1. The values of n and l quantum numbers for sub-Shell 3d are respectively:
   1) 2 and 2
   2) 3 and 2
   3) 3 and 3
   4) 2 and 3

2. Magnetic orbital quantum number for azimuthal quantum 2 are:
   1) \( h^2, h^1, 0 \)
   2) \( h^2, 0, +1, +2 \)
   3) \( h^2, h^1, 0, +1, +2 \)
   4) \(+2, +1, -2, -1\)

3. According to Hund's rule the number of unpaired electrons in the atoms of nitrogen, oxygen and fluorine are respectively:
   1) 7, 8, 9
   2) 5, 6, 7
   3) 9, 8, 7
   4) 3, 2, 1

4. The maximum possible similar quantum numbers of two electrons present in an orbital of an atom may be:
   1) 4
   2) 3
   3) 2
   4) 1

5. The group having the same number of electrons is:

   | A. | Li\(^+\), Na\(^+\), K\(^+\) |
   | B. | P\(^-\), S\(^{2-}\), Cl\(^-\), Ar |
   | C. | N\(^3-\), O\(^2-\), F\(^-\), Ne |
   | D. | F\(^-\), Cl\(^-\), O\(^2-\), S |

6. Which of the following set of elements is not in the correct sequence according to long form of periodic table?
   1) B, C, N, O
   2) Al, Si, P, S
   3) Cr, Mn, Fe, Co
   4) Cr, Ti, V, Mn

7. Which of the following electronic configuration does not belong to a d-block element?
   1) \( 1s^2 \ 2s^2 \ 2p^6 \ 3s^2 \ 3p^6 \ 3d^1 \ 4s^2 \)
   2) \( 1s^2 \ 2s^2 \ 2p^6 \ 3s^2 \ 3p^6 \ 3d^5 \ 4s^2 \)
   3) \( 1s^2 \ 2s^2 \ 2p^6 \ 3s^2 \ 3p^6 \ 3d^{10} \ 4s^2 \)
   4) \( 1s^2 \ 2s^2 \ 2p^6 \ 3s^2 \ 3p^6 \ 3d^{10} \ 4s^2 \ 4p^1 \)

8. The Values of atomic radii (in pm) of Na, Be, B and Mg lie in the range of 88 to 186. The value of atomic radii for B (in pm) is:
   1) 186
   2) 160
   3) 111
   4) 88
9. Which of the following statement is not correct related to electronegativity of elements?

1) Pauling is used to measure electronegativity of elements
2) Fluorine is an element having maximum electronegativity
3) In general electronegativity of elements decreases from right to left in a period.
4) In the first group of elements electronegativity decreases from top to bottom

10. The correct order of first ionization enthalpy (ionization energy) among the following is .

1) Na < Al < Mg < Si
2) Na < Mg
3) Si < Al
4) None of these

11. The molecule having ionic as well as covalent bond between its atoms is :

1) KCN
2) H₂O
3) CHCl₃
4) C₂H₅OH

12. Which of the following molecule or ion has a coordinate bond?

1) NH₃
2) BF₃
3) OH⁻
4) [Fe(CN)₆]³⁻

13. Which of the following shape is given to a molecule due to dsp² hybridization ?

1) Tetrahedral
2) Square planar
3) Octahedral
4) Square Pyramidal

14. The Correct order of increasing field strength of the ligands is :

1) F⁻ < Br⁻ < I⁻ < SCN⁻
2) I⁻ < SCN⁻ < Br⁻ < F⁻
3) I⁻ < Br⁻ < SCN⁻ < Cl⁻
4) F⁻ < Br⁻ < SCN⁻ < Cl⁻

15. The hybridization of chlorine atom in Cl₃F molecule is:

1) sp²
2) sp³
3) sp³d
4) d²sp³

16. The bond order of C₂ is:

1) 1
2) 2
3) 3
4) 4

17. Which of the following element is not considered as a transition element?

1) Cu
2) Zn
3) Sc
4) Ag

18. The correct outermost electronic configuration of palladium atom is:

1) 5s⁰ 4d¹⁰
2) 5s¹ 4d⁹
3) 5s¹ 4d¹⁰
4) 5s² 4d⁸

19. The set of elements belonging to first, second and third transition series respectively, out of the following is?

1) Zr, Y, W
2) Fe Co, Cd
3) Ag, Cu, Pd
4) Zn, Cd, Hg
20. \( \text{Eu}^{2+} \) is a:
1) Strong reducing agent
2) Strong oxidising agent
3) Weak reducing agent
4) Weak oxidising agent

