40. A 40 μF capacitor is connected to a 200 V, 50 Hz ac supply. The rms value of the current in the circuit is, nearly :

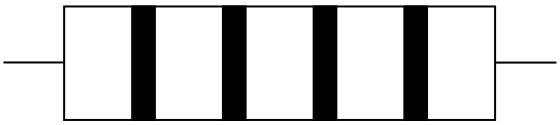
(1) 1.7 A

(2) 2.05 A

(3) 2.5 A

(4) 25.1 A

41. The color code of a resistance is given below :



The values of resistance and tolerance, respectively, are :

(1) 470 kΩ, 5%

(2) 47 kΩ, 10%

(3) 4.7 kΩ, 5%

(4) 470 Ω, 5%

42. Assume that light of wavelength 600 nm is coming from a star. The limit of resolution of telescope whose objective has a diameter of 2 m is :

(1) 3.66×10^{-7} rad

(2) 1.83×10^{-7} rad

(3) 7.32×10^{-7} rad

(4) 6.00×10^{-7} rad

43. Two cylinders A and B of equal capacity are connected to each other via a stop cock. A contains an ideal gas at standard temperature and pressure. B is completely evacuated. The entire system is thermally insulated. The stop cock is suddenly opened. The process is :

(1) isothermal

(2) adiabatic

(3) isochoric

(4) isobaric

44. Light of frequency 1.5 times the threshold frequency is incident on a photosensitive material. What will be the photoelectric current if the frequency is halved and intensity is doubled ?

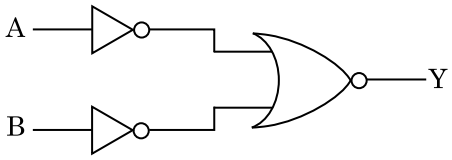
(1) doubled

(2) four times

(3) one-fourth

(4) zero

45. For the logic circuit shown, the truth table is :



(1)

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

(2)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

(3)

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

(4)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

46. Match the following :

	Oxide		**Nature**
(a)	CO	(i)	Basic
(b)	BaO	(ii)	Neutral
(c)	Al_2O_3	(iii)	Acidic
(d)	Cl_2O_7	(iv)	Amphoteric

Which of the following is **correct** option ?

	(a)	**(b)**	**(c)**	**(d)**
(1)	(i)	(ii)	(iii)	(iv)
(2)	(ii)	(i)	(iv)	(iii)
(3)	(iii)	(iv)	(i)	(ii)
(4)	(iv)	(iii)	(ii)	(i)

47. The following metal ion activates many enzymes, participates in the oxidation of glucose to produce ATP and with Na, is responsible for the transmission of nerve signals.

(1) Iron

(2) Copper

(3) Calcium

(4) Potassium

48. The number of Faradays(F) required to produce 20 g of calcium from molten $CaCl_2$ (Atomic mass of Ca = 40 g mol^{-1}) is :

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

49. Which of the following alkane cannot be made in good yield by Wurtz reaction ?

(1) n-Hexane
(2) 2,3-Dimethylbutane
(3) n-Heptane
(4) n-Butane

50. The freezing point depression constant (K_f) of benzene is 5.12 K kg mol^{-1}. The freezing point depression for the solution of molality 0.078 m containing a non-electrolyte solute in benzene is (rounded off upto two decimal places) :

(1) 0.20 K
(2) 0.80 K
(3) 0.40 K
(4) 0.60 K

51. Elimination reaction of 2-Bromo-pentane to form pent-2-ene is :

(a) β-Elimination reaction
(b) Follows Zaitsev rule
(c) Dehydrohalogenation reaction
(d) Dehydration reaction

(1) (a), (b), (c)
(2) (a), (c), (d)
(3) (b), (c), (d)
(4) (a), (b), (d)

52. Match the following and identify the **correct** option.

(a)	$CO(g) + H_2(g)$	(i)	$Mg(HCO_3)_2 + Ca(HCO_3)_2$
(b)	Temporary hardness of water	(ii)	An electron deficient hydride
(c)	B_2H_6	(iii)	Synthesis gas
(d)	H_2O_2	(iv)	Non-planar structure

	(a)	(b)	(c)	(d)
(1)	(iii)	(i)	(ii)	(iv)
(2)	(iii)	(ii)	(i)	(iv)
(3)	(iii)	(iv)	(ii)	(i)
(4)	(i)	(iii)	(ii)	(iv)

53. Which one of the followings has maximum number of atoms ?

(1) 1 g of Ag(s) [Atomic mass of Ag = 108]
(2) 1 g of Mg(s) [Atomic mass of Mg = 24]
(3) 1 g of O_2(g) [Atomic mass of O = 16]
(4) 1 g of Li(s) [Atomic mass of Li = 7]

54. The rate constant for a first order reaction is 4.606×10^{-3} s^{-1}. The time required to reduce 2.0 g of the reactant to 0.2 g is :

(1) 100 s
(2) 200 s
(3) 500 s
(4) 1000 s

55. Which of the following is the **correct** order of increasing field strength of ligands to form coordination compounds ?

