PU Ph D Chemistry

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122 PU_2015_107
Predict the correct combination for Zeise's salt.

- $K[PtCl_3(C_2H_2)]\cdot H_2O$, square planar, η^2- acetylene ligand
- $K[PtCl_3(C_2H_4)]\cdot H_2O$, square planar, η^2- ethylene ligand
- $K[PtCl_3(C_2H_2)]\cdot H_2O$, square planar, η^3- ethylene ligand
- $K[PtCl_3(C_2H_2)]\cdot H_2O$, square planar, η^2- ethyne ligand

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211 PU_2015_107
Cartesian coordinates are not used in solving schrodinger equation for hydrogen atom because:-

- kinetic energy terms are not separable
- potential energy terms are not separable
- particle motion along x, y and z direction are not inter dependent
- to fit the results in to the framework of Bohr's theory

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193 PU_2015_107
The density of O_2 at STP is 1.429 g/L. The standard molar volume of O_2 is:-

- 22.4 L/mol
- 11.2 L/mol
- 2.24 L/mol
- 224 L/mol

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142 PU_2015_107
What is the best reaction for synthesizing CH_3-CO-CH_2-CH_2-CH_2-CO-CH_3?

- Dieckmann condensation
- Robinson annulation
- Malonic ester synthesis
- Michael addition

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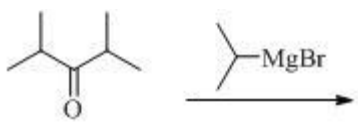
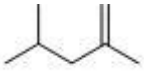
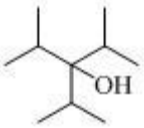
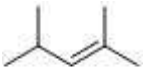
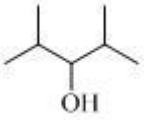
173 PU_2015_107
Predict the product formed in the following reaction:-



- 
- 

- 
- 

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154 PU_2015_107

Aniline failed to undergo bromination reaction with Br_2 in presence of AlB_3 as catalyst. Because:-

- Aniline forms strong complex with Br_2
- Aniline forms strong complex with $AlBr_3$
- Aniline is an electrophile
- $AlBr_3$ forms strong complex with Br_2

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136 PU_2015_107

Acidified dichromate solution reacts with H_2S to give green colored solution, this is due to:-

- oxidation of H_2S
- reduction of metal center
- reduction of H_2S
- oxidation of metal center

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155 PU_2015_107

Which one of the following molecule possess high dipole moment?

- Carbon tetrachloride
- Chlorobenzene
- Cyclohexane
- 1,4-Dibromobenzene

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160 PU_2015_107

How many stereoisomers are possible for butan-2,3-diol and how many of them are known to exhibit optical activity?

- 3 and 2
- 3 and 3
- 2 and 1
- 4 and 3

10 of 100

212 PU_2015_107

No. of quantum numbers that are solutions of the schrodinger H atom is:-

- 3
- 4
- 2
- 1

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137 PU_2015_107

XeF_6 reacts with silica or quartz to produce an explosive compound, which is:-

- XeO_3
- XeO_2F_2
- $XeOF_4$
- XeF_4

12 of 100

159 PU_2015_107

Reaction of acetophenone with I_2/NaOH followed by neutralization gives:-

- Phenylacetic acid and triiodomethane
- Acetic acid and triiodomethane
- Ethylbenzene and triiodomethane
- Benzoic acid and triiodomethane

13 of 100

182 PU_2015_107

At 1127 K and 1 atm pressure, a gaseous mixture of CO and CO_2 in equilibrium with solid carbon has 90.55% CO by mass $C(s) + CO_2(g) \rightleftharpoons 2CO(g)$. At the same temperature K_c for the reaction is:-

- 0.78 mol/L
- 0.156 mol/L
- 0.410 mol/L
- 1.414 mol/L

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210 PU_2015_107

The degeneracy of energy levels in hydrogen is given by the formula:-

- n^2
- 2(n+l)
- $2n^2$
- 2l+1

15 of 100

157 PU_2015_107

Which one of the following molecule exhibits *cis*, *trans* isomerism?

- 2, 3-dimethyl-2-butene
- 2-Methyl-1-propene
- 1, 1-Dimethylcyclohexane
- 1, 2-dimethylcyclohexane

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191 PU_2015_107

At the stopping potential, in photoelectric effect, the initial kinetic energy of electron is equal to the potential energy, which is mathematically represented by:-

- $mV^2_{stopping} = h\nu$
- $mc^2 = -eV_{stopping}$
- $\frac{1}{2}mv^2 = -V_{stopping}$
- $\frac{1}{2}mv^2 = -eV_{stopping}$

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181 PU_2015_107

Consider a reaction $A \rightarrow B + C$. The rates of three separate experiments with [A] = 0.170 mol/L, 0.340 mol/L, and 0.680 mol/L were found to be 0.05 mol/L/hour, 0.10 mol/L/hour and 0.20 mol/L/hour respectively. Then the rate constant for the forward reaction is:-

- 0.294 h^{-1}
- 0.588 h^{-1}
- 0.123 h^{-1}

- $0.210\ h^{-1}$

18 of 100

156 PU_2015_107

Reaction of $[Ag(NH_3)_2]NO_3$ with butanal gives:-

- Butanoic acid
- Butan-1-imine
- Butanoic amide
- 1-Butanol

19 of 100

120 PU_2015_107

Copper(II) ion with lowest g > 2.04 in axial ESR spectrum shows significant exchange coupling.

- G = 4.0
- G < 4.0
- G ≠ 4.0
- G > 4.0

20 of 100

198 PU_2015_107

Which of the following is correct?

- zinc displaces tin from its solution
- zinc acts as cathode in Daniel cell
- in a Li-Zn coule, zinc acts as cathode
- copper will displace iron in solution

21 of 100

201 PU_2015_107

The coagulation of 10 ml of a colloidal sol of gold is completely prevented by addition of 0.25 g of substance X to it before adding 1 mL of 10% NaCl solution. The gold number of X is:-

- 250
- 2.5
- 0.25
- 25

22 of 100

179 PU_2015_107

How many isoprene units are present in citronellal?

- 4
- 2

- 3
- 1

23 of 100

110 PU_2015_107

Zinc and mercury do not show variable valency like d-block elements because:-

- their d-shells are complete
- they have only two electrons in the outermost subshell
- their d-shells are incomplete
- they are soft

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183 PU_2015_107

Given the electrode potentials and giff, the cell potential of the reaction is $2Fe^{3+} + 2I^- \rightarrow 2Fe^{2+} + I_2$ is:-

- 0.771 - 0.536 = 0.235*V*
- (2 x 0.771) - 0.536 = 1.006*V*
- (0.771 - 0.5 x 0.536) = 0.503*V*
- 0.536 - 0.771 = -0.235*V*

25 of 100

100 PU_2015_107

Number of M-M bond present in $Os_4(CO)_{14}$ is:-

- 7
- 6
- 2
- 3

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109 PU_2015_107

$Fe(CO)_4$ is isolobal to:-

- $Cr(CO)_4$
- $Ru(CO)_4$
- $Mn(CO)_4$
- $Cu(CO)_4$

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196 PU_2015_107

A 500 mL sample of the effluent from a water softner required 6 drops of standard soap solution to produce a permanent lather. The soap solution had been calibrated against an artificial hard water solution containing 0.130 g of $CaCl_2$ per litre. On the average, it required 28 drops of standard soap solution to lather 500 mL of the artificial solution. Then, the hardness of the effluent sample in terms of ppm of $CaCO_3$, is:-

- 26 ppm
- 0.123 ppm
- 123 ppm
- 38 ppm

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170 PU_2015_107

The hydrogens of CH_2 group in ethyl benzene are an example for:-

- Diastereotopichydrogens
- Enantiotopic hydrogens
- Homotopic hydrogens
- Allylic hydrogens

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194 PU_2015_107

The extra stability of lyophilic colloids is due to:-

- the larger size of the particles
- the smaller size of the particles
- a protective film of the dispersion medium on the particle
- charge on the particle

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214 PU_2015_107

Lewis Octet rule is not violated in:-

- H_2O
- PCl_5
- BCl_3
- CO

31 of 100

184 PU_2015_107

The reaction of acidified aqueous potassium iodide with aqueous hydrogen peroxide $2I^-(aq)+H_2O_2(aq)+2H^+(aq)\rightarrow I_2(aq)+2H_2O(l)$ is thought to involve the following steps:-

$$H_2O_2+I^- \rightarrow H_2O+OI^- \quad (slow)$$
$$OI^-+H^+ \rightarrow HOI \quad (fast)$$
$$HOI+H^++I^- \rightarrow I_2+H_2O \quad (fast)$$

- the acid acts as a catalyst
- the iodide ion is oxidized by the hydrogen peroxide
- the rate equation for the reaction is = $k[H_2O_2][I^-]$
- the rate determination step is $H_2O_2 + I^- \rightarrow H_2O + OI^-$

32 of 100

185 PU_2015_107

The rate constant of a reaction is given by $k = 2.1 \times 10^{10} e^{-2700kT}$. It suggests:-

- the number of effective collisions are $2.1\times10^{10}\ cm^3 s^{-1}$
-
- half-life of the reaction increases with increase of temperature
- $\log k$ versus $\frac{1}{T}$ will be straight line with slope $= \frac{-2700}{2.303R}$
- $\log k$ versus $\frac{1}{T}$ will be straight line with slope $= \frac{-2700}{R}$
-

33 of 100

108 PU_2015_107

Tilley mechanism explains:-

- hydrogenation reaction
- hydroformylation
- olefin polymerization
- hydrosilylation

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203 PU_2015_107

Which of the following expressions is correct?

- $\left[\frac{\ln k_x}{\partial p}\right] = \frac{p / p^0}{\Delta H}$
- $\left[\frac{\partial \ln k_x}{\partial p}\right] = \frac{\Delta H}{\Delta V}$
- $\left[\frac{\partial \ln k_x}{\partial p}\right] = \frac{\Delta n + p}{p^0}$
- $\left[\frac{\partial \ln k_x}{\partial p}\right] = \frac{\Delta n}{p / p^0}$

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178 PU_2015_107

Saponification of 1 mole of triglyceride produces:-

- 3 Moles of glycerin + 2 Moles of Fatty acids
- 1 Mole of glycerin + 3 Moles of Fatty acids
- 3 Moles of glycerin + 1 Mole of Fatty acids
- 3 Moles of glycerin + 3 Moles of Fatty acids

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204 PU_2015_107

Select the correct statement.

- Osmosis results from decrease in entropy
- Osmotic pressure depends on temperature and concentration but is independent of the nature of the membrane
- The semi permeable membrane is the cause of osmotic pressure
- The passage of solvent molecules occur only in one direction through a semi permeable membrane

37 of 100

202 PU_2015_107

A container of volume of 1 m^3 is divided in to two equal parts by a partition. One part has an ideal diatomic gas at 300 K and the other part has vacuum. The whole system is isolated from the surroundings. When the partition is removed, the gas expands to occupy the whole volume. Its temperature will be:-

- 227.5 K
- 300 K
- 425 K
- 455 K

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143 PU_2015_107

The second step in the mechanism of imine formation is acid-catalyzed, yet the rate drops below pH 4.5. Why does the rate drop below this pH?

- The carbinolamine intermediate is stable at low pH
- The imine product is hydrolyzed at low pH
- Protonation of the amine decreases its nucleophilicity
- The carbonyl oxygen becomes protonated, decreasing its reactivity

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141 PU_2015_107

A *hydrophobic* portion of a protein usually:-

- is oriented away from water molecules

- contains multiple -OH groups
- is formed by hydrogen-bonded interactions
- is highly polar

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168 PU_2015_107

Which one of the following sulfur reagent can exist as chiral compound?

- $PhSO_2OH$
- $PhSOCH_3$
- $PhSCH_3$
- $PhSO_2CH_3$

41 of 100

187 PU_2015_107

An element crystallizes both in fcc and bcc lattices. The density of the element in the two forms is the same, then the ratio of lattice constants of fcc to bcc structure is:-

- 4 : 1
- 2 : 3
- 2 : 1
- 1 : 2

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131 PU_2015_107

The reaction $H_2S + H_2O_2 \rightarrow S + H_2O$ illustrates _____ nature of H_2O_2.

