# PACIFIC ACADEMY OF HIGHER EDUCATION AND RESEARCH UNIVERSITY, UDAIPUR

## SECTION – B

## CHEMISTRY

**Max. Marks – 100**

Roll No. (in figures) _____

Roll No. (in words) _____

Signature of the Candidate _____

Signature of Invigilator's 1. _____ 2. _____

**Instruction for Candidates:**
Attempt all 50 questions, each question carry 02 marks. There is no negative marking. Please mark the correct answer as A/B/C/D at appropriate place, on the right hand side of the question, in blue or black ink.

**Q.1** Purest form of iron is :

(a) White cast iron (b) Grey cast iron

(c) Wrought iron (d) Steel [ ]

**Q.2** Select the one with highest number f unpaired electrons.

(a) $Mn^{2+}$ (b) $Ni^{2+}$

(c) $Fe^{2+}$ (d) $Co^{2+}$ [ ]

**Q.3** $KMnO_4$ acts as an oxidizing agent in neutral, alkaline as well as acidic medium. The final products in these three condition are, respectively.

(a) $MnO_2$, $MnO_2$, $Mn^{2+}$ (b) $MnO4^{2-}$ , $Mn^{3+}$, $Nn^{2+}$

(c) $MnO_2$ , $MnO_4^-$, $Mn^{2+}$ (d) MnO, $MnO_2$, $Mn^{2+}$ [ ]

**Q.4** Zr and Hf have similar atomic and ionic radii because.

(a) Of diagonal relationship (b) Both are in the same group

(c) Of lanthanide contraction (d) They have similar chemical properties [ ]

**Q.5** Which of the following ion is paramagnetic.

(a) $La^{3+}$ (b) $Lu^{3+}$

(c) $Yb^{2+}$ (d) $Sn^{3+}$ [ ]

**Q.6** Fill in the blank:

$B_2H_6 + 6H_2O \rightarrow ? + 6H_2$

(a) $B_2O_3$ (b) 2 $H_3BO_3$

(c) 2 $HBO_2$ (d) None of these [ ]

**Q.7** Fluorine forms chemical compounds only with

(a) He (b) Ne

(c) Ar (d) Xe [ ]

**Q.8** Which one forms the most stable complex?

(a) $Cu^{2+}$ (b) $Ni^{2+}$ [ ]

(c) $Fe^{2+}$ (d) $Mn^{2+}$ [ ]

**Q.9** The pair of complex compounds $[Cr(H_2O)_6Cl_3]$ and $[Cr(H_2O)_5Cl]\ Cl_2.H_2O$ is an example of :

(a) Stereo isomerism (b) Ionisation isomerism

(c) Coordination isomerism (d) Hydrate isomerism [ ]

**Q.10** The coordination number of $Na^+$ in cubic closed packing structure of NaCl is -

(a) 4 (b) 6

(c) 8 (d) 12 [ ]

**Q.11** The hemolytic fission of a hydrocarbon results in the formation of -

(a) Carbonium ions (b) Free radicals

(c) Carbanions (d) Carbenes [ ]

**Q.12** Which of the following is not aromatic?

(a) Benzene (b) Cyclooctatetra-enyl anion

(c) Tropylium cation (d) Cyclopentadienyl anion [ ]

**Q.13** The acid catalysed conversion of ketoximes to amides is known as -

(a) Beckmann rearrangement (b) Curtius rearrangement

(c) Stobbe reaction (d) Witting reaction [ ]

**Q.14** In the Baeyer-Villiger rearrangement -

(a) Carbosylic acid reacts with hydrazoic acid to give primary amines. (b) Aldehydes and ketones are oxidised in presence of per acid.

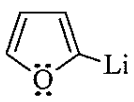
(c) Hydroxamic acid is converted to isocyanate. (d) Amides are converted to amines. [ ]

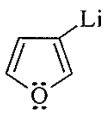
**Q.15** Complete the reaction :

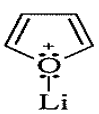
(a) HCOOH (b) HCHO

(c) $RCH_2OH$ (d) RCHO [ ]

**Q.16** In heteroatomic compounds, the preferred product of lithiation is -

(a) 


(b) 


(c) 


(d) None of these [ ]

**Q.17** Pyridine is converted to pyridine-N-oxide in the presence of -

(a) Benzoic acid (b) Perbenzoic acid

(c) $KMnO_4$ (d) $K_2Cr_2O_7$ [ ]

**Q.18** Which of the following compounds is colourless?

(a) $C_6H_5$ (CH = CH) $C_6H_5$ (b) $C_6H_5$ $(CH = CH)_4$ $C_6H_5$

(c) $C_6H_5$ $(CH = CH)_7$ $C_6H_5$ (d) $C_6H_5$ $(CH = CH)_{15}$ $C_6H_5$ [ ]

**Q.19** Pericyclic reaction is -

(a) Elimination reaction (b) Substitution reaction

(c) Concerted reaction (d) None of these [ ]

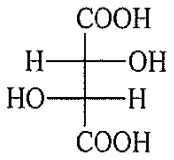
**Q.20** $|| + || \rightarrow \square$

This reaction is -

(a) Thermally allowed (b) Photochemically allowed

(c) Both (a) and (b) (d) None of these [ ]

**Q.21** The nomenclature of C-2 and C-3 carbons in (+) tartaric acid is –




(a) 2S, 3S (b) 2R, 3R

(c) 2R, 3S (d) 2S, 3R [ ]