21. Most Common oxidation state generally shown by actinoids is:
1) +2
2) +3
3) +4
4) +5

22. Which of the Following pair of ions have same oxidation number of their central metal atoms?

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>A.</td>
<td>MnO(_4^-), MnO(_2)(^{2-})</td>
</tr>
<tr>
<td>B.</td>
<td>VO(_2^+), Cr(_2)O(_7^{2-})</td>
</tr>
<tr>
<td>C.</td>
<td>MnO(_4^-), CrO(_4^{2-})</td>
</tr>
<tr>
<td>D.</td>
<td>CrO(_4^{2-}), Cr(_3)O(_7^{2-})</td>
</tr>
</tbody>
</table>

23. The state of hybridization of C in carbocation is:
1) sp\(^2\)
2) sp\(^3\)
3) sp
4) sp\(^3\)d

24. Which of the following is not an electrophile?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>BF(_3)</td>
</tr>
<tr>
<td>B.</td>
<td>NO(_2^+)</td>
</tr>
<tr>
<td>C.</td>
<td>(CH(_3))(_3)N</td>
</tr>
<tr>
<td>D.</td>
<td>Cl(^+)</td>
</tr>
</tbody>
</table>

25. The C - C bond lengths in benzene is:
1) 154 pm
2) 134 pm
3) 3 bonds of 154 pm and 3 bonds of 134 pm
4) 139 pm
26. Which of the following is not an aromatic compound?

A. ![Image]
B. ![Image]
C. ![Image]
D. ![Image]

27. The above chemical reaction is an example of which of the following type of reaction?

A. Elimination reaction
B. Addition reaction
C. Substitution reaction
D. Rearrangement reaction

28. Halogenation of alkane proceeds through which of the following intermediate?

1) Free radical
2) Carbocation
3) Carbanion
4) Carbene

29. Identify the chiral molecule among the following molecules.

A. ![Image]
B. ![Image]
C. ![Image]
D. ![Image]
30. What does the above reaction depicts?

A. Retention
B. Inversion
C. Recemisation
D. None of the above

31. Which physical property is different in enantiomers?
1) Direction of rotation of the plane of polarized light 
2) Refractive index
3) Density 
4) Melting point and boiling point

32. The most stable conformation of cyclohexane is:
1) Chair form 
2) Boat form 
3) Twist boat 
4) Half chair

33. With which of the following compound the relative configuration D or L are related
1) Glycerol 
2) Glycerol acid 
3) Glyceraldehyde 
4) Lactic acid

34. Which of the following is Z - isomer?

A. 
B. 
C. 
D.

35. When CH₃CHO reacts with CH₃CH₂CHO in presence of dilute NaOH then on heating which of the following product is not formed?

A. CH₃ - CH = CH - CHO
B. CH₃ - CH = C - CHO
C. CH₃ - CH₂ - CH = C - CHO
D. CH₂ = CH - CH₂ - CH₂ - CHO
36. What is the product formed in the above reaction?

A. \( \text{CCl}_3 \)  
B. \( \text{CHO} \)  
C. \( \text{COO}^+ \text{Na}^+ \)  
D. \( \text{OH} \text{CHO} \)

37. \( \text{RCH}_2\text{COOH} \)  
\( \text{(i) } \text{X}_2 / \text{Red Phosphorus} \)  
\( \text{(ii) } \text{H}_2\text{O} \)  
\( \text{R - CH - COOH} \)  

The above reaction is known as

A. MPV reduction  
B. HVZ reaction  
C. Haloform reaction  
D. Wittig reaction

38. The major product formed in the reaction, is:

A. \( \text{Cl} \text{O} \)  
B. \( \text{O} \text{Cl} \)  
C. \( \text{Cl} \text{O} \)  
D. \( \text{O} \text{Cl} \)

39. \( \text{C}_6\text{H}_5\text{CHO} + \text{CH}_3\text{COCH}_3 \xrightarrow{\text{NaOH}} \text{C}_6\text{H}_5\text{CH} = \text{CHCOCH}_3 \)

