Sr No.	PhD Chemistry
1	Choose the missing term out of the given options: ___aa__ba__bb__ab__aab
Alt1	aaabb
Alt2	babab
Alt3	bbaab
Alt4	bbbaa

2	Choose word from the given options which bears the same relationship to the third word, as the first two bears: Hour : Second :: Tertiary : ?
Alt1	Intermediary
Alt2	Primary
Alt3	Ordinary
Alt4	Secondary

3	Select the lettered pair that has the same relationship as the original pair of words: Stickler :Insist
Alt1	Laggard: Outlast
Alt2	Braggart: Boast
Alt3	Haggler: Concede
Alt4	Trickster: Risk

4	Select the lettered pair that has the same relationship as the original pair of words: Necromancy : Ghosts
Alt1	Romance: Stories
Alt2	Magie: Amulets
Alt3	Alchemy: Gold
Alt4	Sorcery: Spirits

5	Find out the number that has the same relationship as the numbers of the given pair: MAD: JXA: RUN: ?
Alt1	ORK
Alt2	OSQ
Alt3	PRJ
Alt4	UXQ

6	Spot the defective segment from the following:
Alt1	Keep the miscreants
Alt2	at your arm’s length
Alt3	for
Alt4	they will pull the wool over your eyes

7	The terrorists held the tourists ---------- for ransom.
Alt1	as hostages
Alt2	hostages
Alt3	hostage

Alt4	captives

8	If I ------- wealthy, I would have got many friends.
Alt1	had been
Alt2	were
Alt3	was
Alt4	am

9	Choose the option closest in meaning to the given word: NEOLOGISM
Alt1	inoculation
Alt2	coinage
Alt3	consistency
Alt4	mirth

10	Choose the antonymous option you consider the best: SUAVE
Alt1	crestfallen
Alt2	polite
Alt3	rough
Alt4	cherished

11	In a certain code, REFRIGERATOR is coded as ROTAREGIRFER. Which wordwould be coded as NOITINUMMA ?
Alt1	ANMOMIUTNI
Alt2	AMNTOMUIIN
Alt3	AMMUNITION
Alt4	NMMUNITIOA

12	Traffic : Road in the same way as
Alt1	Aeroplane : Aerodrome
Alt2	Blood : Veins
Alt3	Roots : Tree
Alt4	Car : Garage

13	The following information is given: One of M.Gopi, his wife, their son and Mr.Gopi's mother is an architect and another is a doctor. (i) If the doctor is younger than the architect, then the doctor and the architect are not blood relatives. (ii) If the doctor is a woman, then the doctor and the architect are blood relatives. (iii) If the architect is a man, then the doctor is a man. Whose occupation is known by this information?
Alt1	Mr. Gopi is the doctor
Alt2	Mr. Gopi's son is the architect
Alt3	Mrs. Gopi is the doctor
Alt4	Mr. Gopi's mother is the doctor

14	Gopal was ranked 5th from the top and 16th from the bottom in a test. How many students were there in his class
Alt1	19
Alt2	21
Alt3	22
Alt4	20

15	Median of 10o, 5o, -2o, -1o, -5o, 15o is
Alt1	-2o
Alt2	-1o
Alt3	2o
Alt4	3o

16	Which of the following is 'OXYMORON'?
Alt1	Found Missing
Alt2	TIT-TAT
Alt3	GOTO
Alt4	Misunderstood

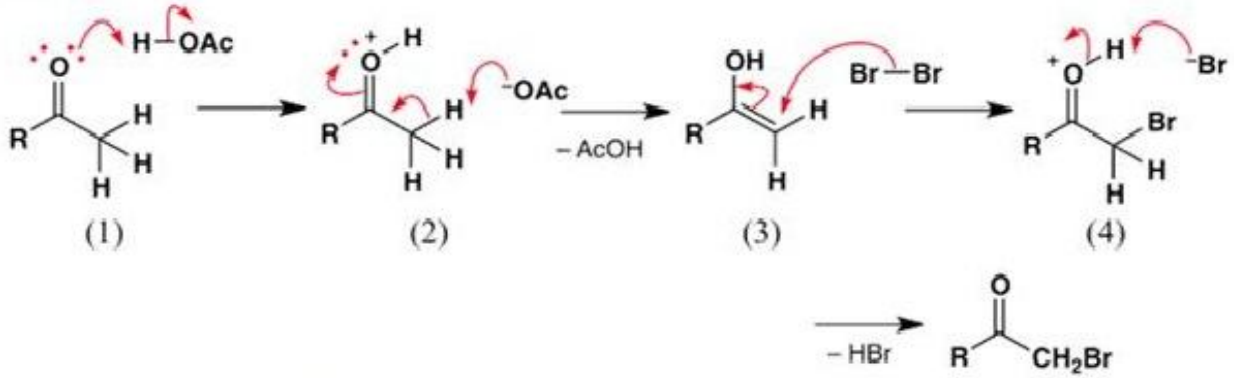
17	There are 5 persons in a class. Each one is shaking hand with the other. Find the total number of hand shakes?
Alt1	5
Alt2	10
Alt3	20
Alt4	60