(1) $SCN^- < F^- < C_2O_4^{2-} < CN^-$
(2) $SCN^- < F^- < CN^- < C_2O_4^{2-}$
(3) $F^- < SCN^- < C_2O_4^{2-} < CN^-$
(4) $CN^- < C_2O_4^{2-} < SCN^- < F^-$

56. A mixture of N_2 and Ar gases in a cylinder contains 7 g of N_2 and 8 g of Ar. If the total pressure of the mixture of the gases in the cylinder is 27 bar, the partial pressure of N_2 is :

[Use atomic masses (in g mol^{-1}) : N = 14, Ar = 40]

(1) 9 bar
(2) 12 bar
(3) 15 bar
(4) 18 bar

57. Measuring Zeta potential is useful in determining which property of colloidal solution ?

(1) Viscosity
(2) Solubility
(3) Stability of the colloidal particles
(4) Size of the colloidal particles

58. Sucrose on hydrolysis gives :

(1) β-D-Glucose + α-D-Fructose
(2) α-D-Glucose + β-D-Glucose
(3) α-D-Glucose + β-D-Fructose
(4) α-D-Fructose + β-D-Fructose

59. Find out the solubility of $Ni(OH)_2$ in 0.1 M NaOH. Given that the ionic product of $Ni(OH)_2$ is 2×10^{-15}.

(1) 2×10^{-13} M

(2) 2×10^{-8} M

(3) 1×10^{-13} M

(4) 1×10^{8} M

60. The mixture which shows positive deviation from Raoult's law is :

(1) Ethanol + Acetone

(2) Benzene + Toluene

(3) Acetone + Chloroform

(4) Chloroethane + Bromoethane

61. Identify a molecule which does **not** exist.

(1) He_2

(2) Li_2

(3) C_2

(4) O_2

62. Identify the **incorrect** statement.

(1) $Cr^{2+}(d^4)$ is a stronger reducing agent than $Fe^{2+}(d^6)$ in water.

(2) The transition metals and their compounds are known for their catalytic activity due to their ability to adopt multiple oxidation states and to form complexes.

(3) Interstitial compounds are those that are formed when small atoms like H, C or N are trapped inside the crystal lattices of metals.

(4) The oxidation states of chromium in CrO_4^{2-} and $Cr_2O_7^{2-}$ are not the same.

63. Which of the following is a basic amino acid ?

(1) Serine

(2) Alanine

(3) Tyrosine

(4) Lysine

64. An element has a body centered cubic (bcc) structure with a cell edge of 288 pm. The atomic radius is :

(1) $\frac{\sqrt{3}}{4}\times 288$ pm

(2) $\frac{\sqrt{2}}{4}\times 288$ pm

(3) $\frac{4}{\sqrt{3}}\times 288$ pm

(4) $\frac{4}{\sqrt{2}}\times 288$ pm

65. Hydrolysis of sucrose is given by the following reaction.

$$\text{Sucrose} + H_2O \rightleftharpoons \text{Glucose} + \text{Fructose}$$

If the equilibrium constant (K_c) is 2×10^{13} at 300 K, the value of $\Delta_r G^{\ominus}$ at the same temperature will be :

(1) $-8.314\ J\ mol^{-1}K^{-1}\times300\ K\times\ln(2\times10^{13})$

(2) $8.314\ J\ mol^{-1}K^{-1}\times300\ K\times\ln(2\times10^{13})$

(3) $8.314\ J\ mol^{-1}K^{-1}\times300\ K\times\ln(3\times10^{13})$

(4) $-8.314\ J\ mol^{-1}K^{-1}\times300\ K\times\ln(4\times10^{13})$

66. Which of the following is a natural polymer ?

(1) *cis*-1,4-polyisoprene

(2) poly (Butadiene-styrene)

(3) polybutadiene

(4) poly (Butadiene-acrylonitrile)

67. A tertiary butyl carbocation is more stable than a secondary butyl carbocation because of which of the following ?

(1) $-$I effect of $-CH_3$ groups

(2) $+$R effect of $-CH_3$ groups

(3) $-$R effect of $-CH_3$ groups

(4) Hyperconjugation

68. An increase in the concentration of the reactants of a reaction leads to change in :

(1) activation energy

(2) heat of reaction

(3) threshold energy

(4) collision frequency

69. Which of the following is **not** correct about carbon monoxide ?

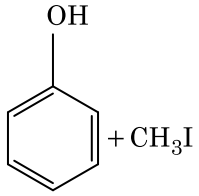
(1) It forms carboxyhaemoglobin.

