Test Booklet No. _____

**This booklet consists of <u>100</u> questions and 12 printed pages.**

**RGUPET/____/__**

**Series**

NIL

**RGUPET 2023**
**Ph.D. in CHEMISTRY**

**Full Marks: 100**                                                    **Time: 3 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) from the concerned subject. Each question carries 1 mark.

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

| 1 | A research problem is feasible only when- | | | | (d) | All of the above |
|---|---|---|---|---|---|---|
| | (a) It has utility and relevance | (b) It is new and adds something to knowledge | (c) It is researchable | (d) All of the above | | |
| 2 | What is the full form of IPR? | | | | (a) | Intellectual Property Right |
| | (a) Intellectual Property Right | (b) Intelligent Property Right | (c) Intellectual Proprietary Right | (d) Intelligent Proprietary Right | | |
| 3 | Concepts which cannot be given operational definitions are ………………… concepts. | | | | (c) | hypothetical |
| | (a) verbal | (b) oral | (c) hypothetical | (d) operational | | |
| 4 | The depth of any research is judged by- | | | | (b) | research objectives |
| | (a) research title | (b) research objectives | (c) research duration | (d) total expenditure on research | | |
| 5 | The research is always- | | | | (d) | All of these |
| | (a) exploring new knowledge | (b) verifying the old knowledge | (c) filling the gap between the knowledge | (d) all of these | | |
| 6 | Which among the following corresponds to the scientific research approach? | | | | (c) | Both (a) and (b) |
| | (a) qualitative approach | (b) quantitative approach | (c) both (a) and (b) | (d) none of them | | |
| 7 | Which of the following statement is not a research objective? | | | | (a) | to achieve monetary gain |
| | (a) to achieve monetary gain | (b) to achieve new insights into problems. | (c) to determine the frequency with which something occurs | (d) to test a hypothesis of a causal relationship between variables | | |
| 8 | Which of the following best represents fundamental research? | | | | (b) | pure/basic research |
| | (a) motivation research | (b) pure/basic research | (c) action research | (d) none of them | | |

| 9 | Research undertaken for knowledge is- | | | | (c) | pure research |
|---|---|---|---|---|---|---|
| | (a) case study | (b) action research | (c) pure research | (d) pilot study | | |
| 10 | Experimental research involves- | | | | (b) | testing of variables in laboratory |
| | (a) systematic study of past events | (b) testing of variables in laboratory | (c) invention of novel products | (d) none of these | | |
| 11 | An example of scientific knowledge is- | | | | (d) | laboratory and field experiments |
| | (a) religious scriptures | (b) social traditions and customs | (c) authority of the Prophet or great men | (d) laboratory and field experiments | | |
| 12 | Why do you need to review the existing literature? | | | | (b) | to find out what is already known about your area of interest |
| | (a) to help in your general studying | (b) to find out what is already known about your area of interest | (c) because without it, you could never reach the required word-count | (d) to make sure you have a long list of references | | |
| 13 | Which of the following is not true? | | | | (c) | Research is disorganized details enquiry |
| | (a) research simply means a search for facts | (b) research is purposive investigation | (c) research is disorganized details enquiry | (d) research includes solutions to problems | | |
| 14 | Which of the following is least likely to be a stakeholder in research? | | | | (c) | the publisher of a research journal |
| | (a) the researcher | (b) the funding body | (c) the publisher of a research journal | (d) the research participants or subject | | |
| 15 | The practice of showing someone's work/idea/paper as one's own without proper acknowledgment is termed as- | | | | b) | plagiarism |
| | a) citation | b) plagiarism | c) referencing | d) personal error | | |
| 16 | Which of the following is not a modern method of research? | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | a) conceptual research | b) empirical research | c) basic research | d) philosophical research | d) | philosophical research |
| 17 | In a line graph within a research report, the …………….. variable is generally shown on the Y-axis and the ………………… variable in put on the X-axis. | | | | b) | dependent; independent |
| | a) independent; dependent | b) dependent; independent | c) interdependent; spontaneous | d) spontaneous; dependent | | |
| 18 | Library is a source of- | | | | b) | secondary data |
| | a) primary data | b) secondary data | c) both primary and secondary data | d) none of these | | |
| 19 | Which of the following is a scientific database search engine? | | | | c) | Google scholar |
| | a) Mozilla | b) Google chrome | c) Google scholar | d) Microsoft edge | | |
| 20 | The most commonly used graphic software is- | | | | d) | Origin |
| | a) Microsoft Paint | b) ChemDraw | c) Microsoft Word | d) Origin | | |
| 21 | The ethics of research is not related to- | | | | a) | Self interest |
| | a) self-interest | b) scientific method | c) reliability | d) humanity | | |
| 22 | Which of the following is not a method of collecting primary data? | | | | d) | use of search engine |
| | a) observation | b) survey | c) interview | d) use of search engine | | |
| 23 | Which of the following is not a characteristic of random sampling? | | | | d) | expensive method |
| | a) reasonably accurate | b) economical method | c)free from personal biases | d) expensive method | | |
| 24 | The name of the conceptual framework in which the research is carried out is called- | | | | c) | research design |
| | a) research hypothesis | b) synopsis | c) research design | d) analysis | | |
| 25 | Which of these is not a method of data collection? | | | | c) | experiments |
| | a) interviews | b) questionnaires | c) experiments | d) observations | | |
| 26 | A formal document that presents the research objectives, design of achieving these objectives and the expected outcomes/ deliverables | | | | | |