- reducing
- acidic
- oxidizing
- alkaline

43 of 100

101 PU_2015_107

The nature of $HCo(CO)_4$ is:-

- acidic
- inert
- basic
- metallic

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186 PU_2015_107

A bottle filled of dry ammonia and other bottle of dry hydrogen chloride connected through a long tube are opened simultaneously at both ends. Then, the white ammonium chloride ring first formed will be:-

- at the centre of the tube
- near the ammonia bottle
- no fumes will form throughout the length of the tube
- near the hydrogen chloride bottle

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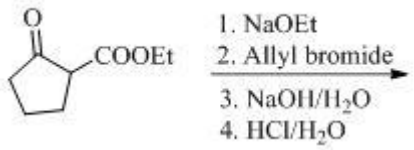
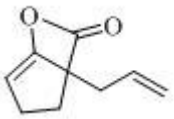
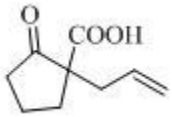
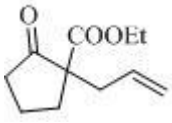
171 PU_2015_107

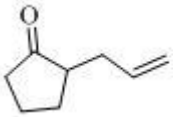
Identify the product formed in the following reaction.



- 

- 

- 

- 

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158 PU_2015_107

Which one of the following statement is wrong about constitutional isomers?

- They have the same molecular formula
- They have the same order of attachment of atoms
- They have the same molecular weight
- They exhibit different physical properties

47 of 100

177 PU_2015_107

Which one of the following amino acid does not have stereogenic carbon?

- Valine
- Proline
- Alanine
- Glycine

48 of 100
213 PU_2015_107
The Huckel 4n+2 electron rule is applicable to:-

- all molecules
- all hydrocarbons
- polycyclic hydrocarbons
- cyclic annulenes

49 of 100
121 PU_2015_107
Which one of the following hemoglobin shows "Domed" shape heme group?

- Deoxyhemoglobin
- Oxyhemoglobin
- Both of these
- None of these

50 of 100
164 PU_2015_107
The generation of amides from oximes by treatment with sulfuric acid is known as:-

- Curtiusrearrangement
- Schmidt rearrangement
- Hoffman rearrangement
- Beckmann rearrangement

51 of 100
197 PU_2015_107
The addition of alcohol to a saturated aqueous solution of calcium acetate first forms a sol, and then sets to a gelatinuous mass called solid alcohol which is a:-

- solid form
- solid sol
- gel
- aerosol

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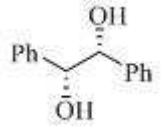
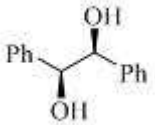
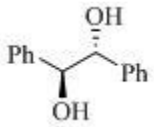
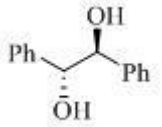
169 PU_2015_107

Identify the appropriate structure, which corresponds to the name (1*R*, 2*R*)-1,2-diphenylethane-1,2-diol.

- 
- 
- 
- 

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161 PU_2015_107

How many ^{13}C NMR signals would be observed for 1,4-dimethylbenzene?

- 4
- 2
- 3
- 5

54 of 100

135 PU_2015_107

When Zn reacts with nitric acid as in: $4Zn + 10HNO_3 \rightarrow 4Zn(NO_3)_2 + NH_4NO_3 + 3H_2O$, the nitric acid involved in the reaction is:-

- Dilute HNO_3
- Very dilute HNO_3
- Conc. HNO_3
- 50% HNO_3

55 of 100

172 PU_2015_107

The CH_2 protons in compound (S)-1,2-diphenylethan-1-ol gives _____ pattern in ^1H-NMR signals.

- Triplets at 3.15 ppm and 2.90 ppm
- Doublet of doublets at 3.15 ppm and 2.90 ppm
- Doublets at 3.15 ppm and 2.90 ppm

- Doublet at 3.15 ppm and triplet at 2.90 ppm

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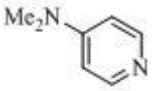
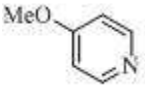
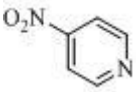
167 PU_2015_107

Identify the weak base from the list of following molecules.

- 
- 
- 
- 

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174 PU_2015_107

Reaction of alkyllithium with carbon dioxide gives:-

- Aldehyde
- Ketone
- Ester
- Carboxylic acid

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195 PU_2015_107

The volume of a hexagonal ice lattice is given by:-

- $V = \frac{\sqrt{3}}{2} abc$
- $V = a^2 c$
- $V = \frac{\sqrt{3}}{2} a^2 c$
- $V = a^2$

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192 PU_2015_107

According to Graham's law, at a given temperature, the ratio of the rate of diffusion of gases A and B (r_A / r_B) is given by:-

- $(p_B / p_A)^{1/2} (M_A / M_B)$
- $(p_A / p_B)(M_B / M_A)^{1/2}$
- $(p_A / p_B)^{1/2} (M_A / M_B)$
- $(p_A / p_B)(M_A / M_B)^{1/2}$

60 of 100

180 PU_2015_107

What weight of solute (molecular weight = 60 g/mole) is required to dissolve in 180 g of water to reduce the vapour pressure to 80% of pure water?

- 96 g
- 175 g
- 150 g
- 48 g

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222 PU_2015_107

The ground state energy level of Co^{2+} in *Td* environment is:-

- ^4F
- $^4A_2$
- $^1T_2$
- $^4T_1$

62 of 100

249 PU_2015_107

Nickel can be purified using the following process:-

- Wolfkisher process
- Heber proc
- Mulliken's method
- Mond's process

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224 PU_2015_107

Cis-platin can be synthesized as an exclusive product from:-

- $[Pt(NH_3)_4]^{2+}$
- $PtCl_4^{2-}$
- *cis*-$PtCl_2(NH_3)_2$
- *trans*-$PtCl_2(NH_3)_2$

64 of 100

242 PU_2015_107

The reducing power of alkali metals in the gaseous state is in the order.

- Li > Na > K < Rb < Cs
- Li < Na < K < Rb < Cs
- Li > Na > K > Rb > Cs
- Li > Na < K > Rb > Cs

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259 PU_2015_107

Successive determination of chloride, bromide and iodide can be made using the following method:-

- iodometry
- gravimetry
- amperometry
- volumetry

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258 PU_2015_107

In paper chromatography, the free energy of transfer of A from one phase to another phase B is:-

- $\ln \alpha_A = \Delta\mu_A/RT$
- $\ln \alpha_A = \Delta\mu_A/nRT$
- $\ln \alpha_A = \Delta\mu_A/T$
- $\ln \alpha_A = \Delta\mu_A/R$

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247 PU_2015_107

Pick out the odd compound out.

- $Fe(CO)_6$
- $Fe(CO)_5$
- $Fe_3(CO)_{12}$
- $Fe_2(CO)_9$

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228 PU_2015_107

Trans effect is more for:-

- Cl^-
- NH_3
- H_2O
- Br^-

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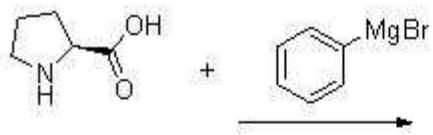
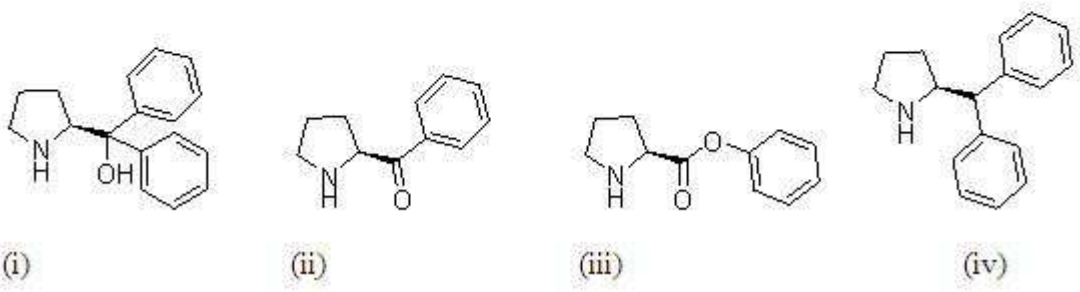
232 PU_2015_107

The product of the following reaction is:-





(i) (ii) (iii) (iv)

- (iii)
- (iv)
- (i)
- (ii)

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257 PU_2015_107

The width of epr signal depends upon _____ of the system under study.

- solvent
- relaxation time
- Zeeman effect
- DPPH

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223 PU_2015_107

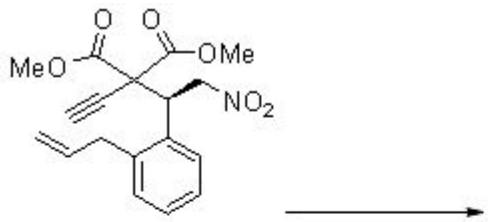
The calculated magnetic moment of Cr^{2+} ion in a weak field is:-

- 4.12 BM
- 4.90 BM
- 7.18 BM
- 2.80 BM

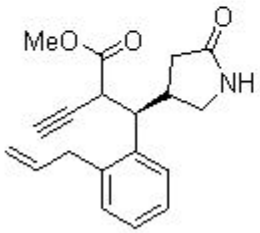
72 of 100

239 PU_2015_107

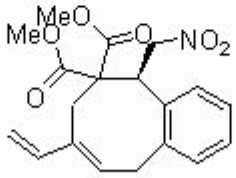
Substrate S can be converted into scaffolds P, Q and R by treating with different reagents. The reagents for the corresponding transformations are:-



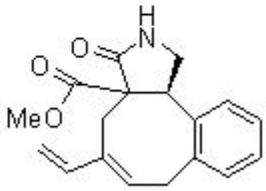
S



P



Q



R

☐	D	P	Pyrrolidone ,	Q	$AlCl_3$	R	Zn / HOAc
☐	B	P	Zn / HOAc/ THF,	Q	Grubbs	R	grubbs& Zn / HOAc
☐	C	P	Zn / HOAc/ THF,	Q	$AlCl_3$	R	grubbs& Zn / HOAc
☐	A	P	Pyrrolidone,	Q	Grubbs	R	$AlCl_3$& Zn / HOAc

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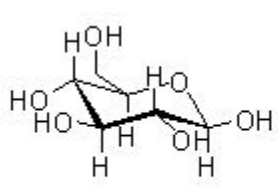
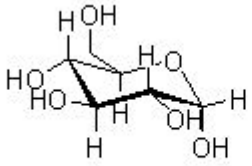
237 PU_2015_107

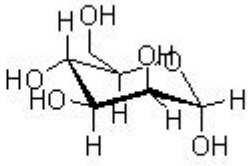
Mannose is C-2 epimer of glucose. Identify which of the following structures represents β -D-manopyranose?



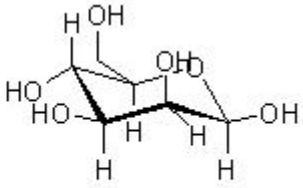
(i)



(ii)



(iii)



(iv)

- ☐ (iv)
- ☐ (i)
- ☐ (ii)
- ☐ (iii)

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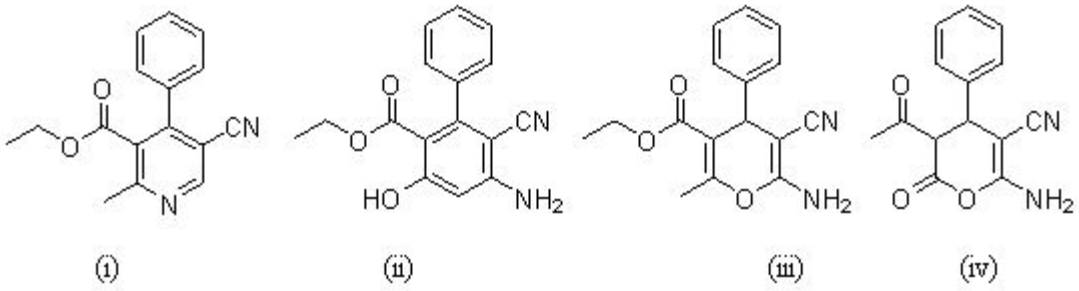
233 PU_2015_107

A three-component reaction between ethyl acetoacetate, benzaldehyde and malononitrile gave the product P for which the following alternate structures were proposed. The ^{13}C chemical shifts of the compound in addition to four chemical shift values corresponding to phenyl ring showed signals at 14.2, 17.2, 38.8, 58.1, 61.7, 119.1, 156.6, 159.2 & 165 .4 ppm. Identify the structure of the molecule from the data.