18	Of the 26 Capital letters, how many are symmetrical along with vertical and horizontal axes.
Alt1	4
Alt2	3
Alt3	6
Alt4	5

19	There are 30 boys and 60 girls in a village . There are 70 men and 40 women in that village. What is the percentage of boys in that village?
Alt1	0.1
Alt2	0.25
Alt3	0.2
Alt4	0.15

20	There are N students in a class and only 8 of them are girls. If 11 boys added to the class,how many students in the class are boys?
Alt1	N+3
Alt2	N-3
Alt3	N-19

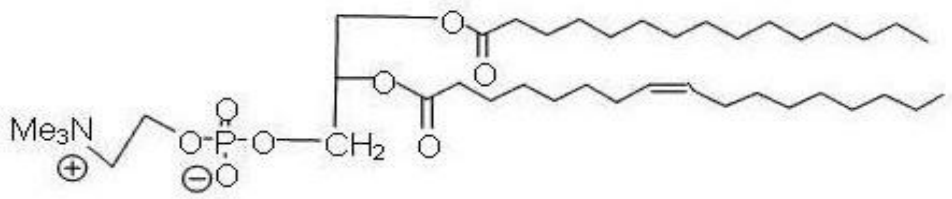
Alt4	19

21	The following scheme shows a mechanism for the α-bromination of a methyl ketone with bromine in ethanoic acid. In which stage do the curly arrows wrongly show the flow of electrons?  A: stage 1 B: stage 2 C: stage 3 D: stage 4
Alt1	A
Alt2	B
Alt3	C
Alt4	D

22	Which of the following pairs of physical quantities commute?
Alt1	L and ϕ ; L is the angular momentum and ϕ azimuthal angle
Alt2	x and p ; x is position vector and p is the momentum
Alt3	v and t ; v is frequency and t is the time,
Alt4	K and λ; K is the wave vector and λ is the de Broglie wavelength

23	If Ψa and Ψb are the atomic wave functions of the two hydrogen atoms, then for the bonding sigma-bonding orbital of hydrogen molecule, the increase in the electronic probability density between the two hydrogen atoms is given by:-
Alt1	2Ψa Ψb
Alt2	ΨaΨb
Alt3	-Ψa Ψb
Alt4	-2 Ψa Ψb

24	Identify the correct match of amino acid to the characteristics of the amino acid described (a) Only standard amino acid whose side chain does not contain carbon (b) Only standard amino acid with a cyclic side chain (c) Only standard amino acid that participates in disulfide bonds (d) Only standard amino acid with a methyl group attached to its alpha carbon atom (i) Alanine (ii) Glycine (iii) Proline (iv) Cysteine
Alt1	(a) - (ii); (b) - (iii); (c) - (iv); (d) - (i)
Alt2	(a) - (i); (b) - (ii); (c) - (iii); (d) - (iv)
Alt3	(a) - (iv); (b) - (i); (c) - (ii); (d) - (iii)
Alt4	(a) - (iii); (b) - (iv); (c) - (i); (d) - (ii)

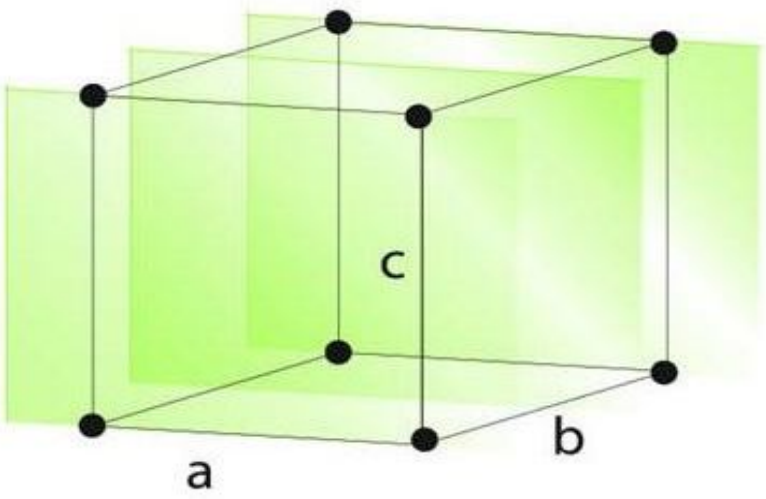
25	What type of molecule is the following structure?  A: A phospholipid B: A nucleic acid C: A carbohydrate D: A protein
Alt1	A
Alt2	B
Alt3	C
Alt4	D

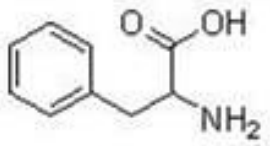
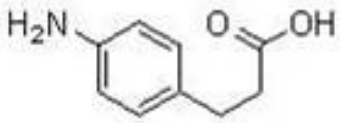
26	HV(CO)6 is:-
Alt1	pH = 7
Alt2	not stable
Alt3	basic
Alt4	acidic

