increases.
3) Monochloro acetic acid is stronger than acetic acid.

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Q.2 Attempt ANY FOUR of the following questions. (20M)

1) Derive the Kirchhoff's equation.
2) State the mathematical expression for First law of thermodynamics.
3) Define following terms with suitable examples.
   a. Isothermal process b. Isochoric process c. Open system d. Closed system e. Isobaric process.
4) What is meant by enthalpy of combustion and give its applications.
5) State and explain the term heat capacity.
6) Define Molarity. A solution containing 12.6 g of oxalic acid ($C_2H_2O_4.H_2O$) per 500 cm^3 has density 1.05 g cm^3. Calculate (i) molarity (ii) normality. (H=1, C=12, O=16)

Q.3 Attempt ANY FOUR of the following questions. (20M)

1) Describe the Rutherford's atomic model. What are the drawbacks of Rutherford's atomic model?
2) Define 1) Aufbau principle 2) Pauli's exclusion principle.
3) Discuss electronegativity of elements determined by Pauling's method.
4) Discuss the postulate of Bohr's atomic theory and its limitation.
5) Give the classification of elements on the basis of periodic table.
6) Calculate effective nuclear charge felt by 4s electron of potassium.

Q.4 Attempt ANY FOUR of the following questions. (20M)

1) Explain the Sp^3 hybridization of carbon. Explain formation of methane molecule.
2) Distinguish between Sigma and Pi bonds.
3) What is resonance. What are the requirements for a molecule to exhibit resonance.
4) Explain the influence of hybridization on the bond properties taking example of Ethane, Ethene and Ethyne.
5) Give the example of following reactions.
   a) Substitution b) Addition c) Elimination d) Pericyclic reaction e) Rearrangement reaction.
6) Write the structural formula for each of the following compounds
   a) cis-2-butene b) 1,3 dimethyl cyclohexane c) 3-ethyl cyclopentanol d) Butanedioic anhydride
   e) sodium ethanoate.