- (iv)
- (iii)
- (i)
- (ii)

75 of 100

246 PU_2015_107
In a close packed arrangement with radius ratio values fall in the range 0.225-0.414;

(i) maximum number of coordination number of cation is 5,
(ii) arrangement of anion round the cation is tetrahedral and
(iii) an example is CsCl.

Pick out the correct statement from the following.

- (i) and (iii) are false, (ii) is true
- (i) and (iii) are true, (ii) is false
- (i) and (ii) are true, (iii) is false
- (i) is true, (ii) and (iii) are false

76 of 100

248 PU_2015_107
Consider a positron emission reaction.

$^{58}Ni_{28} + {}^{1}H_{1} \rightarrow ? + {}^{1}n_{0}$, identify the element that emits positron.

- $^{58}Cu_{28}$
- $^{58}Ni_{28}$
- $^{58}Cu_{29}$
- $^{58}Ni_{29}$

77 of 100

253 PU_2015_107

The second step ionization in sulfuric acid is of the order of $K_a = 10^{-2}$ at 25°C, therefore, this behaves as:-

- weak base
- weak acid
- strong acid
- lewis acid

78 of 100

238 PU_2015_107

Match each item in list A with appropriate item in B.

	A		B
(a)	Glycine	(i)	Smallest enzyme
(b)	Proline	(ii)	Achiral
(c)	Cysteine	(iii)	Basic amino acid
(d)	Histidine	(iv)	R-Configuration

- (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)
- (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)
- (a) - (iii), (b) - (ii), (c) - (iv), (d) - (i)
- (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

79 of 100

225 PU_2015_107

The substitution reaction in $[Co(NH_3)_5Cl]^{2+}$ is faster in the presence of:-

- pressure
- Metal catalyst
- photo light
- OH^-

80 of 100

252 PU_2015_107

According to Maxwell distribution of molecular speeds, the probability of speed of molecule along x direction assuming the range C_x to C_x+dC_x is given by:-

- $Wx = f(C_x) + Cdc_x$
- $Wx = f(C_x) - xdc_x$
- $Wx = f(C_x) - dc_x$
- $Wx = f(C_x) + dc_x$

81 of 100

289 PU_2015_107

If a group has subgroups of order 2, 3, 6, its minimum possible order is:-

- 6
- 11
- 12
- 36

82 of 100

290 PU_2015_107

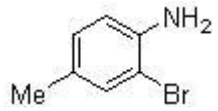
The heat of combustion at constant volume in $C_{10}H_8(s) + 12O_2(g) \rightarrow 10CO_2(g) + 4H_2O(l)$ is -5.133 kJ mol^{-1} at 298 K, the value of enthalpy change is:-

- -5.13×10^2 J
- -5.13×10^3 J
- -5.13×10^6 J
- -5.13×10^4 J

83 of 100

275 PU_2015_107

Preparation of the following molecule from toluene involves several steps like bromination, nitration, reduction, etc. The correct order of performing the reactions is:-



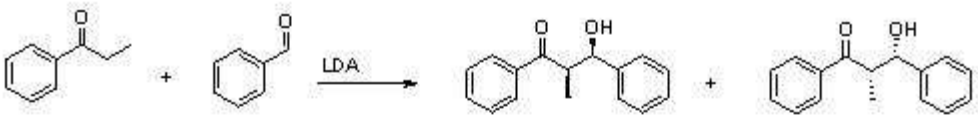
- Nitration, reduction, acylation , bromination&deacylation
- Nitation, bromination& reduction
- Bromination, nitration & reduction
- Acylation, bromination, nitration, reduction &deacylation

84 of 100

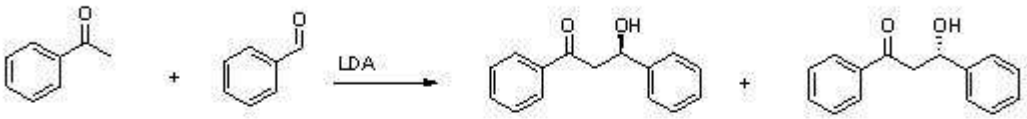
272 PU_2015_107

Which among the following reactions can yield one enantiomer as a major product?

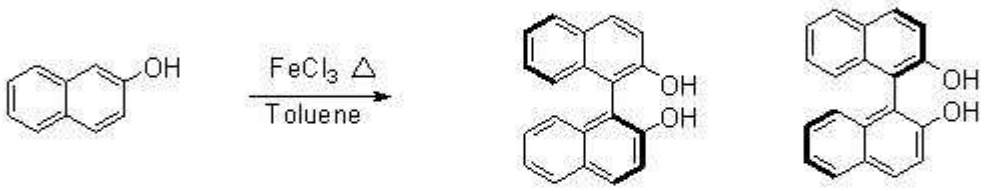
(i)



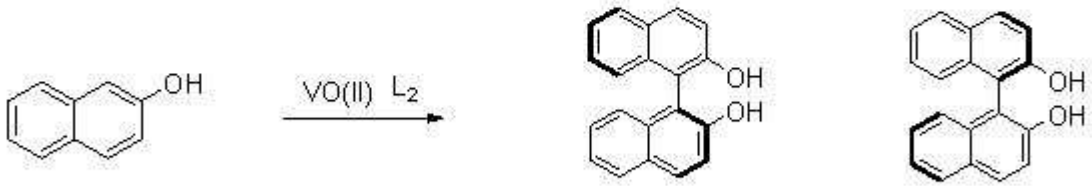
(ii)



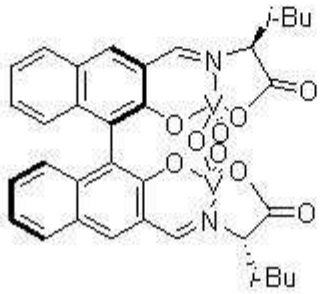
(iii)



(iv)



L_2



- (i)
- (iv)
- (iii) & (iv)
- (i) & (ii)

85 of 100

287 PU_2015_107

It is impossible to solve the a differential equation using power series around a point x, if:-

- x is essentially singular
- x is a regular point
- x is a singular point
- None of the above

86 of 100

262 PU_2015_107

If ClF_3 has to be stereochemically rigid, its ^{19}F NMR spectrum (I = ½ for ^{19}F) would be:- (assume that Cl is not NMR active)

- two singlets
- a doublet and a singlet
- a doublet and a triplet
- a singlet

87 of 100

291 PU_2015_107

Consider a cell Zn/Zn^{2+}, (0.1M) / Ag^{+}, (0.1M)/Ag, calculate EMF of the cell at 25°C if E^{0}cell is 1.56 V.

- 2.6485 V
- 1.6485 V
- 0.6485 V
- 5.6485 V

88 of 100

299 PU_2015_107

Sucrose on complete combustion gives out heat 5.65 x 10^3 kJ, calculate the heat given out for 1 kg of sucrose upon complete combustion.

- 1.65 x 10^4 kJ
- 1.65 x 10^3 kJ
- 3.42 x 10^3 kJ
- 5.65 x 10^3 kJ

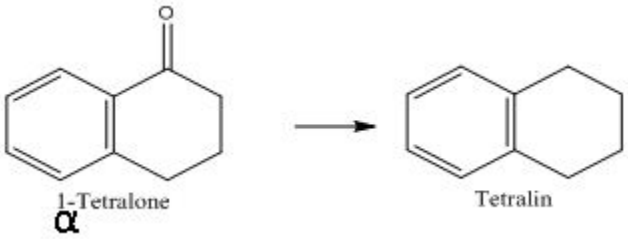
89 of 100

285 PU_2015_107

Orthogonal matrices are necessarily:-

- hermitian
- periodic
- unitary
- scalar

90 of 100
270 PU_2015_107



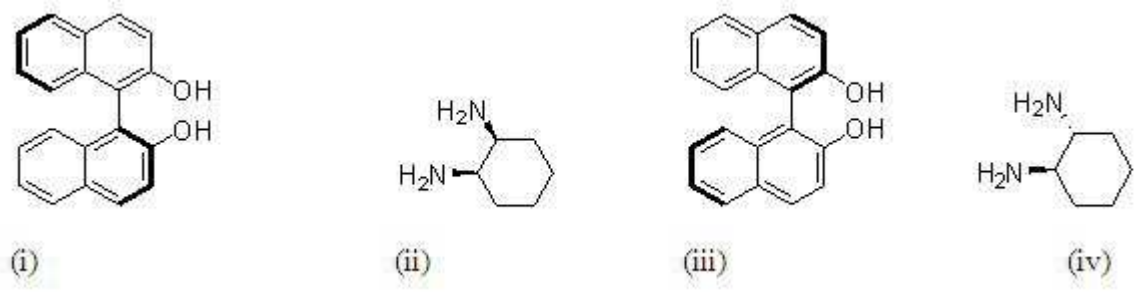
Predict the catalysts for the above reaction.

- Zn and HCl
- Zn(Hg) and HCl
- Zn(Hg) and HBr
- Zn(Hg) and HI

91 of 100
282 PU_2015_107
The equation $x^2 + y^2 = k^2$ represents:-

- parabola
- circle
- a rectangle
- ellipse

92 of 100
271 PU_2015_107
Which of the following can be used as ligands in asymmetric synthesis?



- (i), (iii) and (iv)
- (i) and (iii)
- (i), (ii) and (iii)
- (ii) and (iv)

93 of 100
286 PU_2015_107

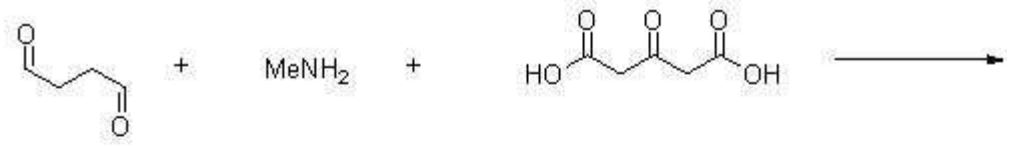
The operator for kinetic energy is:-

- Vector operator
- Differential operator
- Vector operator and differential operator
- Neither vector operator nor differential operator

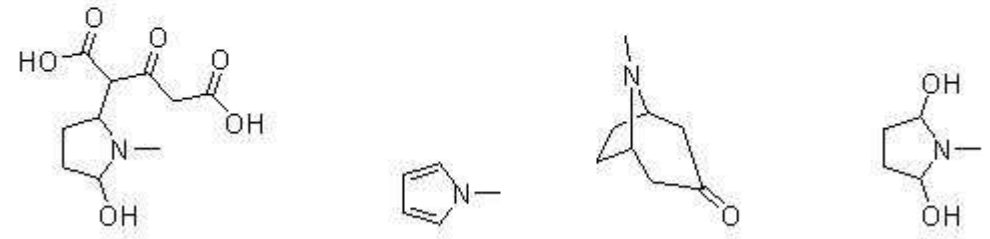
94 of 100

277 PU_2015_107

The product of the following reaction is:-



A



(i) (ii) (iii) (iv)

- (i)
- (i) & (iv)
- (ii) & (iv)
- (iii)

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269 PU_2015_107

In the following reactions:-

(i) $Mn_2(CO)_{10} + Na \rightarrow X$ and (ii) $X + CH_3COCl \rightarrow Y$. The X and Y respectively are:-