| | of the study is called a- | | | | | |
|---|---|---|---|---|---|---|
| | a) research design | b) research proposal | c) research hypothesis | d) research report | b) | research proposal |
| 27 | The most commonly used software to draw chemical reactions while preparing any scientific report is- | | | | b) | ChemDraw |
| | a) Microsoft Paint | b) ChemDraw | c) Microsoft Word | d) Adobe Photoshop | | |
| 28 | Which of the following can be used to display the steps or components of a process? | | | | c) | Flow charts |
| | a) Pie chart | b) Bar chart | c) Flow charts | d) Histogram | | |
| 29 | The objective of case-study is- | | | | d) | all of these |
| | a) remedial | b) diagnostic | c) educational | d) all of these | | |
| 30 | Before starting to write a report, it is advisable to develop a/an- | | | | a) | outline |
| | a) outline | b) chapter | c) theme | d) model | | |
| 31 | In which of the following numbers all zeroes are significant- | | | | a) | 0.0005 |
| | a) 0.0005 | b) 0.0500 | c) 50.000 | d) 0.0050 | | |
| 32 | Which of the following gives the measure of consistency of data? | | | | d) | standard deviation |
| | a) mean | b) mode | c) median | d) standard deviation | | |
| 33 | The experimental method is- | | | | a) | a method for verifying a hypothesis |
| | a) a method for verifying a hypothesis | b) a method for deriving inferences | c) a variable controlling method | d) none of these | | |
| 34 | In a certain coding method, "ITANAGAR" is written as "FQXKXDXO". In this coding, what is the code word for "PASIGHAT" | | | | c) | MXPFDEXQ |
| | a) MXPFGEXQ | b) MXPFDEAQ | c) MXPFDEXQ | d) MXPIDEXQ | | |
| 35 | Messi runs with a speed of 2 km/h from goal post **A** to goal post **B**. Then he returns from goal post **B** to goal post **A** at a speed of 4 km/h. What is the average speed of his entire run? | | | | a) | 2.67 km/h |
| | a) 2.67 km/h | b) 2.89 km/h | c) 3.53 km/h | d) 4.0 km/h | | |
| 36 | **A** has 100 apples. **A** gave 1/2 of his apples to **B** and 1/3 of his apples to **C**. What is the percentage of apples **B** has with respect to **C**. | | | | d) | 150 % |
| | a) 25 % | b) 75 % | c) 125 % | d) 150 % | | |
| 37 | Find the odd one- | | | | b) | energy |
| | a) Joule | b) energy | c) second | d) Newton | | |
| 38 | What is the $n$th term of the sequence 1, 5, 9, 13, 17, 21, ......? | | | | | |