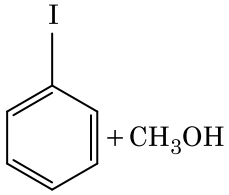
(2) It reduces oxygen carrying ability of blood.

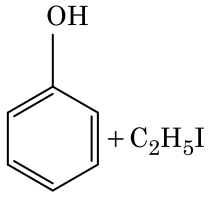
(3) The carboxyhaemoglobin (haemoglobin bound to CO) is less stable than oxyhaemoglobin.

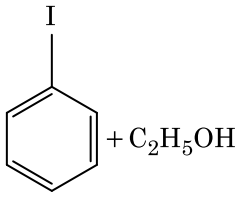
(4) It is produced due to incomplete combustion.

70. Anisole on cleavage with HI gives :

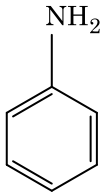
(1) 

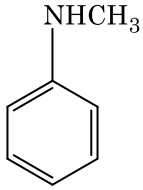
(2) 

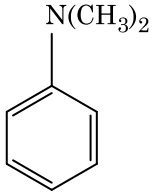
(3) 

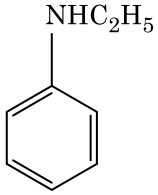
(4) 

71. Which of the following amine will give the carbylamine test ?

(1) 

(2) 

(3) 

(4) 

72. Identify the **incorrect** match.

	Name	**IUPAC Official Name**	
(a)	Unnilunium	(i)	Mendelevium
(b)	Unniltrium	(ii)	Lawrencium
(c)	Unnilhexium	(iii)	Seaborgium
(d)	Unununnium	(iv)	Darmstadtium

(1) (a), (i)

(2) (b), (ii)

(3) (c), (iii)

(4) (d), (iv)

73. On electrolysis of dil.sulphuric acid using Platinum (Pt) electrode, the product obtained at anode will be :

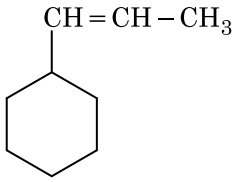
(1) Hydrogen gas

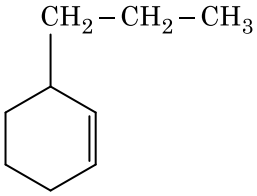
(2) Oxygen gas

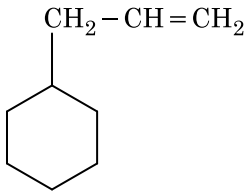
(3) H_2S gas

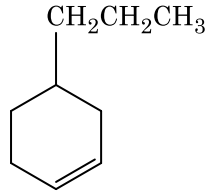
(4) SO_2 gas

74. An alkene on ozonolysis gives methanal as one of the product. Its structure is :

(1) 

(2) 

(3) 

(4) 

75. Reaction between acetone and methylmagnesium chloride followed by hydrolysis will give :

(1) Isopropyl alcohol

(2) Sec. butyl alcohol

(3) Tert. butyl alcohol

(4) Isobutyl alcohol

76. The calculated spin only magnetic moment of Cr^{2+} ion is :

(1) 3.87 BM

(2) 4.90 BM

(3) 5.92 BM

(4) 2.84 BM

77. Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as :

(1) Aldol condensation

(2) Cannizzaro's reaction

(3) Cross Cannizzaro's reaction

(4) Cross Aldol condensation

78. Which of the following oxoacid of sulphur has $-O-O-$ linkage ?

(1) H_2SO_3, sulphurous acid

(2) H_2SO_4, sulphuric acid

(3) $H_2S_2O_8$, peroxodisulphuric acid

(4) $H_2S_2O_7$, pyrosulphuric acid

79. Which of the following set of molecules will have zero dipole moment ?

(1) Ammonia, beryllium difluoride, water, 1,4-dichlorobenzene

(2) Boron trifluoride, hydrogen fluoride, carbon dioxide, 1,3-dichlorobenzene

(3) Nitrogen trifluoride, beryllium difluoride, water, 1,3-dichlorobenzene

(4) Boron trifluoride, beryllium difluoride, carbon dioxide, 1,4-dichlorobenzene

80. The number of protons, neutrons and electrons in $^{175}_{71}Lu$, respectively, are :

(1) 71, 104 and 71

(2) 104, 71 and 71

(3) 71, 71 and 104

(4) 175, 104 and 71

81. Identify the **correct** statements from the following :

(a) $CO_2(g)$ is used as refrigerant for ice-cream and frozen food.

(b) The structure of C_{60} contains twelve six carbon rings and twenty five carbon rings.

(c) ZSM-5, a type of zeolite, is used to convert alcohols into gasoline.

(d) CO is colorless and odourless gas.