- $[Mn(CO)_4]^{2-}$, $[CH_3C(O)Mn(CO)_5]^-$
- $[Mn(CO)_5]^-$, $CH_3C(O)Mn(CO)_5$
- $[Mn(CO)_4]^{2-}$, $[ClMn(CO)_5]^-$
- $[Mn(CO)_5]^-$, $ClMn(CO)_5$

96 of 100

297 PU_2015_107

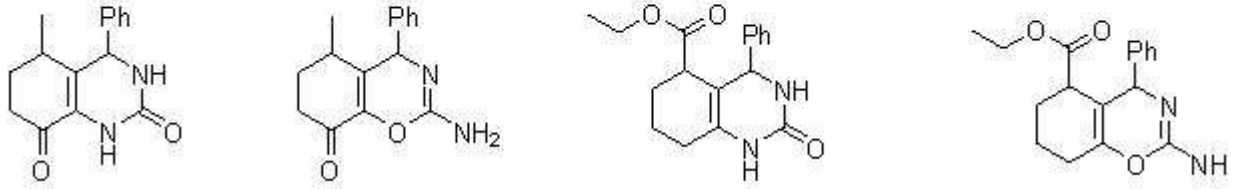
Freundich adsorption isotherm gives a straight line by plotting the following:-

- x/m *vs* 1/P
- x/m *vs* P
- logx/m *vs* P
- logx/m *vs* lopP

97 of 100

276 PU_2015_107

The product of the following reaction is:-



(i) (ii) (iii) (iv)

- (ii) & (iv)
- (i) &(iii)
- (iii)
- (i)

98 of 100

298 PU_2015_107

In a hydrogenation reaction at 27° C, the pressure of hydrogen gas decreases from 2 atm to 1.1 atm in 75 min, calculate the rate of the reaction (R = 0.0821 lit atm mol^{-1} K^{-1}).

- 8.12 x 10^{6} mol L^{-1} s^{-1}
- 8.12 x 10^{-2} mol L^{-1} s^{-1}
- 8.12 x 10^{2} mol L^{-1} s^{-1}
- 8.12 x 10^{-6} mol L^{-1} s^{-1}

99 of 100

288 PU_2015_107

If a pair of dice is thrown, what is the probability that a sum of 7 shows up?

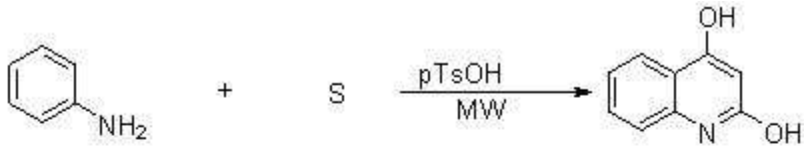
- 1/36
- 5/12

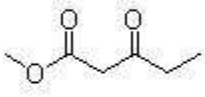
- 7/36
- 1/6

100 of 100

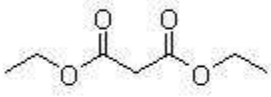
278 PU_2015_107

Identify the substrate S which on treatment with aniline will give the product shown in the following reaction.

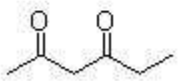




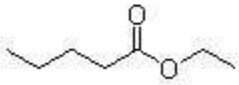
(i)



(ii)



(iii)



(iv)

- (ii)
- (iii)
- (iv)
- (i)

107 PU Ph D Chemistry

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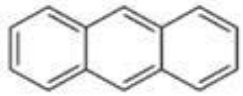
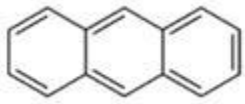
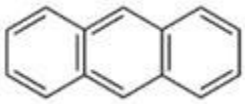
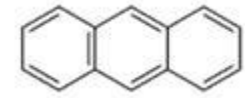
193 PU_2016_107_E
Which of the following statements is true for an *ideal-dilute* solution?

- The solute and solvent both obey Raoult's law.
- The solute obeys Henry's law and the solvent obeys Raoult's law.
- The solute and solvent both obey Henry's law.
- The solute obeys Raoult's law and the solvent obeys Henry's law.

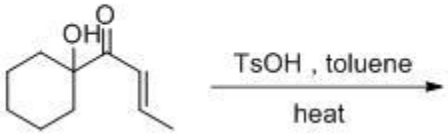
2 of 100
144 PU_2016_107_E
Which is impossible as a resonance contributor of anthracene:-

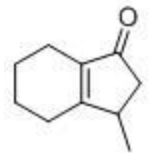
- 
- 
- 
- 

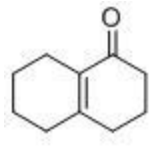
3 of 100
163 PU_2016_107_E
Among the following, the synthetic equivalent for acyl anion is:-

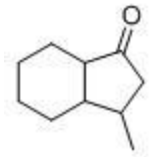
- Nitro ethane and a base
- α-Chloro acrylonitrile
- Acetyl Chloride and trimethyl amine
- Ethyl magnesium bromide

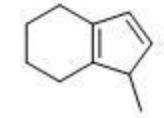
4 of 100
164 PU_2016_107_E
The major product obtained in the following transformation is











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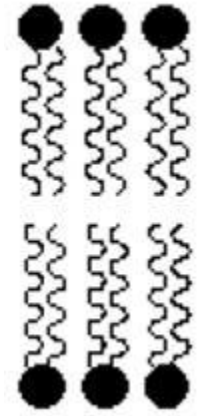
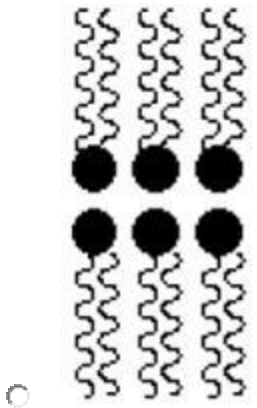
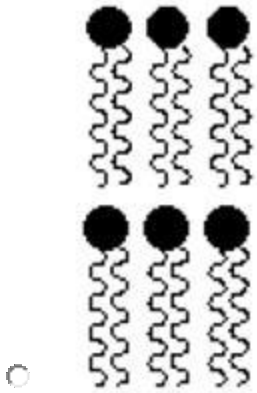
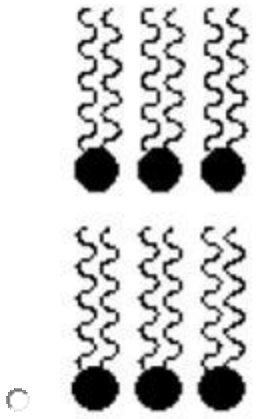
147 PU_2016_107_E

Which of the following is the correct representation for the structure of a lipid bilayer under physiological conditions?









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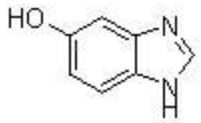
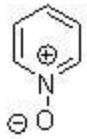
(i) Presence of an imine nitrogen deactivates the heterocyclic system for an electophilic substitution reaction. But, performing electophilic substitution reaction is possible by incorporating an electron releasing group on such systems.

(ii) Formylation using DMF/ $POCl_3$ is possible only on very reactive aromatics.

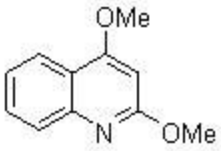
Based on the information given in (i) & (ii) which of the following substrates can be readily formylated using DMF / $POCl_3$?



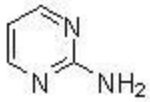
(i)



(ii)



(iii)



(iv)

- (i), (iii) & (iv)
- (i) & (iii)
- (i), (ii) & (iii)
- (iii) & (iv)

7 of 100

212 PU_2016_107_E

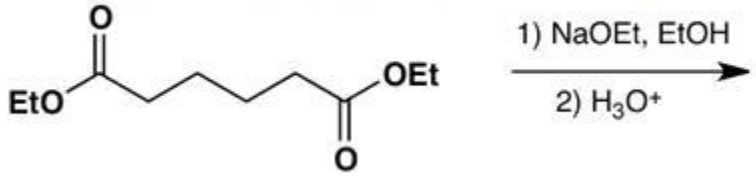
The standard reduction potentials of Mg/Mg^{2+} is -2.360 , and Cu/Cu^{2+} is 0.337 V. The standard cell emf for the raction Mg + Cu2+ → Mg^{2+} + Cu, wil be given by:-

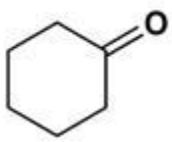
- - 2.023 V
- 2.697 V
- 2.02 V
- -2.697 V

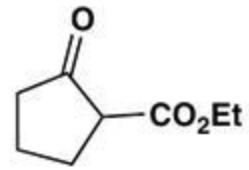
8 of 100

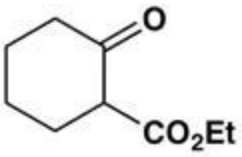
153 PU_2016_107_E

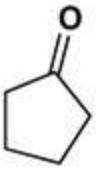
Which is the main product of the following reaction?



- 







9 of 100

136 PU_2016_107_E

RCH_2CH_2 can be converted to corresponding aldehyde in the presence of CO and H_2 using one of the following catalysts:-

- $RhL_2(PR_3)(Cl)$
- $Cu(OAc)_2$
- $Pd(OAc)_2$
- $Co_2(CO)_8$

10 of 100

126 PU_2016_107_E

Fe(CO) reacts with BH_4^- to yield:-

- aldehyde
- H- substituted product
- 1,2 one
- none of these

11 of 100

128 PU_2016_107_E

$M\text{-}CH_2CH_2R$ cannot be isolated due to:-

- carbene generation
- β-hydride elimination
- σ-bond metathesis
- α-hydride elimination

12 of 100

122 PU_2016_107_E

Tilley mechanism explains:-

- hydrogenation reaction
- hydroformylation
- olefin polymerization
- hydrosilylation

13 of 100

143 PU_2016_107_E

How many signals does the unsaturated ketone $(CH_3)_2CHCH_2C(O)CH=CH_2$ have in ^{1}H NMR and ^{13}C NMR spectra?

- five ^{1}H signals and seven ^{13}C signals
- five ^{1}H signals and six ^{13}C signals
- six ^{1}H signals and six ^{13}C signals
- six ^{1}H signals and seven ^{13}C signals

14 of 100

180 PU_2016_107_E

A nuclear magnetic resonance transition is shifted from the reference in a 400 MHz NMR spectrometer by 529 Hz. Calculate the chemical shift:-

- 1.76
- 1.32
- 5.29
- 7.56

15 of 100

100 PU_2016_107_E

The neutral complex which follows the eighteen electron rule is:-

- $(\eta^5\text{-}C_5H_5)Mo(CO)_3$
- $(\eta 5\text{-}C_5H_5)_2Co$
- $(\eta^5\text{-}C_5H_5)Re((\eta^6\text{-}C_6H_6)$
- $(\eta^5\text{-}C_5H_5)Fe(CO)_2$

16 of 100

206 PU_2016_107_E

The mean square average distance, $<X^2>$ of a diffusing species after time t is given by:-

- $<x^2> = 2Dt$
- $<x^2> = 2Dt^2$
- $<x^2> = Dt$

- $\langle x^2 \rangle = 3Dt$

17 of 100

150 PU_2016_107_E

40% of the bases in a certain DNA molecule are found to be C. What percent of thebases in this same molecule are A?

- 20%
- 80%
- 10%
- 40%

18 of 100

129 PU_2016_107_E

Fischer carbene prefers low oxidation metal ions and Schrock carbene prefers high oxidation state metal ions:-

- Correct
- Not correct
- Fischer carbene prefers para magnetic ions
- both prefer unpaired electrons

19 of 100

157 PU_2016_107_E

Which of the following statement(s) is / are true with respect to privileged scaffolds?

i The core structure of a molecule that is common to a series of compounds
ii The scaffold should not be capable of forming any binding interactions with the target.
iii A scaffold that is present in a wide range of drugs with different activities
iv Similar functional groups on the scaffold should be capable of being varied independently of each other

- ii & iv alone
- i,ii & iii
- i,iii & iv
- i & iii alone

20 of 100

123 PU_2016_107_E

The metal ion that is expected to shift the C_1 methylene group in heptanol, from δ 2 to 10 ppm in ^1H NMR is:-

- Al(III)
- Sc(III)
- Eu(III)
- Tl(III)

21 of 100

110 PU_2016_107_E
The pair of ions that most commonly forms complexes with coordination number 2 is:-

- Cu(II) and Hg(I)
- Cu(I) and Hg(II)
- Cd(II) and Hg(I)
- Cd(II) and Hg(II)

22 of 100

188 PU_2016_107_E
To which orbitals may an electron in a 2p orbital in a hydrogenic atom make allowed spectroscopic transitions?