The above reaction is known as-

A. Reformatsky reaction  
B. Hofmann elimination  
C. Claisen- Schmidt reaction  
D. Mannich reaction
40. The oxidising agent used in Baeyer-Villiger oxidation is:
   1) $\text{H}_2\text{O}_2$
   2) $\text{KMnO}_4$
   3) $\text{HNO}_3$
   4) $\text{CrO}_3$

41. In presence of which catalyst high density polythene is formed when addition polymerisation of ethane takes place in a hydrocarbon solvent?
   1) Wilkinson catalyst
   2) Ziegler Natta Catalyst
   3) $\text{LiAlH}_4$
   4) $\text{H}_2$/$\text{Ni}$

42. As which of the following N-Bromosuccinimide is used?
   1) Reducing agent
   2) Oxidising and brominating agent
   3) Dehydrating agent
   4) Dehydrohalogenating agent

43. Ultra-violet spectroscopy is based on:
   1) Hook's Law
   2) Fieser's Law
   3) Beer-Lambert's Law
   4) Wood-Word's Law

44. If $\lambda_{\text{max}}$ shifts from 230 nm to 203 nm, the shift is known as:
   1) Red Shift
   2) Bathochromic shift
   3) Hypsochromic shift
   4) Hyperchromic shift

45. Which of the following transition has highest energy?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>A.</td>
<td>$\sigma \rightarrow \pi^*$</td>
</tr>
<tr>
<td>B.</td>
<td>$\pi \rightarrow \sigma^*$</td>
</tr>
<tr>
<td>C.</td>
<td>$\pi \rightarrow \pi^*$</td>
</tr>
<tr>
<td>D.</td>
<td>$\sigma \rightarrow \sigma^*$</td>
</tr>
</tbody>
</table>

46. Which of the following value of $I$ (nuclear spin) will give useful signal in NMR spectra?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>A.</td>
<td>0</td>
</tr>
<tr>
<td>B.</td>
<td>$\frac{1}{4}$</td>
</tr>
<tr>
<td>C.</td>
<td>$\frac{3}{2}$</td>
</tr>
<tr>
<td>D.</td>
<td>$\frac{2}{3}$</td>
</tr>
</tbody>
</table>

47. Which of the following is not the use of chloroform?
   1) Solvent for fats
   2) Production of freon refrigerant
   3) Antiseptic
   4) Solvent for $\text{i}_2$ and alkaloids
48. About how many times artificial sweetening agent saccharin is sweeter than cane sugar

1) 100  
2) 550  
3) 1000  
4) 2000

49. In which of the following reagent sodium potassium tartrate is used?

1) Tollen's reagent  
2) Bayer's reagent  
3) Fehling A  
4) Fehling B

50. Which of the following does not give iodoform reaction?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td><img src="structure.png" alt="Structure A" /></td>
</tr>
<tr>
<td>B.</td>
<td>HCHO</td>
</tr>
<tr>
<td>C.</td>
<td>CH₃-CH-CH₃</td>
</tr>
<tr>
<td>D.</td>
<td>CH₃-C-CH₃</td>
</tr>
</tbody>
</table>

51. \[ C₆H₁₂O₆ \xrightarrow{\text{Enzyme}} 2C₂H₅OH + 2 \text{CO}_₂ \]

The name of enzyme in the above reaction is:

A. Invertase  
B. Zymase  
C. Diastase  
D. Maltase

52. Which of the following is used as phase transfer catalyst?

1) Urea  
2) Acetoacetic ester  
3) Menthol  
4) Crown ether

53. Which one of the following is a non-reducing sugar?

1) Sucrose  
2) Glucose  
3) Maltose  
4) Lactose

54. Glucose on reaction with bromine-water gives:

1) Pentabromo derivative  
2) Saccharic acid  
3) Gluconic acid  
4) n-hexane
55. Deficiency of which vitamin causes increased fragility of RBCs and muscular weakness?