| | a) 2*n* −1 | b) 2*n* +1 | c) 4*n* − 3 | d) 2*n* | c) | 4*n* − 3 |
|---|---|---|---|---|---|---|
| 39 | A bus running at 60 km/h speed crosses a pole in 1.2 sec. What is the length of the bus? | | | | a) | 20 m |
| | a) 20 m | b) 24 m | c) 15 m | d) 17 m | | |
| 40 | The sum of the current ages of a father and his son is 65 years. 5 years ago, the age of the father was 4 times more than his son. The current age of father and the son is- | | | | b) | 16, 49 |
| | a) 14, 50 | b) 16, 49 | c) 15, 49 | d) 17, 50 | | |
| 41 | Shoe always has- | | | | c) | soles |
| | a) laces | b) strap | c) soles | d) socks | | |
| 42 | B, the son of A is married to C, whose sister D is married to E, the brother of B. How is D related to A? | | | | a) | daughter-in-law |
| | a) daughter-in-law | b) cousin | c) sister | d) sister-in-law | | |
| 43 | Which of the following is not a "Graphic representation"- | | | | c) | Table |
| | a) Pie chart | b) Bar chart | c) Table | d) Histogram | | |
| 44 | Error in calculation can be classified as- | | | | a) | personal error |
| | a) personal error | b) operational error | c) methodical error | d) indeterminate error | | |
| 45 | Which of the following tool is best for presenting the data to a group? | | | | b) | MS Power Point |
| | a) MS Excel | b) MS Power Point | (c) MS Word | d) ChemDraw | | |
| 46 | The closeness of a result to its true or accepted value is- | | | | b) | accuracy |
| | a) precision | b) accuracy | c) median | d) standard deviation | | |
| 47 | A short summary of a research article is called- | | | | a) | Abstract |
| | a) Abstract | b) Bibliography | c) Acknowledgement | d) Method | | |
| 48 | The method of research reporting should be- | | | | a) | Scientific |
| | a) scientific | b) ethical and attractive | c) personal | d) favourable to globalisation | | |
| 49 | A comprehensive full report of the research process is called- | | | | | |

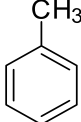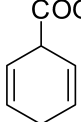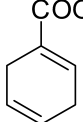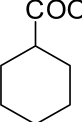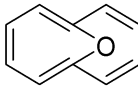| | a) Synopsis | b) Article | c) Thesis | d) Abstract | c) | Thesis |
|---|---|---|---|---|---|---|
| 50 | Which of the following is data processing software? | | | | | |
| | a) Microsoft Excel | b) Microsoft PowerPoint | c) Windows 11 | d) Microsoft Word | a) | Microsoft Excel |

| 51 | Which of the following measures escaping tendency of a component in the system - | | | | | |
|---|---|---|---|---|---|---|
| | (a) kinetic energy | (b) free energy | (c) chemical potential | (d) entropy | (c) | chemical potential |
| 52 | The free energy change of mixing of ideal gases is given by $\Delta G_{mix}=nRT\Sigma x_i \ln x_i$. Hence, mixing of two or more ideal gases is a – | | | | | |
| | (a) spontaneous process | (b) non-spontaneous process | (c) reversible process | (d) unpredictable | (a) | spontaneous process |
| 53 | Which of the following transport processes represent mass transfer- | | | | | |
| | (a) $J_Q =- k\frac{dT}{dx}$ | (b) $J_m =- D\frac{dc}{dx}$ | (c) $J_M =- M\frac{d\mu}{dx}$ | (d) $J_e =- \lambda\frac{dE}{dx}$ | (b) | $J_m =- D\frac{dc}{dx}$ |
| 54 | The normalized wave function, $\psi_n$ of a particle of mass, $m$ moving in a one-dimensional box of length, $a$ is– | | | | | |
| | (a) $\psi_n = \sqrt{\frac{2}{a}} sin($ | (b) $\psi_n = \sqrt{\frac{2}{a}} a\ sin$ | (c) $\psi_n = \sqrt{\frac{2}{a}} sin($ | (d) $\psi_n = \sqrt{\frac{2}{a}} x\ sin$ | (a) | $\psi_n = \sqrt{\frac{2}{a}} sin\left(\frac{n\pi}{a}x\right)$ |
| 55 | On dilution, the specific conductance of a solution of an electrolyte– | | | | | |
| | (a) increases | (b) decreases | (c) does not vary with dilution | (d) cannot be predicted | (b) | decreases |
| 56 | The Debye-Huckel limiting law is given by $log\ \gamma_{\pm} =- Az_+z_-\sqrt{I}$. The parameter, '$I$' in the equation is- | | | | | |

| | (a) $I = \sum m_i z_i^2$ | (b) $I = \frac{1}{2}\sum m_i z_i^2$ | (c) $I = \sum z_i m_i^2$ | (d) $I = \sum m_i^2 z_i^2$ | (b) $I = \frac{1}{2}\sum m_i z_i^2$ |
|---|---|---|---|---|---|
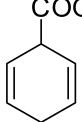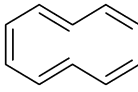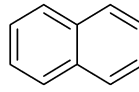
The expressions for activity of $AlCl_3$ in terms of its molality and mean ionic activity coefficient is-

| 57 | (a) $a = 9\gamma_\pm^3 m^3$ | (b) $a = 27\gamma_\pm^4 m^4$ | (c) $a = 4\gamma_\pm^3 m^3$ | (d) $a = 27\gamma_\pm^3 m^3$ | (b) $a = 27\gamma_\pm^4 m^4$ |
|---|---|---|---|---|---|