- 1s and 3p
- ns and nd
- ns, np and nd
- nd and nf

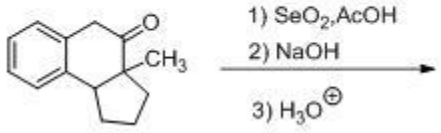
23 of 100

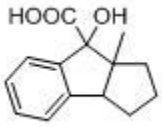
119 PU_2016_107_E
In biological systems, the metal ions involved in electron transport are:-

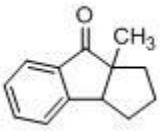
- Na^+ and K^+
- Cu^{2+} and Fe^{3+}
- Ca^{2+} and Mg^{2+}
- Zn^{2+} and Mg^{2+}

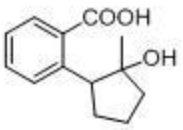
24 of 100

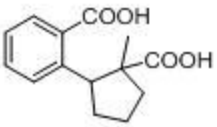
179 PU_2016_107_E
The major product formed in the following reaction is



- 

- 

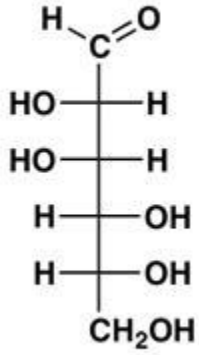




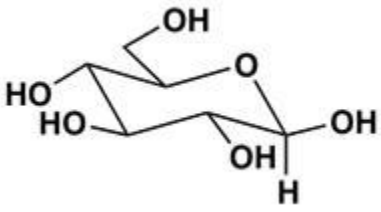
25 of 100

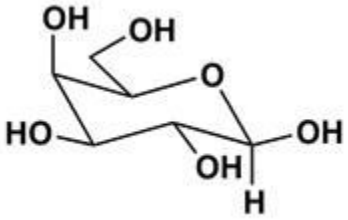
155 PU_2016_107_E

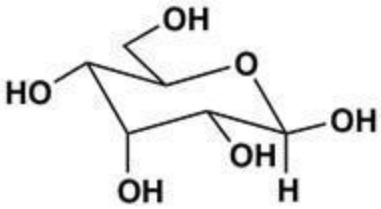
Which is the correct chair form of the β anomer of D-mannose?

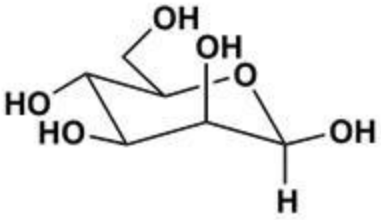


D-mannose









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104 PU_2016_107_E

Low oxidation metal centre can be stabilized using:-

- σ acid ligands
- π-acid ligands
- more electron rich ligands
- metal acids

27 of 100

194 PU_2016_107_E

A hypothetical system consists of 5 molecules and 2 quanta. What is the number of possible arrangements?

- 2
- 21
- 3
- 15

28 of 100

182 PU_2016_107_E

The root-mean-square distance between the ends of a polymer chain was found to be 6.2 nm. Estimate the number of monomers in the chain, given that the length of each monomer unit is 2.1 Å.

- 870
- 17
- 6
- 30

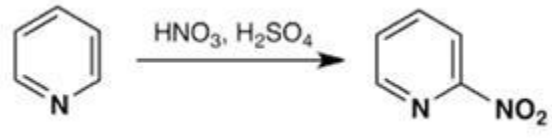
29 of 100

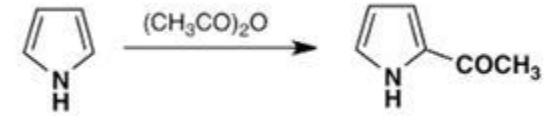
207 PU_2016_107_E
The number of variables in phase space is given:-

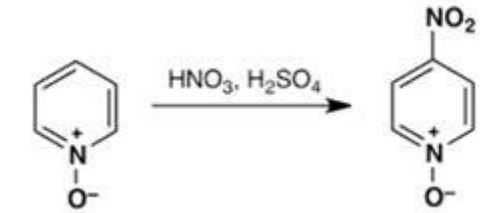
- 5
- 4
- 3
- 6

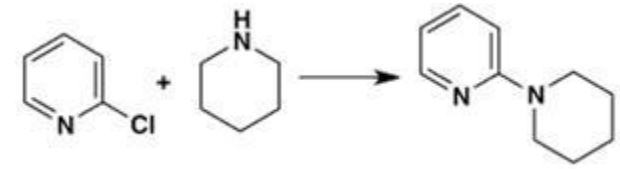
30 of 100

146 PU_2016_107_E
Which of the following equations shows an unlikely result?

- 

- 

- 

- 

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189 PU_2016_107_E
On a pressure-temperature phase diagram, the conditions under which a one-component system exists as two phases in equilibrium corresponds to:-

- an area.
- the entire diagram
- a point.
- a line.

32 of 100

190 PU_2016_107_E

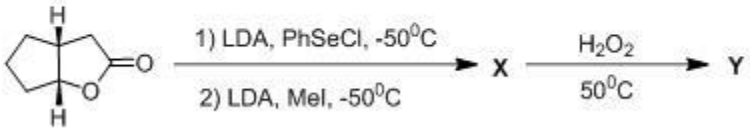
How many nodes are expected for the vibrational wavefunction with quantum number v = 4?

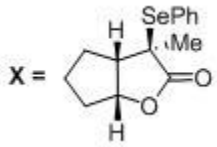
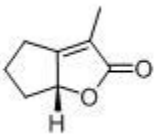
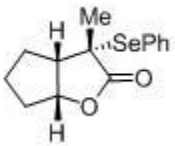
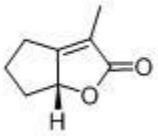
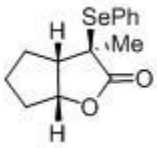
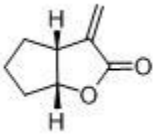
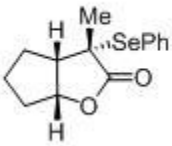
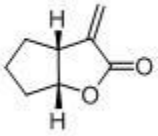
- 3
- 0
- 4
- 1

33 of 100

178 PU_2016_107_E

The major products X and Y formed in the following reaction sequence are



- X =  Y = 
- X =  Y = 
- X =  Y = 
- X =  Y = 

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124 PU_2016_107_E

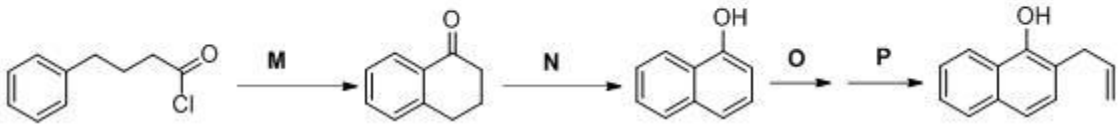
The ground state energy level of Co^{2+} in *Td* environment is:-

- $^1T_2$
- $^4T_1$
- $^4A_2$
- ^4F

35 of 100

162 PU_2016_107_E

Choose the correct combination of reagents/reaction conditions from M to P to carry out the following transformation



- M = $ZnCl_2$; N = H_2 , Pd/C ; O = Allyl bromide , acetone, K_2CO_3 ; P = Δ
- M = $AlCl_3$, N = DDQ ; O = Vinyl chloride , $NaNH_2$; P = Δ
- M = Δ ; N = H_2 , Pd/C ; O = Vinyl chloride, KOH ; P = $AlCl_3$
- M = $AlCl_3$; N = DDQ ; O = Allyl bromide , acetone , K_2CO_3 ; P = Δ

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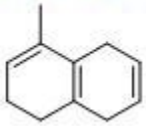
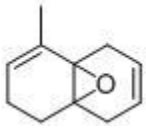
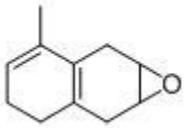
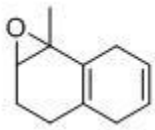
177 PU_2016_107_E

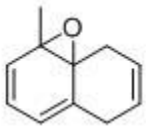
The major product obtained upon epoxidation of the following triene with m-chloroperbenzoic acid is



- 

- 

- 

- 

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185 PU_2016_107_E

How many molecular orbitals may be constructed from the valence shell orbitals of the constituent atoms in CH_4?

- 6
- 8
- 4
- 7

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138 PU_2016_107_E

When we go from D_3h to C_2v point group the energy of doubly degenerate orbital:-

- remains unaltered
- Degeneracy will be lost
- degeneracy will not be lost
- only a symmetry will be affected

39 of 100

195 PU_2016_107_E

The electrical conductivity of a new material was measured at different temperatures and found to vary as below. What is the best description of the conduction properties of the material?

T / K	300	400	500	600
Conductivity / S m^{-1}	0.004	0.047	0.202	0.535

- Semiconductor
- Conductor
- Insulator
- It is not possible to infer anything about the properties of the material

40 of 100

209 PU_2016_107_E

Which of the following plane is not parallel to the z-axis?

- (001)
- (110)
- (100)
- (010)

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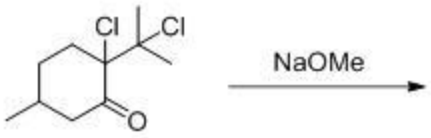
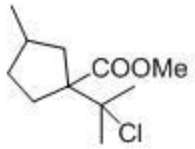
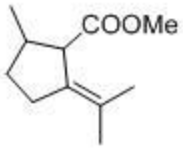
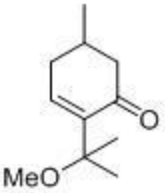
165 PU_2016_107_E

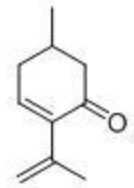
The major product formed in the following reaction is











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121 PU_2016_107_E

C_2H_4 can be converted into CH_3CHO in the presence of O_2 is known as:-

- Mansanto process
- Grubbs metathesis process
- Olefin reduction process
- Wacker process

43 of 100

131 PU_2016_107_E

One of the following statement is correct for the CpRe(Me)(PMe_3)(NO):-

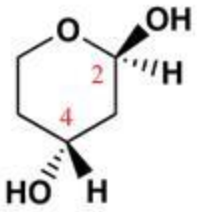
- Me can be substituted by PMe_3

- NO can be substituted by PMe_3
- Cp can be substituted by PMe_3
- PMe_3 can be substituted by NO

44 of 100

141 PU_2016_107_E

Which is the correct assignment of chirality at C2 and C4 of the following molecule?