1) Vitamin K  
2) Vitamin E  
3) Vitamin B₆  
4) Vitamin B₁₂

56. The Sugar moiety present in DNA molecule is:

1) β-D-2-deoxyribose  
2) β-D-ribose  
3) β-D-Glucopyranose  
4) β-D-fructofuranose

57. An example of globular protein is:

1) Insulin  
2) Myosin  
3) Keratin  
4) Protein present in hair, wool and silk

58. Which one of the following is not an essential amino acid?

1) Valine  
2) Leucine  
3) Alanine  
4) Lysine

59. Which hormone suppresses ovulation?

1) Testosterone  
2) Estrogen  
3) Progesterone  
4) Thyroxine

60. The weak antiseptic for eyes is:

1) Tincture of Iodine  
2) Boric acid  
3) Iodoform  
4) Chlorine

61. Disinfectant among the following is:

1) Soframicine  
2) 1% solution of phenol  
3) Furacine  
4) 0.2% solution of phenol

62. The antibiotic having bactericidal effect is:

1) Penicillin  
2) Tetracycline  
3) Erythromycin  
4) Chloramphenicol

63. Which of the following is not a broad spectrum antibiotic?

1) Ampicillin  
2) Amoxicillin  
3) Penicillin G  
4) Chloramphenicol

64. Acetyl Salicylic acid is:

1) Dettol  
2) Chloroquine  
3) Aspirin  
4) Ampicillin

65. If the dispersed phase and dispersion medium are two liquids then the colloid formed is known as:

1) Sol  
2) Emulsion  
3) Foam  
4) Gel

66. Dispersion medium and dispersed phase in butter are respectively:

1) Solid, Liquid  
2) Liquid, Solid  
3) Solid, Gas  
4) Solid, Solid

67. Colloid formations not possible when dispersed phase and dispersion medium are respectively:

1) Solid, Solid  
2) Solid, Liquid  
3) Liquid, Liquid  
4) Gas, Gas
68. Which of the following is not a method to purify colloid?
1) Electro-dialysis
2) Ultrafiltration
3) Coagulation
4) Dialysis

69. The Correct order of flocculation power in the coagulation of a positive sol is

<table>
<thead>
<tr>
<th>Order</th>
<th>Reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>[Fe(CN)₆]⁴⁻ &gt; PO₄³⁻ &gt; SO₄²⁻ &gt; Cl⁻</td>
</tr>
<tr>
<td>B.</td>
<td>Cl⁻ &gt; SO₄²⁻ &gt; PO₄³⁻ &gt; [Fe(CN)₆]⁴⁻</td>
</tr>
<tr>
<td>C.</td>
<td>βa²⁺ &gt; Al³⁺ &gt; Na⁺</td>
</tr>
<tr>
<td>D.</td>
<td>Na⁺ &gt; βa²⁺ &gt; Al³⁺</td>
</tr>
</tbody>
</table>

70. The study of rate and mechanism of chemical reaction is known as:
1) Thermodynamics
2) Chemical Kinetics
3) Chemical equilibrium
4) Surface chemistry

71. The unit of rate Constant for zero order reaction is:
1) mol L⁻¹ s⁻¹
2) mol⁻¹ L s⁻¹
3) s⁻¹
4) mol L s⁻¹

72. If Rate K[A]⁹/₂[B]⁻¹, then the order of reaction will be:

<table>
<thead>
<tr>
<th>Order</th>
<th>Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>5/2</td>
</tr>
<tr>
<td>B.</td>
<td>1/2</td>
</tr>
<tr>
<td>C.</td>
<td>-5/2</td>
</tr>
<tr>
<td>D.</td>
<td>-1/2</td>
</tr>
</tbody>
</table>

73. Molecularity of any reaction can not be:
1) 0
2) 1
3) 2
4) 3

74. The order of artificial radioactive decay reaction is:
1) Zero
2) First
3) Second
4) Pseudo - First

75. According to collision Theory Z is known as:
1) Probability factor
2) Steric factor
3) Collision frequency
4) Orientation of molecule
76. If there is exchange of energy and matter between system and surroundings, then the system is called:

1) isolated system  
2) closed system  
3) open system  
4) adiabatic system

77. When heat is transferred from system to the surroundings, then q is:

1) Zero  
2) Negative  
3) Positive  
4) Unity

78. Which of the following law is stated as ∆U = q + W?

1) Third Law of thermodynamics  
2) First Law of thermodynamics  
3) Second Law of thermodynamics  
4) Zeroth Law of thermodynamics