27	The reaction of Potassium phthalimide with Ethyl Chloroacetate followed by hydrolysis results in:-
Alt1	Glycine
Alt2	Valine
Alt3	Alanine
Alt4	Leucine

28	The nature of HCo(CO)4 is:-
Alt1	inert
Alt2	acidic
Alt3	metallic
Alt4	basic

29	The numbers of classes in the C3v point group symmetry is:-
Alt1	1
Alt2	4
Alt3	2
Alt4	3

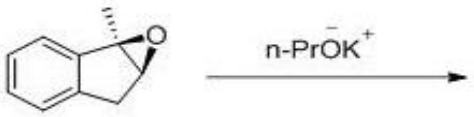
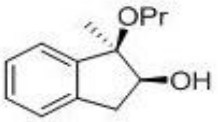
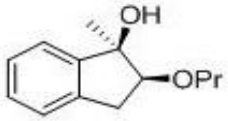
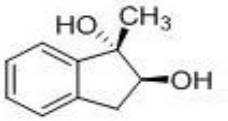
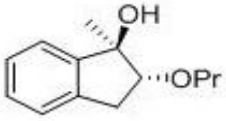
30	What are the Miller indices of the following planes?  A: (020) B: (202) C: (022) D: (220)
Alt1	A
Alt2	B
Alt3	C
Alt4	D

31	Which of the following pattern of ^{1}H NMR will match with compounds (i) and (ii)?  (i)  (ii)
Alt1	For (i): A complex multiplet in aromatic region; three doublets of doublets in aliphatic region in addition to two singlets for NH2 and OH protons; For (ii) Two doublets characteristic of A2B2 in aromatic region and two triplets in aliphatic region in addition to two singlets for NH2 and OH protons;
Alt2	For(i) : A complex multiplet in aromatic region a triplet and doublet integrating for one and two protons respectively in aliphatic region in addition to two singlets for NH2 and OH protons; For (ii): Two doublets of doublets characteristic of AA'XX' spin system in aromatic region and two triplets in aliphatic region in addition to two singlets for NH2 and OH protons;
Alt3	For (i) : A complex multiplet in aromatic region; a triplet and doublet integrating for one and two protons respectively in aliphatic region in addition to two singlets for NH2 and OH protons; For (ii): Two doublets in aromatic region and two triplets in aliphatic region in addition to two singlets for NH2 and OH protons;
Alt4	For (i) : A complex multiplet in aromatic region; three doublets of doublets in aliphatic region in addition to two singlets for NH2 and OH protons; For (ii): Two doublets of doublets characteristic of AA'XX' spin system in aromatic region and two triplets in aliphatic region in addition to two singlets for NH2 and OH protons;

32	The hydrolysis of t-bromobutane, C4H9Br, by hydroxide, OH-, ions in aqueous solution follows an SN1 reaction mechanism in which the rate-determining step is the loss of a bromide, Br-, ion, followed by rapid reaction with hydroxide ions. Which of the following rate laws is consistent with this mechanism?
Alt1	Rate = k [OH-]
Alt2	Rate = k[C4H9Br][OH-]
Alt3	Rate = k[C4H9Br]
Alt4	Rate = k[C4H9Br]2

33	Which of the following is not a Van der Waal force?
Alt1	Dipole -dipole interaction
Alt2	Hydrogen bonding
Alt3	Dipole induced- dipole force
Alt4	London dispersion force

34	Which of the following is true for melting?
Alt1	exothermic process
Alt2	irreversible process
Alt3	endothermic process
Alt4	none of the above

35	The major product formed in the following reaction is  A:  B:  C:  D: 
Alt1	A
Alt2	B
Alt3	C
Alt4	D

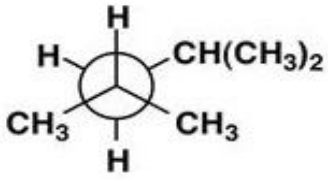
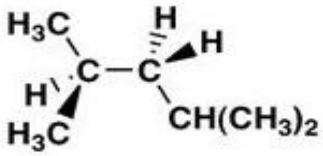
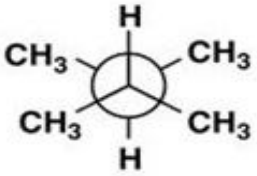
36	M(CH2CHCH2) complex does not have interaction between:-
Alt1	LGO with dxz and dx2-y2
Alt2	LGO with dxz and dyz
Alt3	LGO with dxz and dz2
Alt4	LGO with dxy and dx2-y2

37	In EPR spectroscopy, the selection rule is:-
Alt1	both electron and nuclear spin change
Alt2	both electron spin and nuclear spin do not change
Alt3	electron spin changes, while nuclear spin does not
Alt4	nuclear spin changes, while electron spin does not change