- 2S,4R
- 2R,4R
- 2R,4S
- 2S,4S

45 of 100

108 PU_2016_107_E

The bonding in Cp in $Fe(Cp)_2(CO)_2$ is such that:-

- both Cp rings are pentahapto
- both Cp rings are monohapto
- one Cp ring is pentahapto and other Cp ring is monohapto
- both Cp rings are ionically bonded

46 of 100

133 PU_2016_107_E

$Ir(PPh_3)_3Cl$ shows one of the following:-

- Agostic interaction
- 100% ionic bond
- non covalent interaction
- 100 % covalent bond

47 of 100

114 PU_2016_107_E

cis-platin can be synthesized as an exclusive product from:-

- $[Pt(NH_3)_4]^{2+}$
- $PtCl_4^{2-}$

- *cis*-$PtCl_2(NH_3)_2$
- *trans*-$PtCl_2(NH_3)_2$

48 of 100

211 PU_2016_107_E

In Bragg reflection formula $n\lambda = 2d \sin\theta$, the possible value(s) on the order reflection, n, is given by:-

- 2 only
- 1 only
- 3 only
- all values as above

49 of 100

101 PU_2016_107_E

The zero magnetic moment of octahedral K_2NiF_6 is due to:-

- high spin d^6 Ni(IV) complex
- low spin d^8 Ni(II) complex
- high spin d^8 Ni(II) complex
- low spin d^6 Ni(IV) complex

50 of 100

112 PU_2016_107_E

Number of M-M bond present in $Os_4(CO)_{14}$ is:-

- 7
- 6
- 2
- 3

51 of 100

187 PU_2016_107_E

Use Hückel theory to determine the energies of the π orbitals of the allyl radical system, C_3H_4:-

- $\alpha + \sqrt{2}\beta, \alpha, \alpha - \sqrt{2}\beta$
- $\alpha + \beta, \alpha, \alpha - \beta$
- $\alpha + 2\beta, \alpha, \alpha - 2\beta$
- α, α, α

52 of 100

116 PU_2016_107_E

The structures of $N(CH_3)_3$ and $N(SiH_3)_3$, respectively, are:-

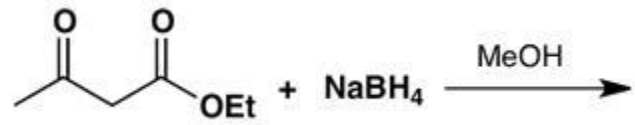
- pyramidal and pyramidal
- trigonal planar and pyramidal
- pyramidal and trigonal planar
- trigonal planar and trigonal planar

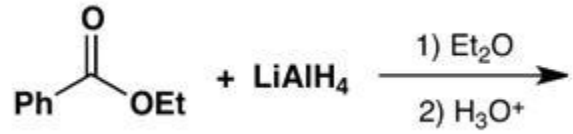
53 of 100

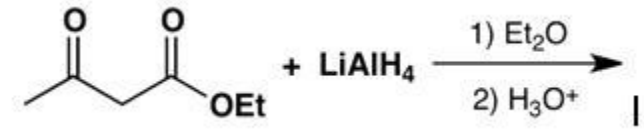
151 PU_2016_107_E

Which of the following reactions does not give a racemic mixture of the product?

- 

- 

- 

- 

54 of 100

134 PU_2016_107_E

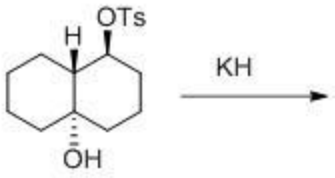
$CpFe(CO)_2(C_2H_4)$ reacts with OMe to yield:-

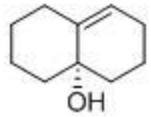
- Aromatic nucleophilic substitution reaction on Cp
- addition on C centre of C_2H_4
- addition on C centre of CO
- addition on Fe centre

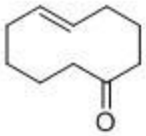
55 of 100

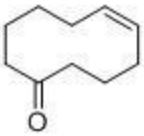
175 PU_2016_107_E

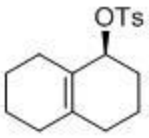
The major product formed in the following reaction is











56 of 100

181 PU_2016_107_E

How many normal modes of vibrational are possible for a benzene molecule?

- 30
- 31
- 6
- 12

57 of 100

139 PU_2016_107_E

ΔH will be related to applied magnetic field is:-

- H_o+B
- B+H_o
- H_o-B
- B-H_o

58 of 100

192 PU_2016_107_E

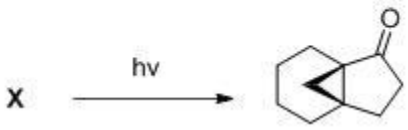
Which of the following statements is always true for a liquid mixture of two components A and B in equilibrium with a mixture of their vapours?

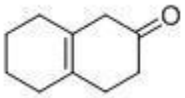
- $\mu_A(l) \neq \mu_A(g) \neq \mu_B(l) \neq \mu_B(g)$
- $\mu_A(l) = \mu_A(g)$ and $\mu_B(l) = \mu_B(g)$
- $\mu_A(l) = \mu_A(g) = \mu_B(l) = \mu_B(g)$
- $\mu_A(l) = \mu_B(l)$ and $\mu_A(g) = \mu_B(g)$

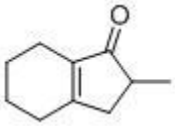
59 of 100

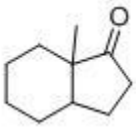
176 PU_2016_107_E

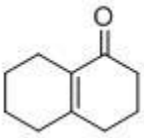
Structure of the starting material X in the following Photochemical Norrish reaction is



- 

- 

- 

- 

60 of 100

169 PU_2016_107_E

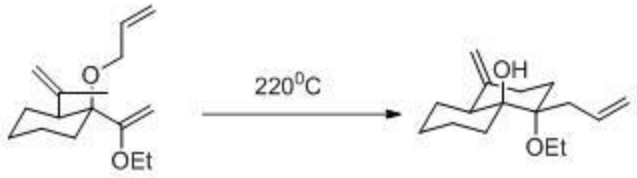
The reagent suitable for converting Oct-4-yne to trans -oct-4-ene is:-

- $NaBH_4$
- Pd / $CaCO_3$ / H_2
- H_2-Pd / C
- Na / Liq.NH_3

61 of 100

236 PU_2016_107_M

The following transformation involves sequential



- Cope rearrangement - Ene reaction - Claisen rearrangement
- Cope rearrangement - Claisen rearrangement - Ene reaction
- Claisen rearrangement Cope rearrangement - Ene reaction
- Ene reaction - Claisen rearrangement - Cope rearrangement

62 of 100

240 PU_2016_107_M

The adsorption of a gas on a solid surface was found to follow a Langmuir isotherm with K = 3.76 kPa^{-1} at a temperature of 25°C. Determine the pressure of gas required to achieve a fractional surface coverage of 10%.

- 30 Pa
- 270 Pa
- 27 Pa
- 38 Pa

63 of 100

229 PU_2016_107_M

If ClF_3 has to be stereochemically rigid, its ^{19}F NMR spectrum (I = for ^{19}F) would be (assume that Cl is not NMR active)

- a singlet
- a doublet and a singlet
- a doublet and a triplet
- two singlets

64 of 100

225 PU_2016_107_M

The correct order of the CO stretching vibrational frequency is:-

- $[Ti(CO)_6]^{2-} > [V(CO)_6]^{-} > CO > Cr(CO)_6$
- $CO > [V(CO)_6]^{-} > [Ti(CO)_6]^{2-} > Cr(CO)_6$
- $CO > Cr(CO)_6 > [V(CO)_6]^{-} > [Ti(CO)_6]^{2-}$
- $Cr(CO)_6 > CO > [V(CO)_6]^{-} > [Ti(CO)_6]^{2-}$

65 of 100

243 PU_2016_107_M

A line in the Paschen series of the emission spectrum of atomic hydrogen is observed at a wavenumber of 7800 cm^{-1}. Deduce the upper state principal quantum number for this transition:-

- 5
- 6
- 4
- 7

66 of 100

226 PU_2016_107_M

Photochromism is defined as:-

- light induced irreversible color change
- light induced reversible color change
- thermally activated reversible color change
- light induced sensing of small molecules

67 of 100

244 PU_2016_107_M

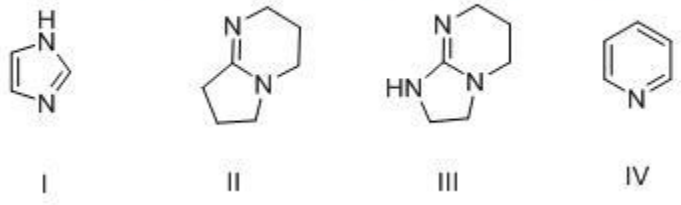
What terms can arise from the configuration $2p^1 3p^1$?

- $^3D, ^3P, ^3S$
- $^1D, ^3P, ^3S$
- $^3D, ^1D, ^3P, ^1P, ^3S, ^1S$
- $^1D, ^1P, ^1S$

68 of 100

238 PU_2016_107_M

The decreasing order of basicity of the following compounds is



- IV> I> II> III
- IV> III> II>I
- I> II> III >IV
- III> II> I> IV

69 of 100

246 PU_2016_107_M

Which of the following statements about the kinetics of the reaction $H_2(g) + Br_2(g) \rightarrow 2HBr\ (g)$ is definitely true?

- The reaction is second order overall
- It is not possible to determine anything about the kinetics of the reaction from the stoichiometry
- The reaction is first order with respect to bromine, Br_2
- The presence of hydrogen bromide, HBr, inhibits the rate of the reaction

70 of 100

247 PU_2016_107_M

For a galvanic cell, which of the following statements is never true?

- The electrons flow in the external circuit from the anode to the cathode.
- Oxidation takes place at the anode
- Reduction takes place at the cathode.
- The potential of the cathode is higher than that of the anode.

71 of 100

228 PU_2016_107_M

The order of MOs for PR_3 complexes of transition metals in *Oh* field is:-

- $t_{2g} > e_g > e_g^*$
- $t_{2g}^* > e_g^* > t_{2g}$
- $t_{2g} > t_{2g}^* > e_g^*$
- $t_{2g} > e_g^* > t_{2g}^*$

72 of 100

252 PU_2016_107_M

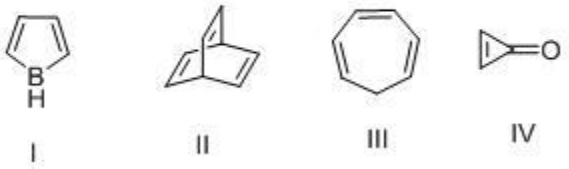
The minimal energy conformation of staggered form of ethane is attributed to:-

- steric attraction between hydrogen atoms
- steric repulsion between hydrogen atoms
- Polarizability
- Hyper-conjugation

73 of 100

237 PU_2016_107_M

The compound that is antiaromatic is



I II III IV

- III
- IV
- II
- I

74 of 100

255 PU_2016_107_M

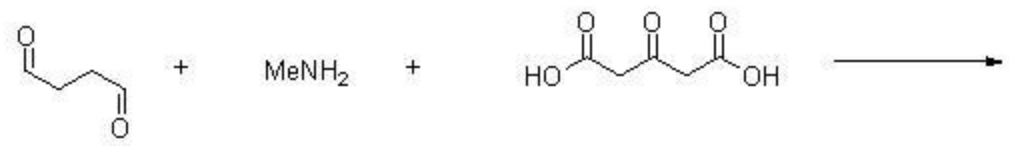
The tight-binding approximation is ideal for:-

- All periodic systems
- metals
- semi-conductors
- insulators

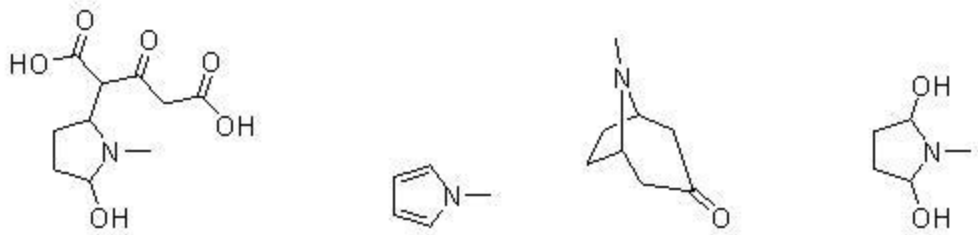
75 of 100

234 PU_2016_107_M

The product of the following reaction is:



A



(i) (ii) (iii) (iv)

- (iii)
- (i)
- (ii) & (iv)
- (i) & (iv)

76 of 100

242 PU_2016_107_M

The dipole moment of hydrogen fluoride, HCl, is 1.91 D and the bond length is 0.917Å . Calculate the fractional charge on the hydrogen and chlorine atoms:-