80. The measure of disorder is known as:

1) Enthalpy  
2) Gibb's energy  
3) Entropy  
4) Heat

81. Relationship between C_p and C_v for an ideal gas is:

<table>
<thead>
<tr>
<th></th>
<th>( \frac{C_v}{C_p} = R )</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>( C_v - C_p = R )</td>
</tr>
<tr>
<td>B</td>
<td>( C_p - C_v = R )</td>
</tr>
<tr>
<td>C</td>
<td>( \frac{C_p}{C_v} = R )</td>
</tr>
<tr>
<td>D</td>
<td>( \frac{C_v}{C_p} = R )</td>
</tr>
</tbody>
</table>

82. For exothermic reaction the value of ∆H is:

1) Negative  
2) Positive  
3) Zero  
4) Unity
83. **Oxidation reaction occurring in Daniell cell is:**

| A. | Cu\(^{2+}\) + 2e\(^-\) → Cu(s) |
| B. | Zn(s) → Zn\(^{2+}\) + 2e\(^-\) |
| C. | Zn\(^{2+}\) + 2e\(^-\) → Zn(s) |
| D. | Cu(s) → Cu\(^{2+}\) + 2e\(^-\) |

84. **In the cell reaction,**

Zn(s) + Cu\(^{2+}\)\(_{(aq)}\) → Zn\(^{2+}\)\(_{(aq)}\) + Cu(s),

if $E_{R}^{\circ} = 0.34$V and $E_{L}^{\circ} = -0.76$V,

then $E_{cell}^{\circ}$ will be -

| A. | -0.42 V |
| B. | 1.1 V |
| C. | 0.42 V |
| D. | -1.1 V |

85. **The Unit of specific conductance is:**

1) ohm  
2) ohm cm  
3) ohm\(^{-1}\) cm\(^{-1}\)  
4) ohm\(^{-1}\)

86. **Q = It, is related with:**

1) Kohlrausch's Law  
2) Ostwald's Law  
3) Faraday's Law  
4) Daniel's Law

87. **For a strong electrolyte, the conductivity of the solution on dilution:**

1) Increases  
2) Decreases  
3) Remains constant  
4) Become infinite

88. **Amalgam of mercury with sodium is a solution of:**

1) Solid in solid  
2) Liquid in solid  
3) Solid in liquid  
4) Liquid in liquid

89. **A mass of the solute present in 100 ml of the solution is known as**

1) Mass percentage  
2) Volume percentage  
3) Mass by volume percentage  
4) Parts per million

90. **If 74.5 g of KCl is dissolved in 1Kg of water, then the molality of the solution will be**

1) 1 m  
2) 10 m  
3) 0.1 m  
4) 0.01 m
91. if $\Delta H > 0$, then the dissolution process is:
   1) Exothermic
   2) Endothermic
   3) Adiabatic
   4) Isothermal

92. Two solutions having same osmotic pressure at a given temperature, are called:
   1) Isobaric solutions
   2) Isothermal solutions
   3) Isotonic solutions
   4) Isotopic solutions

93. "Partial vapour pressure of each volatile component in the solution is directly proportional to its mole fraction" This Law is known as:
   1) Dalton's Law
   2) Hess's Law
   3) Henry's Law
   4) Raoult's Law

94. Ratio of carbon, oxygen and hydrogen atoms in a molecule of fructose is:
   1) $1 : 1 : 2$
   2) $1 : 2 : 1$
   3) $2 : 1 : 1$
   4) $2 : 3 : 2$

95. Errors that depend on constant reasons and recur in all observations are called:
   1) Indeterminate errors
   2) Determinate errors
   3) Random errors
   4) Unsystematic errors

96. Which of the following indicator is used in complex metric titrations?
   1) Phenolphthalein
   2) Methyl orange
   3) EDTA
   4) Iodine

97. A cation exchanger consists of:
   1) Polymeric anion and active cation
   2) Polymeric cation and active anion
   3) Active cation and active anion
   4) Polymeric cation and inactive anion

98. Which of the following is not a software?
   1) Microsoft word
   2) Adobe reader
   3) Pendrive
   4) Google Chrome

99. The output device out of the following is:
   1) Keyboard
   2) Mouse
   3) Pendrive
   4) Monitor

100. Device that is used in the bank to read the code number on check is:
    1) OMR
    2) OCR
    3) MICR
    4) Scanner