**Q.22** Which of the following is not applicable to molecules that form isomers by rotation about single bonds?

(a) Flexible molecules (b) Rotational isomers

(c) Stereoisomers (d) Conformations [ ]

**Q.23** The bond orders of the given species is in the order -

(a) $O_2^- > O_2^+ > O_2^{2-} > O_2$ (b) $O_2^+ > O_2 > O_2^- > O_2^{2-}$

(c) $O_2 > O_2^{2-} > O_2^- > O_2$ (d) $O_2^{2-} > O_2 > O_2^+ > O_2^-$ [ ]

**Q.24** Which of the following diatonic molecules would be stabilized by the removal of an $e^-$.

(a) $C_2$ (b) CN

(c) $N_2$ (d) $O_2$ [ ]

**Q.25** Oxetane formation takes place in -

(a) Norrish type I (b) Norrish type II

(c) Paterno-Buchi reaction (d) Barton reaction [ ]

**Q.26** Phosphorescence occurs, which electronic transition taken place from -

(a) $T_1 \rightarrow S_0$ (b) $S_1 \rightarrow S_0$

(c) $S_1 \rightarrow T_1$ (d) $S_2 \rightarrow S_1$ [ ]

**Q.27** Which group of compound does not involve the $\pi \rightarrow \pi^*$ transition in UV spectrosocopy?

(a) Alkenes (b) Azo compounds

(c) Alcohols (d) Cyanides [ ]

**Q.28** Which one of the following is microwave inactive?

(a) HCI (b) $Cl_2$

(c) NO (d) CO [ ]

**Q.29** Mossbauer effect is also related with resonance fluorescence of -

(a) Beta rays (b) Alpha rays

(c) Gamma rays (d) X-rays [ ]

**Q.30** Pick out the correct match -

(a) Pure rotational spectra – Far infra red (b) Pure Vibrational spectra – Microwave

(c) Electronic spectra – Infrared (d) NMR Spectra – Visible region [ ]

**Q.31** The most radioactive isotope of an element is the one with largest value of its -

(a) Half life (b) Neutron number

(c) Atomic number (d) Decay constant [ ]

**Q.32** represents :

(a) Average life (b) One fourth life

(c) Half life (d) Three fourth life [ ]

**Q.33** Arrhenius equation is -

(a) $\ln k = \ln A -$ (b) $ke^{-E/RT} = A$

(c) (d) $K = A^{-1} e^{-E/RT}$ [ ]

**Q.34** A stright line will be obtained for the following plot :

(a) k vs. T (b) log k vs.

(c) log k vs. T (d) None of these [ ]

**Q.35** $A + B \rightarrow C + D + x$ kj

The reaction indicates that -

(a) Reactant molecules gain energy (b) Reactant molecules give up energy

(c) Surrounding gives energy to the system (d) None of the above [ ]

**Q.36** Number of types of ions obtained by dissolution of one molecule $FeSO_4.Al_2(SO_4)_3.24H_2O$ are -

(a) 2 (b) 3

(c) 4 (d) 5 [ ]

**Q.37** Solubility of NaCl in heavy water is -

(a) More than ordinary water (b) Less than ordinary water

(c) Same as ordinary water (d) None of the above [ ]

**Q.38** In galvanic cell, the salt bridge is used to -

(a) Complete the circuit (b) Reduce the electrical resistance in the cell

(c) Separate cathode from anode (d) Carry salts for the chemical reaction [ ]

**Q.39** An ionic fragment, produced by disconnection, which gives an idea of reagent that is used in the synthesis is called -

(a) Target molecule (b) Synthon

(c) Retern (d) Reterosynthesis [ ]

**Q.40** The use of ultrasound in organic synthesis is studied in the field of :

(a) Photochemistry (b) Microwave assisted synthesis

(c) Polymer chemistry (d) sonochemistry [ ]

**Q.41** An example of non-aqueous soluent is -

(a) NaOH (b) Naphthalene

(c) Liquid $NH_3$ (d) $H_2O$ [ ]

**Q.42** In liq $SO_2$ $Na_2SO_3$ acts as -

(a) Acid (b) Base

(c) Neutral (d) Amphoteric [ ]

**Q.43** The egg yolk is an example of -

(a) Thermoplastic polymer (b) Thermosetting polymer

(c) Both the above (d) None of these

**Q.44** The method to determine molecular weight of macromolecules is -

(a) Osmotic pressure method (b) Viscosity method

(c) Light scattering method (d) All the above [ ]

**Q.45** The point group of $BF_3$ is -

(a) $C_{3v}$ (b) $D_{3d}$

(c) $D_{3h}$ (d) $C_{3h}$ [ ]

**Q.46** Classes ore decided by -

(a) Reduction formula (b) Similarity transformation

(c) Irreducible representation (d) Reducible representation [ ]

**Q.47** In Schrodinger equation, $\nabla^2$ is known as -

(a) Hamiltonian operator (b) Ladder operator

(c) Hermitian operator (d) Laplacion operator [ ]

**Q.48** Variation theorem is used for calculating -

(a) Energy of a system (b) Entrophy of a system

(c) Enthalpy of a system (d) Life time of a system [ ]

**Q.49** AAS is used for -

(a) Estimation of organic compounds (b) Determination of nuclear relaxation time

(c) Concentration of some metal in a (d) Half life of a reaction [ ]

system

**Q.50** Half wave potential is associated with this technique -

(a) Polaragraphy (b) DTA

(c) TGA (d) Absorption chromatography [ ]

## Rough Sheet