38	Use molecular orbital theory to determine the bond order for the O2+ ion:-
Alt1	1 ½
Alt2	3
Alt3	2 ½
Alt4	2

39	The number of normal modes of vibration in H2S molecule is:-
Alt1	2
Alt2	3
Alt3	4
Alt4	1

40	When Al4C3 reacts with H2O, the major product is:-
Alt1	methane
Alt2	propane
Alt3	ethyne
Alt4	propyne

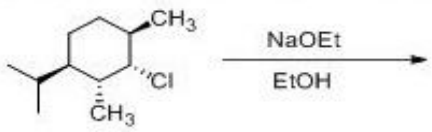
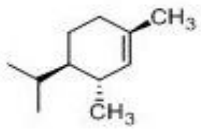
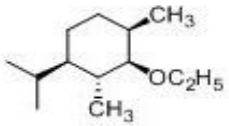
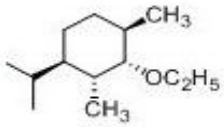
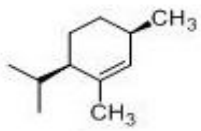
41	Which compound is different from the others? A:  B:  C:  D: 
Alt1	A
Alt2	B
Alt3	C
Alt4	D

42	Cp2WCl2 complex is stable owing to one of the following reasons:-
Alt1	18 electron
Alt2	16 electron
Alt3	The molecule is unstable
Alt4	8 electron

43	Oh CFSE is more for d6 ion in the case of:-
Alt1	strong field
Alt2	magnetic field
Alt3	weak field
Alt4	electric field

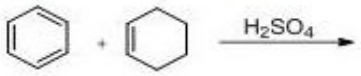
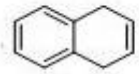
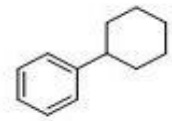
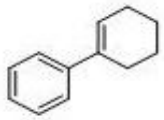
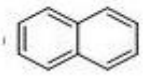
44	Aluminum chloride melts at a much lower temperature than that of sodium chloride, because:-
Alt1	aluminum chloride is dimeric
Alt2	aluminum chloride is polymeric
Alt3	the Al-Cl bond is more ionic than that of Na-Cl
Alt4	Al-Cl bond is highly covalent while NaCl is ionic

45	The first step in the Wilkinson's catalytic cycle is:-
Alt1	decomplexation
Alt2	Cl dissociation
Alt3	oxidation
Alt4	PPh3 dissociation

46	The major product formed in the following reaction is  A:  B:  C:  D: 
Alt1	A
Alt2	B
Alt3	C
Alt4	D

47	Which of the following combination of liquids form ideal mixture?
Alt1	carbon tetrachloride and methyl alcohol
Alt2	water and ethyl alcohol
Alt3	acetone and chloroform
Alt4	benzene and toluene

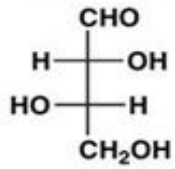
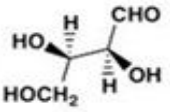
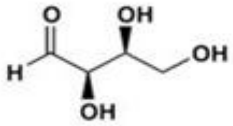
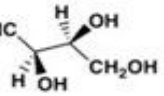
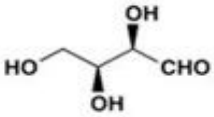
48	1.2 m The molality of a solution containing 18 g of glucose (molar mass 180 g) in 500 g of water is:-
Alt1	1.2 m
Alt2	0.2 m
Alt3	1 m
Alt4	0.5 m

49	The major product obtained in the following reaction is  A:  B:  C:  D: 
Alt1	A
Alt2	B
Alt3	C
Alt4	D

50	The numbers of radial nodes of 3d orbital is:-
Alt1	3
Alt2	2
Alt3	1
Alt4	0

51	The general formula of a spinel is, AB2O4 , where A is a divalent and B is a trivalent cation. Then Fe3O4 is:-
Alt1	an inverse spinel
Alt2	a mixed spinel

Alt3	a normal spinel
Alt4	not a spinel

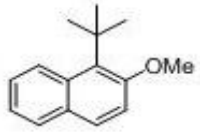
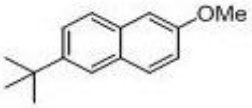
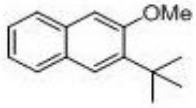
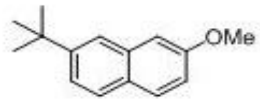
52	Which is the enantiomer of the following molecule?  A:  B:  C:  D: 
Alt1	A
Alt2	B
Alt3	C
Alt4	D

53	Predict the geometry of a molecule in which the bonding may be described using the valence-bond model as being made up of sp3 hybrid orbitals on the central atom:-
Alt1	tetrahedral
Alt2	octahedral
Alt3	trigonal bipyramidal
Alt4	square planar