Which method is the most appropriate for determining weight average molecular weight?

| 58 | (a) osmometry method | (b) viscometry method | (c) light scattering method | (d) sedimentation method | (b) viscometry method |
|---|---|---|---|---|---|

The polydispersity index (PDI) of a polymer is-

| 59 | (a) greater than 1 | (b) lesser than 1 | (c) equal to 1 | (d) equal to 0 | (a) greater than 1 |
|---|---|---|---|---|---|

Which process is based upon Tyndall effect-

| 60 | (a) osmotic pressure method | (b) light scattering method | (c) sedimentation method | (d) viscosity method | (b) light scattering method |
|---|---|---|---|---|---|

A solution of sulfuric acid contains 14.7 g of $H_2SO_4$ per liter of the solution. The normality of the solution is-

| 61 | (a) 0.15 N | (b) 0.3 N | (c) 0.2 N | (d) 0.4 N | (b) 0.3 N |
|---|---|---|---|---|---|

The CFSE for $CoCl_6^{4-}$ is 18000 cm$^{-1}$. The CFSE for $CoCl_4^{2-}$ is-

| 62 | a) 18000 cm$^{-1}$ | b) 16000 cm$^{-1}$ | c) 8000 cm$^{-1}$ | d) 10000 cm$^{-1}$ | c) 8000 cm$^{-1}$ |
|---|---|---|---|---|---|

The spectroscopic ground state term symbol for the octahedral aqua Mn(II) complex is-

| 63 | a) $^2H$ | b) $^6S$ | c) $^4F$ | d) $^2D$ | b) $^6S$ |
|---|---|---|---|---|---|

| 64 | The intense colour of $KMnO_4$ is due to- | | | | |
|---|---|---|---|---|---|

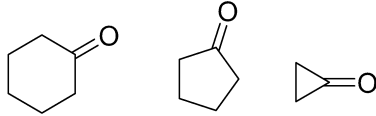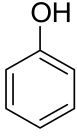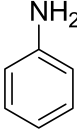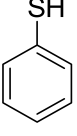| | a) | b) | c) | d) | | Answer |
|---|---|---|---|---|---|---|
| | a) Ligand to metal charge transfer | b) d-d transition | c) metal-to-ligand charge transfer | d) vibronic coupling | a) | Ligand to metal charge transfer |
| 65 | The oxidative addition and reductive elimination steps are favoured by- | | | | | |
| | a) Electron-rich metal centres | b) Electron deficient metal cetres | c) Electron-deficient and electron-rich centre respectively | d) Electron-rich and electron-deficient centre respectively | d) | Electron-rich and electron-deficient centre respectively |
| 66 | An organometallic fragment isolobal to $CH_3^+$ is- | | | | | |
| | a) $[Fe(CO)_5]$ | b) $[Mn(CO)_5]$ | c) $[Cr(CO)_5]$ | d) $[Ni(CO)_5]$ | c) | $[Cr(CO)_5]$ |
| 67 | According to Wade's theory predict the structure of $[C_2B_5H_7]$ is- | | | | | |
| | a) closo | b) nido | c) arachno | d) hypo | a) | closo |
| 68 | Metal-metal quadruple bonds are known for the metal- | | | | | |
| | a) Re | b) Ni | c) Co | d) Fe | a) | Re |
| 69 | The magnesium complex of $EDTA^{2+}$, the number of *N*-donor and *O*-donor centres, are | | | | | |
| | a) two and four | b) two and two | c) two and six | d) two and eight | a) | two and four |
| 70 | Chelate effect is- | | | | | |
| | a) due to the enthalpy and entropy change | b) due to entropy change but independent of enthalpy change | c) independent of ring size | d) due to enthalpy change but independent of entropy change | a) | due to the enthalpy and entropy change |
| 71 | $[Cu(H_2O)_6]^{2+}$ is labile due to- | | | | | |
| | a) the octahedral geometry of the complex | b) Jahn-Teller distortion | c) the presence of water ligand | d) the easy reaction of $Cu^{2+}$ with water to form copper hydroxide | b) | Jahn-Teller distortion |