(1) (a), (b) and (c) only

(2) (a) and (c) only

(3) (b) and (c) only

(4) (c) and (d) only

82. Urea reacts with water to form **A** which will decompose to form **B**. **B** when passed through Cu^{2+} (aq), deep blue colour solution **C** is formed. What is the formula of **C** from the following ?

(1) $CuSO_4$

(2) $[Cu(NH_3)_4]^{2+}$

(3) $Cu(OH)_2$

(4) $CuCO_3 \cdot Cu(OH)_2$

83. Which of the following is a cationic detergent ?

(1) Sodium lauryl sulphate

(2) Sodium stearate

(3) Cetyltrimethyl ammonium bromide

(4) Sodium dodecylbenzene sulphonate

84. For the reaction, $2Cl(g) \rightarrow Cl_2(g)$, the **correct** option is :

(1) $\Delta_r H > 0$ and $\Delta_r S > 0$

(2) $\Delta_r H > 0$ and $\Delta_r S < 0$

(3) $\Delta_r H < 0$ and $\Delta_r S > 0$

(4) $\Delta_r H < 0$ and $\Delta_r S < 0$

85. Identify the **correct** statement from the following :

(1) Wrought iron is impure iron with 4% carbon.

(2) Blister copper has blistered appearance due to evolution of CO_2.

(3) Vapour phase refining is carried out for Nickel by Van Arkel method.

(4) Pig iron can be moulded into a variety of shapes.

86. The correct option for free expansion of an ideal gas under adiabatic condition is :

(1) $q = 0$, $\Delta T = 0$ and $w = 0$

(2) $q = 0$, $\Delta T < 0$ and $w > 0$

(3) $q < 0$, $\Delta T = 0$ and $w = 0$

(4) $q > 0$, $\Delta T > 0$ and $w > 0$

87. HCl was passed through a solution of $CaCl_2$, $MgCl_2$ and NaCl. Which of the following compound(s) crystallise(s) ?

(1) Both $MgCl_2$ and $CaCl_2$

(2) Only NaCl

(3) Only $MgCl_2$

(4) NaCl, $MgCl_2$ and $CaCl_2$

88. What is the change in oxidation number of carbon in the following reaction ?

$CH_4(g) + 4Cl_2(g) \rightarrow CCl_4(l) + 4HCl(g)$

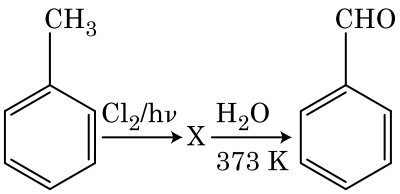
(1) $+4$ to $+4$

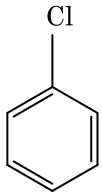
(2) 0 to $+4$

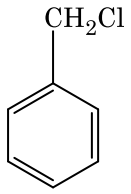
(3) -4 to $+4$

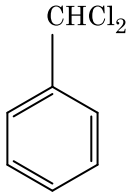
(4) 0 to -4

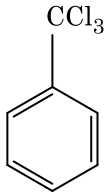
89. Identify compound X in the following sequence of reactions :



(1) 

(2) 

(3) 

(4) 

90. Paper chromatography is an example of :

(1) Adsorption chromatography

(2) Partition chromatography

(3) Thin layer chromatography

(4) Column chromatography

91. Dissolution of the synaptonemal complex occurs during :

(1) Pachytene

(2) Zygotene

(3) Diplotene

(4) Leptotene

92. Select the option including all sexually transmitted diseases.

(1) Gonorrhoea, Syphilis, Genital herpes

(2) Gonorrhoea, Malaria, Genital herpes

(3) AIDS, Malaria, Filaria

(4) Cancer, AIDS, Syphilis

93. Which of the following would help in prevention of diuresis ?

(1) More water reabsorption due to undersecretion of ADH

(2) Reabsorption of Na^+ and water from renal tubules due to aldosterone

(3) Atrial natriuretic factor causes vasoconstriction

(4) Decrease in secretion of renin by JG cells

94. Cuboidal epithelium with brush border of microvilli is found in :

(1) lining of intestine

(2) ducts of salivary glands

(3) proximal convoluted tubule of nephron

(4) eustachian tube

95. Identify the substances having glycosidic bond and peptide bond, respectively in their structure :

(1) Chitin, cholesterol

(2) Glycerol, trypsin

(3) Cellulose, lecithin

(4) Inulin, insulin

96. Bt cotton variety that was developed by the introduction of toxin gene of *Bacillus thuringiensis* (Bt) is resistant to :

(1) Insect pests

(2) Fungal diseases

(3) Plant nematodes

(4) Insect predators

97. The ovary is half inferior in :

(1) Brinjal

(2) Mustard

(3) Sunflower

(4) Plum