54	Cis-Pt(Cl)2(NH3)2 from one of the following complexes:-
Alt1	Pt, NH3 and Cl
Alt2	Pt(NH2)4
Alt3	PtCl4
Alt4	Pt(NH3)4

55	Which of the following is an arachno borane ?
Alt1	[B5H9]

Alt2	[B6H12]
Alt3	[B2H6]
Alt4	[B6H6]2-

56	The major product obtained in the following reaction is  A:  B:  C:  D: 
Alt1	A
Alt2	B
Alt3	C
Alt4	D

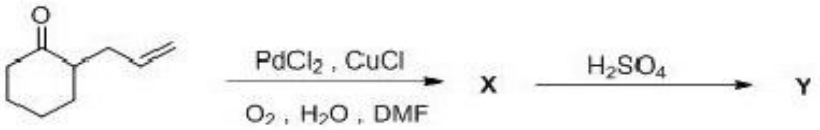
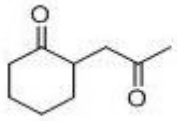
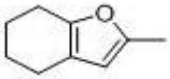
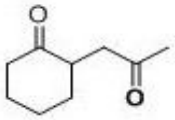
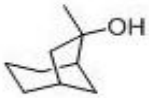
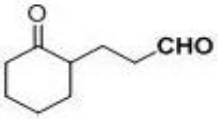
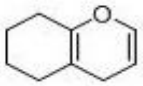
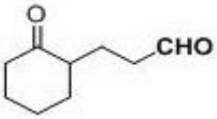
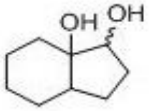
57	Which of the following is the SI unit of viscosity?
Alt1	Kg -1S-1m
Alt2	Kg-1 S-1m-1
Alt3	Kg S m-1
Alt4	Kg S-1m-1

58	106 _E The subs tu on reac on in [Co(NH3)5Cl]2+ is faster in the presence of:-
Alt1	pressure
Alt2	photo light
Alt3	OH-
Alt4	Metal catalyst

59	If position vectors of points A and B are 3i-2j+k and 2i+4j-3k, where i , j, k are unit vectors, then the length AB is given by:-
Alt1	√ 14
Alt2	√ 53
Alt3	√ 29
Alt4	√ 43

60	Hydrogen, H2, may exist in two forms: in ortho-hydrogen, o-H2, the nuclear spins are parallel, whilst in para-hydrogen, p-H2, the spins are antiparallel. Ortho-hydrogen is threefold degenerate, so that the nuclear partition function qS = 3, whilst para-hydrogen is singly degenerate and has a nuclear partition function qS = 1. Only rotational levels with odd values of J are permitted for ortho-hydrogen, whilst only even values of J are permitted for para-hydrogen. The two forms of hydrogen coexist in equilibrium in the presence of a catalyst such as charcoal. Calculate, by direct summation, the equilibrium constant for the conversion of ortho-hydrogen to para-hydrogen at a temperature of 200 K. The rotational constant of hydrogen is 60.80 cm-1.
Alt1	3.18
Alt2	3.00
Alt3	1.67
Alt4	1.00

61	What is the symmetry of the antibonding molecular orbital formed by a linear combination of the px or py atomic orbitals in a homonuclear diatomic molecule?
Alt1	σu
Alt2	πu
Alt3	πg
Alt4	σg

62	The major products, X and Y in the following reaction sequences are  A: X =  Y =  B: X =  Y =  C: X =  Y =  D: X =  Y = 
Alt1	A
Alt2	B
Alt3	C
Alt4	D

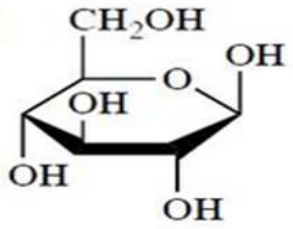
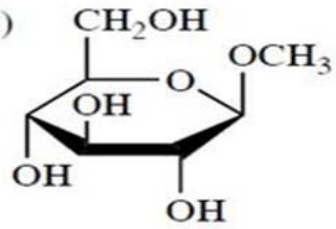
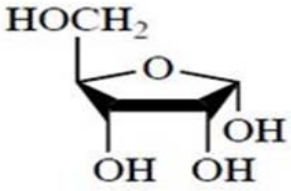
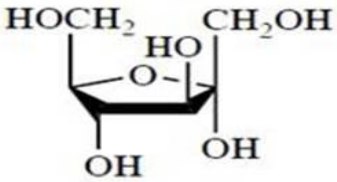
63	The biological role of ferritin is:-
Alt1	metal transport
Alt2	oxygen storage
Alt3	electron transfer
Alt4	iron storage

64	Among, RO-, AsMe3, ROR', CN-, RCO2-, SCN-, the set of ligands with good π-acceptor nature are:-
Alt1	RO-, RCO2-, SCN-
Alt2	AsMe3, CN-, SCN-
Alt3	RO-, ROR', RCO2-
Alt4	RO-, RCO2-, AsMe3

65	The ordering of the d-orbital energies in an octahedral complex on tetragonal elongation is expected to be:-
Alt1	dxy > dyz, dxz > dz2 > dx2-y2
Alt2	dx2-y2 > dz2 > dxy > dyz, dxz
Alt3	dx2-y2 > dxy > dz2 > dyz, dxz
Alt4	dx2-y2 < dz2 < dxy > dyz, dxz