| 72 | The regeneration of the catalyst in Wacker process involves- | | | | | |
|---|---|---|---|---|---|---|
| | a) reduction of Pd(II) to Pd(0) by Cu(I) | b) reduction of Pd(II) to Pd(0) by Cu(II) | c) oxidation of Pd(0) to Pd(II) by Cu(I) | d) oxidation of Pd(0) to Pd (II) by Cu(II) | d) | oxidation of Pd(0) to Pd (II) by Cu(II) |

| 73 | The set of magic number is | | | | | |
|---|---|---|---|---|---|---|
| | a) 20, 28, 50 and 126 | b) 24, 28, 82, and 126 | c) 20, 50, 80, and 184 | d) 28, 50, 82, and180 | a) | 20, 28, 50 and 126 |

| 74 | The intermediate formed during the hydroformylation of olefins using $Co_2(CO)_8$ as catalyst is- | | | | | |
|---|---|---|---|---|---|---|
| | a) $HCo(CO)_6$ | b) $H_4Co(CO)_3$ | c) $H_2Co(CO)_4$ | d) $HCo(CO)_4$ | d) | $HCo(CO)_4$ |

| 75 | The increasing order of polarity of $NH_3$, $NF_3$ and $BF_3$ is | | | | | |
|---|---|---|---|---|---|---|
| | a) $NH_3<NF_3<BF_3$ | b) $BF_3<NF_3<NH_3$ | c) $BF_3<NH_3<NF_3$ | d) $NF_3<BF_3<NH_3$ | b) | $BF_3<NF_3<NH_3$ |

| 76 | Ammonolysis of $S_2Cl_2$ in an inert solvent gives- | | | | | |
|---|---|---|---|---|---|---|
| | a) $S_2N_2$ | b) $S_2N_2Cl$ | c) $S_2N_2H_4$ | d) $S_4N_4$ | d) | $S_4N_4$ |

| 77 | The most electropositive atom among the following species is- | | | | | |
|---|---|---|---|---|---|---|
| | a) Cs | b) Ga | c) Li | d) Pb | a) | Cs |

| 78 | The metals present in nitrogenase are- | | | | | |
|---|---|---|---|---|---|---|
| | a) Fe and Mg | b) Mo and K | c) Mo and Fe | d) Fe and K | c) | Mo and Fe |

| 79 | Iron sulfur proteins in biological systems are involved in | | | | | |
|---|---|---|---|---|---|---|
| | a) proton transfer | b) atom transfer | c) electron transfer | d) group transfer | c) | electron transfer |

| 80 | The known oxidation state(s) of Eu in aqueous solution is/are | | | | | |
|---|---|---|---|---|---|---|
| | a) +2 and +3 | b) +3 and +4 | c) +2, +3 and +4 | d) +3 only | a) | +2 and +3 |

| 81 | Birch reaction of benzoic acid will produce | | |
|---|---|---|---|

| | | | | | b) | COOH |
|---|---|---|---|---|---|---|
| | CH₃ a) | COOH b) | COOH c) | COOH d) | | (structure) |

| 82 | Lithium diallkylcuprates are known as- | | | | | |
|---|---|---|---|---|---|---|
| | a) Grignard reagent | b) Grubb's catalyst | c) Gilman reagent | d) Gilbert reagent | c) | Gilman reagent |

| 83 | Among **1-3**, the aromatic compounds are-  <br> **1**  **2**  **3** | | | | | |
|---|---|---|---|---|---|---|
| | a) 1, 2 and 3 | b) 1 and 2 | c) 2 and 3 | d) 1 and 3 | c) | 2 and 3 |

| 84 | The suitable reagent for the following conversion is- | | | | | |
|---|---|---|---|---|---|---|
| | a) *m*-CPBA | b) $H_2O_2$/AcOH | c) ᵗBuOOH/HCl | d) $H_2O_2$/NaOH | d) | $H_2O_2$/NaOH |

| 85 | Which of the following is a basic amino acid? | | | | | |
|---|---|---|---|---|---|---|
| | a) Lysine | b) Leucine | c) Serine | d) Valine | a) | Lysine |

| 86 | Identify the most appropriate reagent for the following conversion | | | | | |
|---|---|---|---|---|---|---|
| | a) PCC | b) Jones reagent | c) *m*-CPBA | d) $MnO_2$ | d) | $MnO_2$ |