- 0.22e
- 1.45e
- 0.43e
- 0.65e

77 of 100

258 PU_2016_107_M

Potential energy surface is a plot of:-

- Total energy of the Schrodinger equation for nuclear motion
- Potential energy associated with nuclear-nuclear repulsion
- Total energy associated with electronic Schrodinger equation
- potential energy associated with the electronic Schrodinger equation

78 of 100

249 PU_2016_107_M

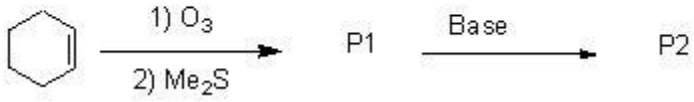
The standard Gibbs energy of reaction, ΔrG°, for the dissociation of phenol is 56.4 kJ mol-1 at 298 K. Calculate the Pk_a of phenol:-

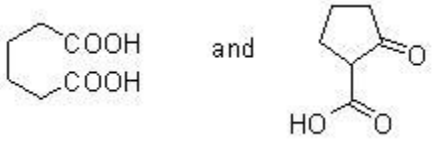
- 9.88
- 5.24
- 22.8
- 4.12

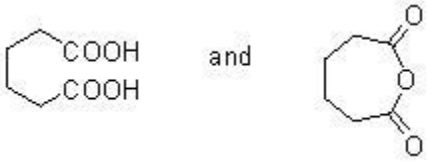
79 of 100

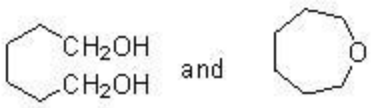
231 PU_2016_107_M

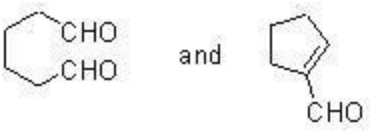
The products of the following reaction P1 and P2 are



- 

- 





80 of 100

251 PU_2016_107_M

Inert pair effect is not related to:-

- Hund's rule of maximum multiplicity
- Relative diffusion of s and p orbitals
- avoided crossing
- sp mixing

81 of 100

279 PU_2016_107_D

The $[\alpha]_D$ of a 90% optically pure 2-arylpropanoic acid solution is +135°.On treatment with a base at RT for one hour, $[a]_D$ changed to +120°. The optical purity is reduced to 40% after 3 hours. If so, the optical purity of the solution after one hour and its $[\alpha]_D$ after 3 hours respectively would be

- 70 % and 60°
- 80 % and 60°
- 80 % and 90°
- 70 % and 40°

82 of 100

280 PU_2016_107_D

The ΔG for a reaction at 300 K is -16 kcal and ΔH is -10 kcal. The entropy of the reaction is:-

- 20 cal deg^{-1}
- 100 cal deg^{-1}
- 86.6 cal deg^{-1}
- 166 cal deg^{-1}

83 of 100

281 PU_2016_107_D

The pH of 10^{-3} M NaOH solution is:-

- 11
- 10
- 12

- 13

84 of 100

290 PU_2016_107_D

In VB theory, the stability of ground state H_2 molecule is primarily attributed to:-

- Overlap
- Exchange interaction
- Kinetic energy of electrons.
- (e) electron-nuclear attraction

85 of 100

293 PU_2016_107_D

Which of the following is not unity in atomic units?

- Planck's energy packet h/2π
- Energy of the 1s electron in Hydrogen atom
- Mass of the electron
- Charge of the electron

86 of 100

285 PU_2016_107_D

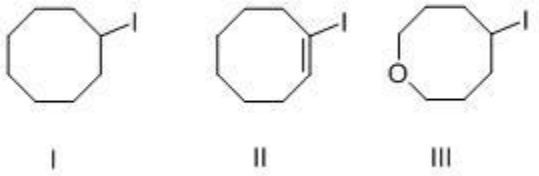
Sets having same elements are called:-

- equivalent set
- (c) equal set
- overlapping set
- subset

87 of 100

275 PU_2016_107_D

The relative rates of solvolysis of iodides A- C are



- III> I> II
- III> II> I
- II> I> III
- II> III> I

88 of 100
295 PU_2016_107_D
A linear variational trial function should necessarily:-

- Be the linear combination of Eigen functions of the Hamiltonian operator.
- Satisfy the boundary conditions of the system.
- Normalized.
- Linear combination of orthogonal functions.

89 of 100
297 PU_2016_107_D
The Highest occupied molecular orbital in water molecule is:-

- O-H Bonding
- O-H antibonding
- One of the nonbonding non-degenerate oxygen lone-pair
- Non-bonding Doubly degenerate oxygen lone-pairs

90 of 100
282 PU_2016_107_D
For the reaction

$A + B \rightarrow C + D$,
ΔH = -25 kcal and ΔS = 90 cal deg^{-1} at 27° C.
The reaction:-

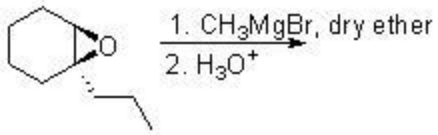
- is not feasible at 27° C
- is reversible at 27° C
- can occur only at temperature higher than 27° C.
- represents equilibrium state at 27° C

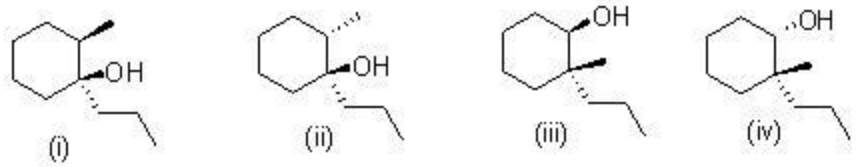
91 of 100
284 PU_2016_107_D
The latent heat of vaporization of water at 100 °C is 540 cal g-1. What will be the change in entropy when one mole of water at 100° C is evaporated:-

- 260 cal K^{-1} mol^{-1}
- 26 cal K^{-1} mol^{-1}
- 360 cal K^{-1} mol^{-1}
- 160 cal K^{-1} mol^{-1}

92 of 100
271 PU_2016_107_D

Which of the following is the major product of the reaction shown below:





- (ii)
- (i) & (iii)
- (iii) & (iv)
- (iv)

93 of 100

269 PU_2016_107_D

The low reactivity of N2 molecule is attributed to:-

- High electronegativity of nitrogen atoms
- The smaller size of the nitrogen atom
- High bond order
- sp-mixing

94 of 100

264 PU_2016_107_D

The ground term for d1 Oh and d9 Td is:-

- $^0T_{1u}$
- $^2T_{1u}$
- $^2T_{2g}$
- $^1A_{1g}$

95 of 100

286 PU_2016_107_D

If a function is defined as f(x)= (x^2-1) / 3 ; then at which of the following point is the function singular?

- -1
- 1
- 3
- none of the above

96 of 100

299 PU_2016_107_D

An acceptable wave function for a quantum mechanical system need not be:-

- Finite
- Continuous
- Real
- Single valued

97 of 100

262 PU_2016_107_D

For Cr(III) ion which one of the following transition is lower in energy:-

- $^4A_{2g}$ to $^4T_{2g}$
- $^4A_{2g}$ to $^4A_{1g}$(P)
- $^4A_{1g}$ to $^4A_{1u}$
- $^4A_{2g}$ to $^4A_{1g}$(F)

98 of 100

266 PU_2016_107_D

K2PtCl6 shows one of the following:-

- UV-Vis band at 450nm
- EPR fine structure
- IR band at 2435 cm^{-1}
- NMR signal at 8 ppm

99 of 100

287 PU_2016_107_D

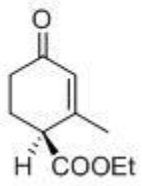
Which of the following is a monotonically increasing function?

- $y = ae^{bx}$, where a and b are positive constants,
- $y = (x^2-a^2)^{1/2}$, where a is a positive constant
- $y = ae^{-bx}$, where a and b are positive constants,
- y = -mx, where m is positive constant,

100 of 100

277 PU_2016_107_D

The IUPAC name of the compound given below is



- Ethyl (S) 2-methyl 4-oxocyclohex -2- enecarboxylate
- (S) 4-ethoxycarbonyl -3-methylcyclohex-2-enone
- (R) 4-ethoxycarbonyl -3-methylcyclohex-2-enone
- Ethyl (R) 2-methyl 4-oxocyclohex -2- enecarboxylate

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

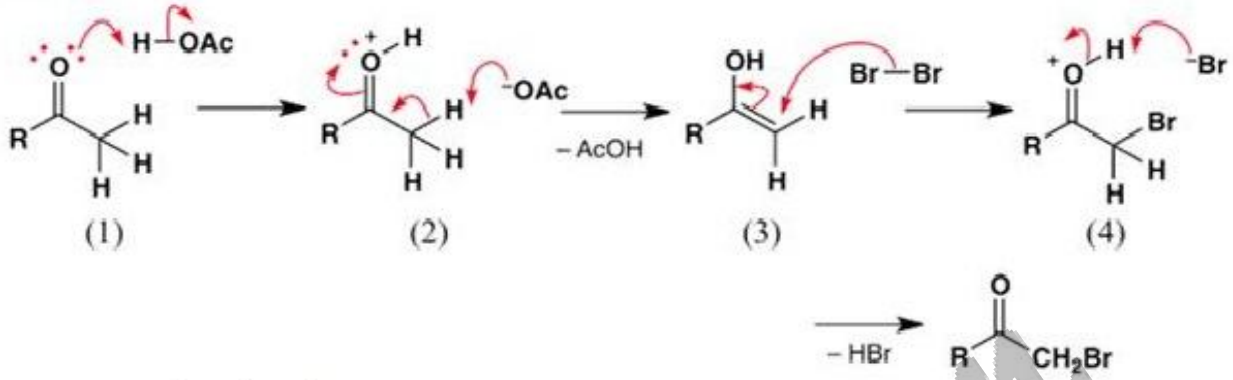
17	There are 5 persons in a class. Each one is shaking hand with the other. Find the total number of hand shakes?
Alt1	5
Alt2	10
Alt3	20
Alt4	60

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

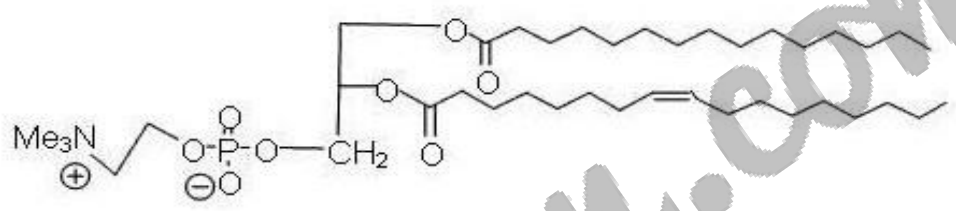
Alt4	19

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

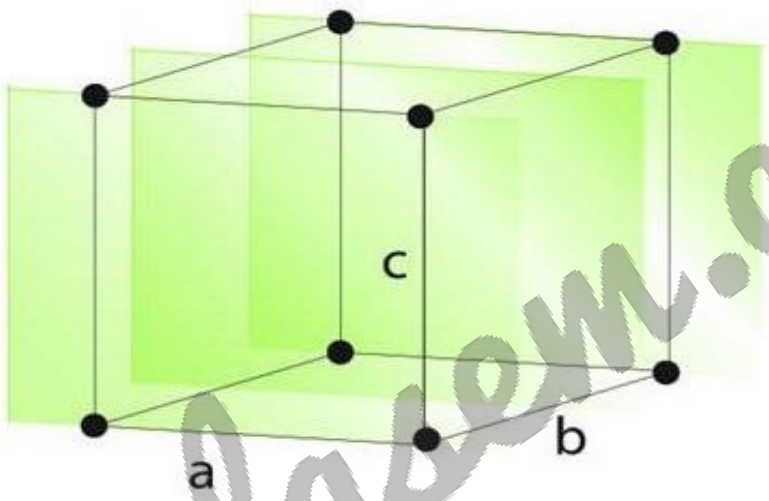
25	What type of molecule is the following structure?  A: A phospholipid B: A nucleic acid C: A carbohydrate D: A protein
Alt1	A
Alt2	B
Alt3	C
Alt4	D