66	107Q42.jpg
Alt1	A
Alt2	B
Alt3	C
Alt4	D

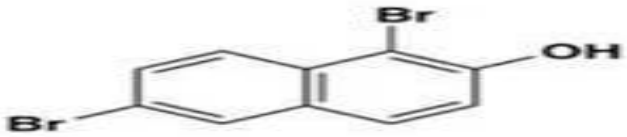
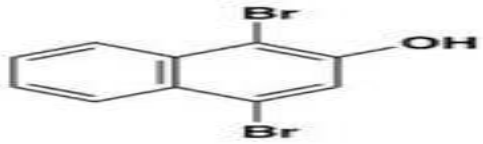
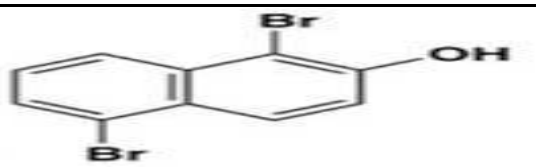
67	H2 and CO can be produced from one of the following reactions:-
Alt1	H2O reaction with C
Alt2	H2O reaction with Mn(CO)6
Alt3	H2O reaction with CO2
Alt4	H2O reaction with Na

68	Identify the correct match of monosacharide to the characteristics of the monosacharide described a)  b)  c)  d)  **(i) Open-chain form is an aldopentose** **(ii) Open-chain form is a ketohexose** **(iii) D-glucose** **(iv) A glycoside**
Alt1	(a) - (ii); (b) - (iii); (c) - (iv); (d) - (i)
Alt2	(a) - (i); (b) - (ii); (c) - (iii); (d) - (iv)
Alt3	(a) - (iv); (b) - (i); (c) - (ii); (d) - (iii)
Alt4	(a) - (iii); (b) - (iv); (c) - (i); (d) - (ii)

69	L2Ir(CO)Cl reaction with H2 is called:-
Alt1	oxidative addition
Alt2	sigma bond metathesis
Alt3	substitution reaction
Alt4	Oxidation reaction

70	Fe(CO)4 is isolobal to:-

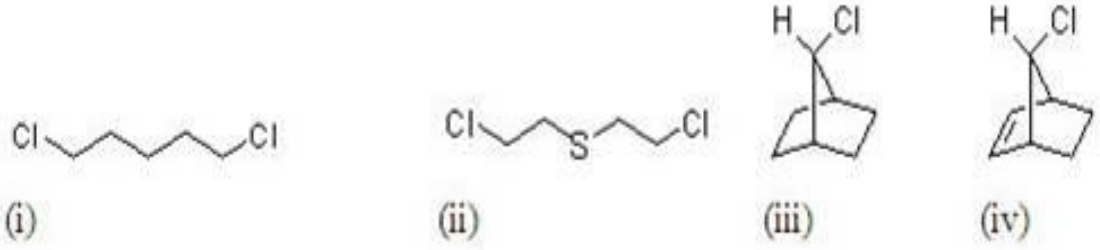
Alt1	Cu(CO)4
Alt2	Mn(CO)4
Alt3	Ru(CO)4
Alt4	Cr(CO)4

71	Naphthalene-2-ol (2-naphthol) readily gives a dibromo substitution product with bromine in ethanoic acid. What is the most likely structure of this compound?
Alt1	
Alt2	
Alt3	
Alt4	

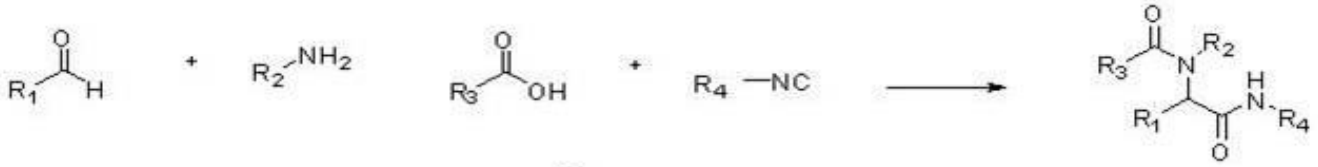
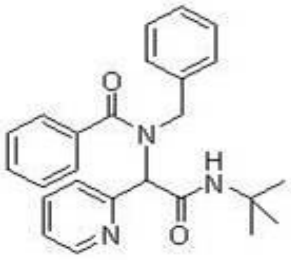
72	Which of the following is not a thermoelectric effect?
Alt1	Peltier effect
Alt2	Thomson effect
Alt3	Meissner effect
Alt4	Seebeck effect