| 87 | The p$K_a$s of benzoic acid and *p*-nitrobenzoic acid are 4.20 and 3.43, respectively. The Hammett substituent constant ($\sigma_P$) for *p*-nitrobenzoic acid will be- | | | | | |
|---|---|---|---|---|---|---|
| | a) 0.77 | b) −0.77 | c) 7.63 | d) data inadequate | a) | 0.77 |

| 88 | Which of the following reactions involve an oxime? | | | | | |
|---|---|---|---|---|---|---|
| | a) Beckmann rearrangement | b) Favorskii rearrangement | c) Reimer-Tiemann reaction | d) All of these | a) | Beckmann rearrangement |

| 89 | The major product formed in the following reaction is- | | | | | |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| |  NaH, THF ⟶ Br | | | | c) |  |
| | a)  | b)  | c)  | d)  Br | | |
| 90 | Carbenes that add to alkenes in stereospecific *cis* manner are- | | | | b) | Singlet carbenes |
| | a) Triplet carbenes | b) Singlet carbenes | c) None of these | d) Both of these | | |

<br/>

| | | | | | | |
|---|---|---|---|---|---|---|
| 91 | For pure rotational Raman spectroscopy, the formal selection rule is. | | | | c) | $\pm 2$ |
| | a) $\pm 4$ | b) $\pm 1$ | c) $\pm 2$ | d) $\pm 3$ | | |
| 92 | Which among the following molecules is microwave active? | | | | b) | $N_2O$ |
| | a) $H_2$ | b) $N_2O$ | c) $CH_4$ | d) $C_6H_6$ | | |
| 93 | For the following compound, the number of signals present in the proton decoupled $^{13}C$ NMR spectrum is.  | | | | b) | 5 |
| | a) 4 | b) 5 | c) 6 | d) 7 | | |
| 94 | The molecular term symbol for the electronic configuration $(\sigma_g 1s)^1 (\sigma_u 1s)^1$ considering a singlet state is- | | | | a) | $1\Sigma_u^+$ |
| | a) $1\Sigma_u^+$ | b) $1\Sigma_g^+$ | c) $3\Sigma_g^+$ | d) $3\Sigma_u^+$ | | |
| 95 | The number of lines expected in the $^1H$ NMR spectrum of $[HMn(CO)_5]$ is. [Given: For Mn, $I = \frac{5}{2}$ ] | | | | c) | 6 |
| | a) 4 | b) 5 | c) 6 | d) 7 | | |
| 96 | Absorbance of a chemical species at 250 nm is 0.1 and the concentration is $1.0 \times 10^{-5}$ M. Assuming the length of the cell as 10 cm, calculate the molar extinction coefficient of this transition at 250 nm. | | | | a) | $1000 \ M^{-1} \ cm^{-1}$ |
| | a) $1000 \ M^{-1} \ cm^{-1}$ | b) $100 \ M^{-1} \ cm^{-1}$ | c) $10 \ M^{-1} \ cm^{-1}$ | d) $10000 \ M^{-1} \ cm^{-1}$ | | |
| 97 | The correct order of FT-IR stretching frequency of the following compounds is- | | | | | |

| | | | | | | a) | A<B<C |
|---|---|---|---|---|---|---|---|
| |  **A** **B** **C** | | | | | | |
| | a) A<B<C | b) C<B<A | c) B<A<C | d) A<C<B | | | |
| 98 | A compound displays the following FT-IR spectral data. The correct structure of the compound is - <br> IR: 2550 cm$^{-1}$ | | | | | c) | SH <br>  |
| | a) OH  | b) NH$_2$  | c) SH  | d)  | | | |
| 99 | An organic compound (A) on reduction gave a compound (B). Upon treatment with HNO$_2$, (B) gave ethyl alcohol, and on warming with CHCl$_3$ and alcoholic KOH, (B) gave an offensive smell. The compound (A) is | | | | | c) | CH$_3$CN |
| | a) CH$_3$NH$_2$ | b) CH$_3$NC | c) CH$_3$CN | d) C$_2$H$_5$CN | | | |
| 100 | In mass spectroscopy, the ion with abnormal translational energy is- | | | | | c) | metastable ion |
| | a) fragment ion | b) molecular ion | c) metastable ion | d) rearrangement ion | | | |

**SPACE FOR ROUGH WORK**