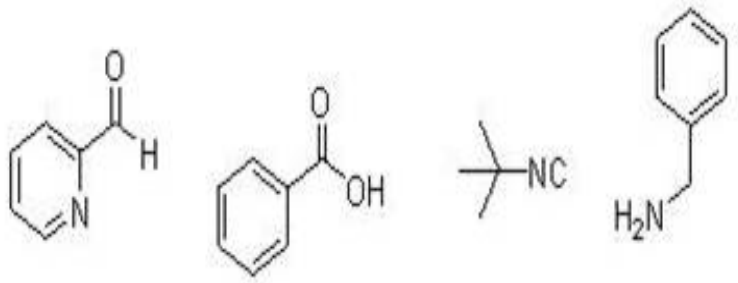
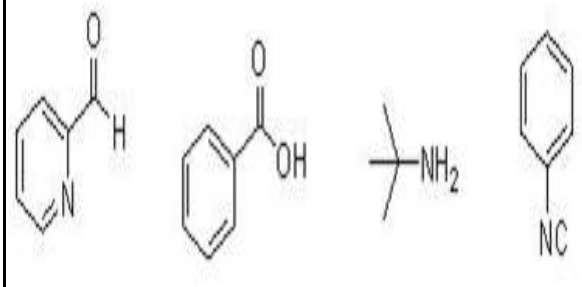
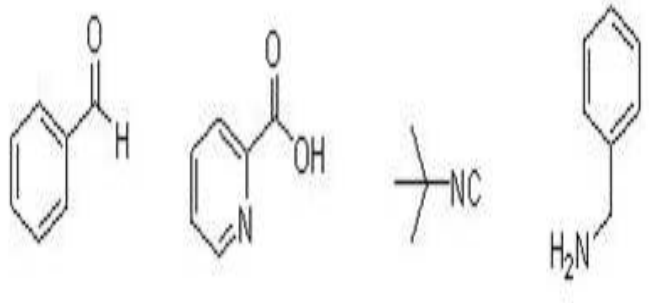
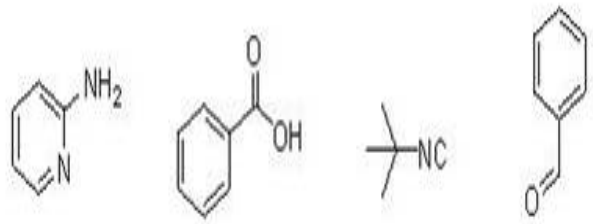
73	The total number of hyperfine lines in an isotropic EPR spectrum of V4+ ion is given by:-
Alt1	8
Alt2	6
Alt3	2
Alt4	4

74	In a two component solid-solid phase diagram, what is the degrees of freedom at the eutectic point?
Alt1	0
Alt2	2
Alt3	1
Alt4	3

75	Which of the following statements is true regarding the rate of hydrolysis of the following substrates:  (i) (ii) (iii) (iv)
Alt1	(ii) and (iv) faster than (i) and (iii)
Alt2	(i) and (ii) faster than (iii) and (iv)
Alt3	(i) and (iii) faster than (ii) and (iv)
Alt4	(iii) and (iv) faster than (i) and (ii)

76	In the following reactions, (i) Mn2(CO)10 + Na → X (ii) X + CH3COCl → Y The X and Y respectively are:-
Alt1	[Mn(CO)4]2- , [ClMn(CO)5]-
Alt2	[Mn(CO)5]- , CH3C(O)Mn(CO)5
Alt3	[Mn(CO)4]2- , [CH3C(O)Mn(CO)5]-
Alt4	[Mn(CO)5]- , ClMn(CO)5

77	Ugi four component reaction involves reaction between an aldehyde, amine, isocyanide and an acid. Based on the scheme given below identify the correct set building blocks to be used in Ugi reaction to obtain the compound shown in Fig.A:   Fig.A

Alt1	
Alt2	
Alt3	
Alt4	

78	The higher stability of cis dichloro ethylene compared to its trans form is due to:-
Alt1	Hydrogen bonding
Alt2	steric repulsion
Alt3	inter-halogen attraction from weak interactions
Alt4	hyper-conjugation

79	Calculate the ionic strength of a solution of iron (III) carbonate, Fe2(CO3)3 of concentration 0.020 mol dm-3
Alt1	0.3
Alt2	-0.1
Alt3	0
Alt4	0.25

80	The calculated magnetic moment of Cr2+ ion in a weak field is:-
Alt1	4.12 BM
Alt2	4.90 BM
Alt3	2.80 BM
Alt4	7.18 BM

81	The complexes [Cu(NH3)4] [PtCl4] and [Pt(NH3)4] [CuCl4] represents an example of:-
Alt1	linkage isomerism
Alt2	coordination isomerism
Alt3	ionisation isomerism
Alt4	geometrical isomerism

82	Reduction of [Co(NH3)5Cl]2+ by [Cr(H2O)6]2+ is faster owing to:-
Alt1	presence of water
Alt2	presence of Cl-
Alt3	high oxidation state
Alt4	presence of amine

83	The separation of bonding as σ type and π -type is strictly applicable only to:-
Alt1	diatomics
Alt2	systems with center of symmetry
Alt3	linear systems
Alt4	planar molecules

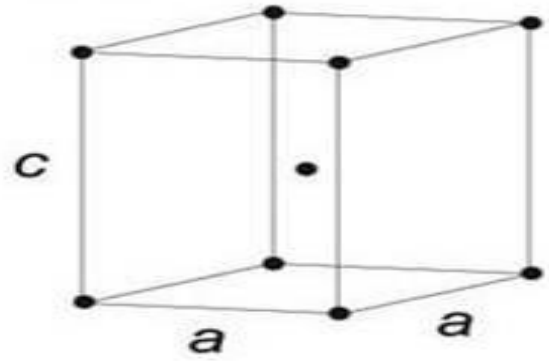
84	The rate law for the multistep chain reaction $H_2 + Br_2 \rightarrow 2\,HBr$ is $\text{Rate} = \frac{d[HBr]}{dt} = \frac{k_{r1}[H_2][Br_2]^{3/2}}{[Br_2] + k_{r2}[HBr]}$ Which of the following expresses the rate law in the limit of high pressures of bromine, Br_2?
Alt1	Rate = kr1[H2][Br2]1/2
Alt2	Rate = kr1[H2][Br2]3/2
Alt3	Rate = kr1[Br2]3/2
Alt4	Rate = kr1[H2][Br2]

85	spin-orbit coupling is not significant for:-
Alt1	First row elements
Alt2	metals
Alt3	Lanthanides

Alt4	s block elements

86	On the potential energy surface of cyclohexane, the boat form is:-
Alt1	higher order saddle point
Alt2	not a stationary point at all
Alt3	minimum energy conformer
Alt4	transition state

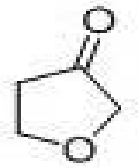
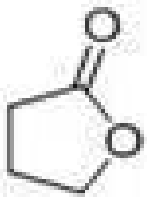
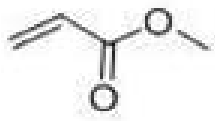
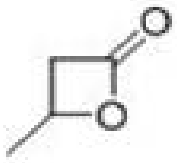
87	The number of chemical shift non equivalent protons expected in ^{1}H NMR spectrum of α-Pinene is 
Alt1	9
Alt2	7
Alt3	10
Alt4	8

88	Assign the Bravais lattice type for the following unit-cell structure. 
Alt1	Cubic I
Alt2	Monoclinic
Alt3	Tetragonal I
Alt4	Orthorhombic I

89	Trans effect is more for:-
Alt1	H2O
Alt2	NH3
Alt3	Cl-
Alt4	Br-

90	The original of VB theory is not associated with the works of:-
Alt1	Lewis

Alt2	Heitler
Alt3	London
Alt4	Pauling

91	A compound with molecular formula C4H6O2 shows band at 1770 cm-1 in IR spectrum and peaks at 178, 68, 28 and 22 ppm in 13C NMR. The correct structure of the compound is
Alt1	
Alt2	
Alt3	
Alt4	

92	The violet colour of [Ti(H2O)6]3+ is due to:-
Alt1	f-f transition
Alt2	ligand to metal charge transfer transition
Alt3	d-d transition
Alt4	metal to ligand charge transfer transition

93	The non-Planarity of Si2H4 is associated with:-
Alt1	Weak Si-Si pi bonds
Alt2	Steric repulsion
Alt3	Inert pair effect
Alt4	Weak Si-H bonds

94	For a d9 ion the singly occupied orbital is:-
Alt1	b2g
Alt2	b1g
Alt3	a1g
Alt4	eg

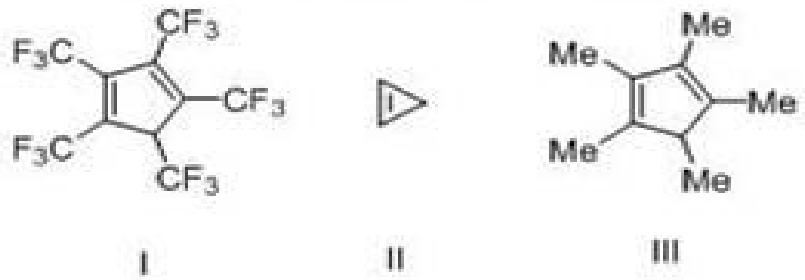
95	The bonding pattern of M(CO)x complex can be explained using one the following methods:-
Alt1	16 electron count
Alt2	18 electron count
Alt3	VSEPR
Alt4	DCD

96	107Q76.jpg
Alt1	A
Alt2	b1g
Alt3	C
Alt4	D

97	Which one of the following ground state term will not have Jahn-Teller distortion?
Alt1	1A1g (low spin)
Alt2	2Eg (low spin)
Alt3	3T1g
Alt4	2T2g

98	107Q78.jpg
Alt1	A
Alt2	B
Alt3	C
Alt4	D

99	The point group for chair form of cyclohexane is:-
Alt1	D3d
Alt2	C2h
Alt3	C2v
Alt4	None of the above

100	The correct order of acidity of the following compounds I – III is  I II III
Alt1	I >III> II
Alt2	II> III> I
Alt3	III> II> I
Alt4	I>II> III