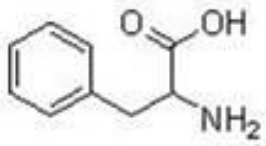
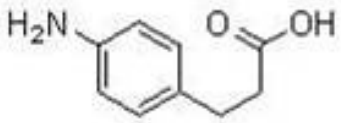
26	HV(CO)6 is:-
Alt1	pH = 7
Alt2	not stable
Alt3	basic
Alt4	acidic

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

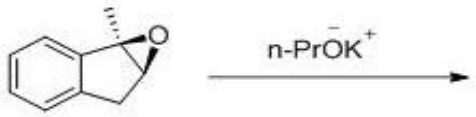
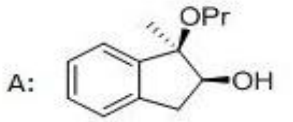
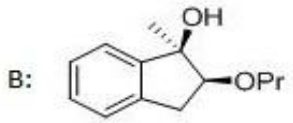
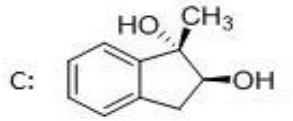
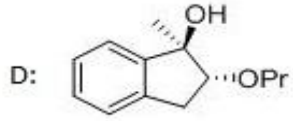
30	What are the Miller indices of the following planes?  A: (020) B: (202) C: (022) D: (220)
Alt1	A
Alt2	B
Alt3	C
Alt4	D

31	Which of the following pattern of ^1H 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     
Alt1	A
Alt2	B
Alt3	C
Alt4	D

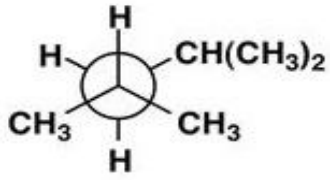
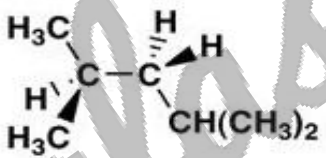
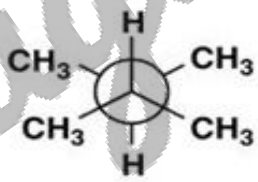
36	M(CH2CHCH2) complex does not have interaction between:-
Alt1	LGO with dxz and dx2-y2
Alt2	LGO with dxz and dyz
Alt3	LGO with dxz and dz2
Alt4	LGO with dxy and dx2-y2

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

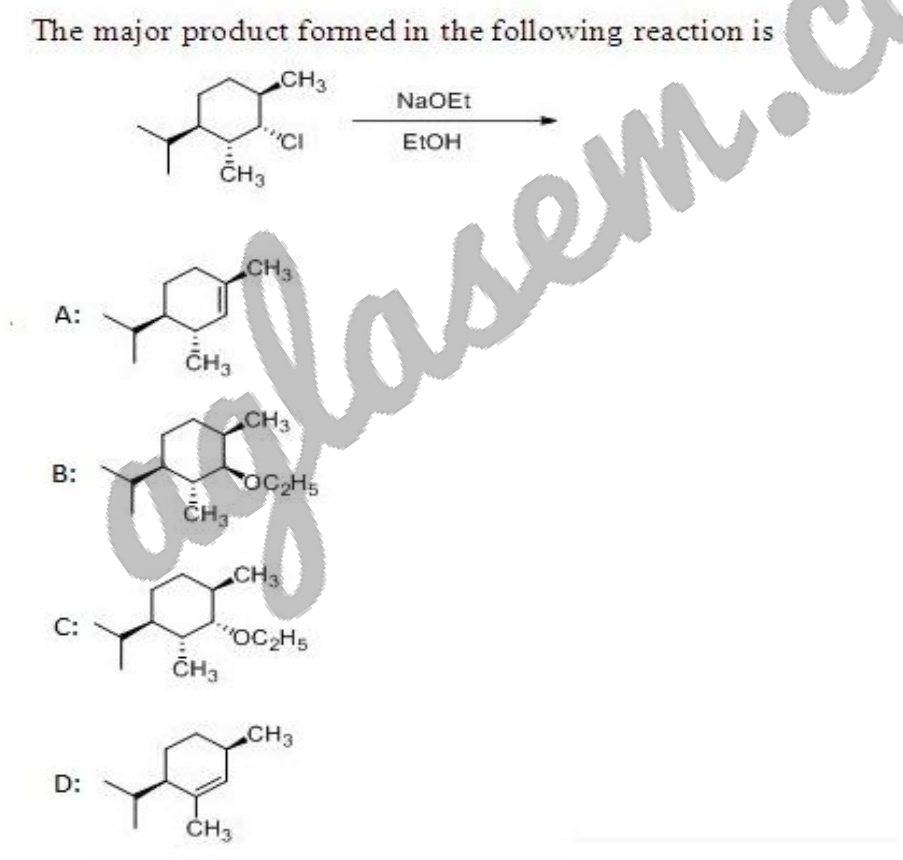
41	Which compound is different from the others? A:  B:  C:  D: 
Alt1	A
Alt2	B
Alt3	C
Alt4	D

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

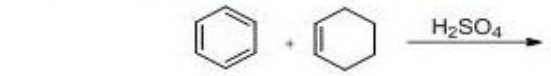
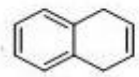
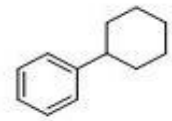
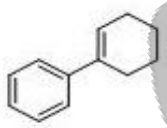
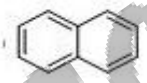
44	Aluminum chloride melts at a much lower temperature than that of sodium chloride, because:-
Alt1	aluminum chloride is dimeric
Alt2	aluminum chloride is polymeric
Alt3	the Al-Cl bond is more ionic than that of Na-Cl
Alt4	Al-Cl bond is highly covalent while NaCl is ionic

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

46	
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

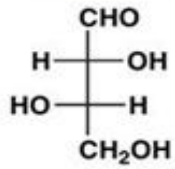
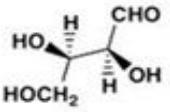
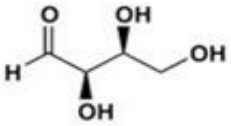
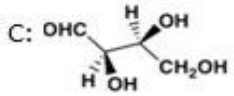
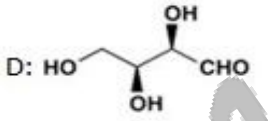
48	1.2 m The molality of a solution containing 18 g of glucose (molar mass 180 g) in 500 g of water is:-
Alt1	1.2 m
Alt2	0.2 m
Alt3	1 m
Alt4	0.5 m

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

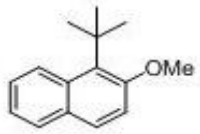
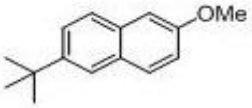
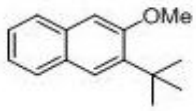
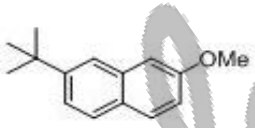
52	Which is the enantiomer of the following molecule?  A:  B:  C:  D: 
Alt1	A
Alt2	B
Alt3	C
Alt4	D

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

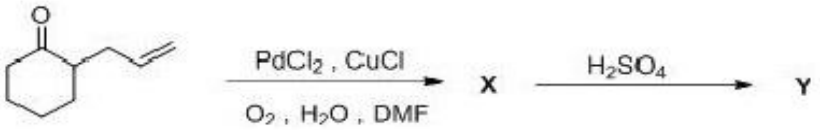
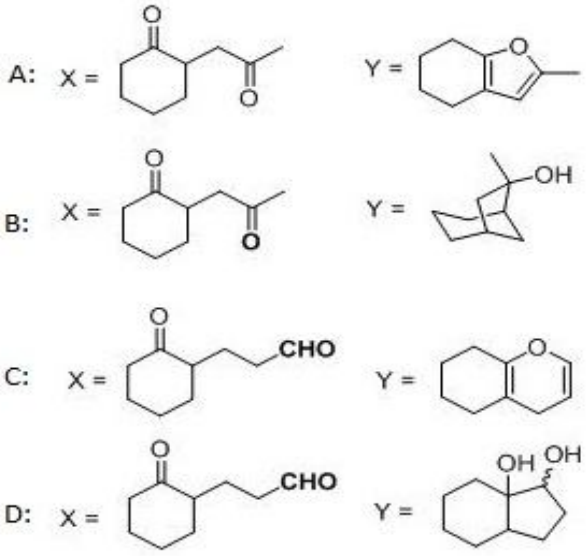
57	Which of the following is the SI unit of viscosity?
Alt1	Kg -1S-1m
Alt2	Kg-1 S-1m-1
Alt3	Kg S m-1
Alt4	Kg S-1m-1

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  
Alt1	A
Alt2	B
Alt3	C
Alt4	D

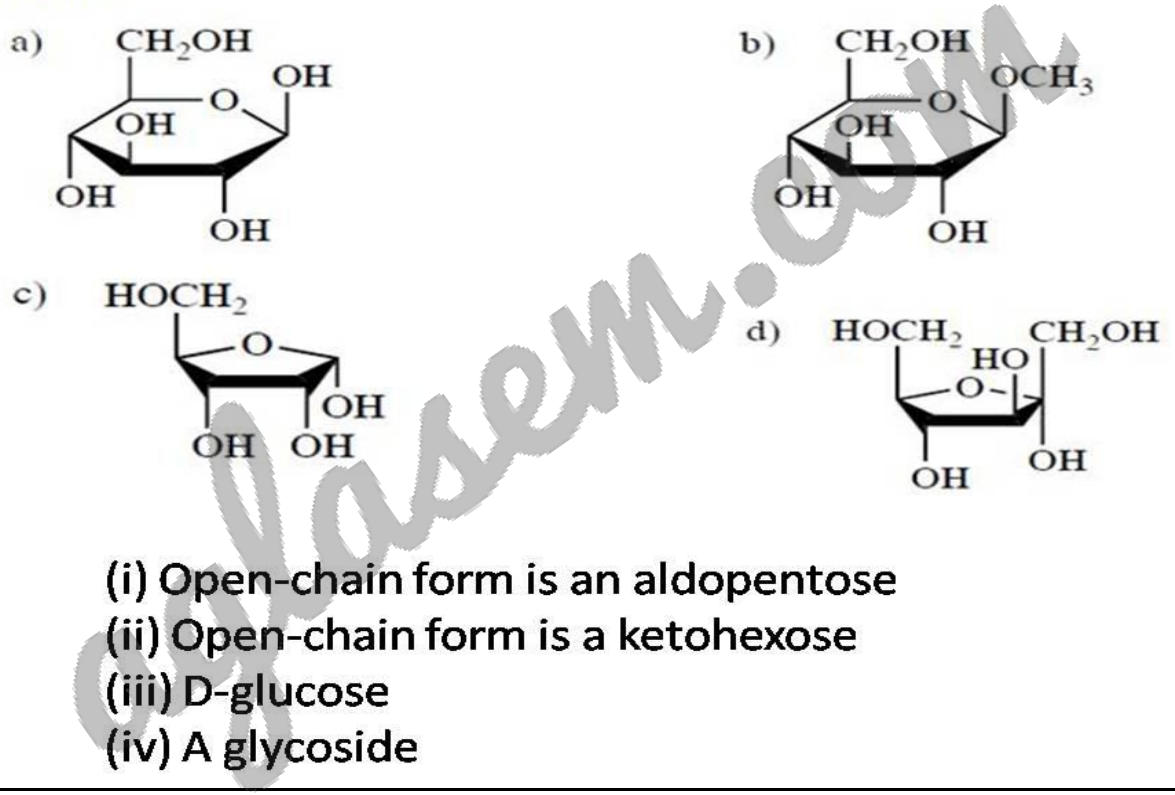
63	The biological role of ferritin is:-
Alt1	metal transport
Alt2	oxygen storage
Alt3	electron transfer
Alt4	iron storage

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

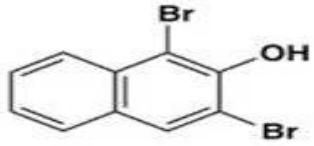
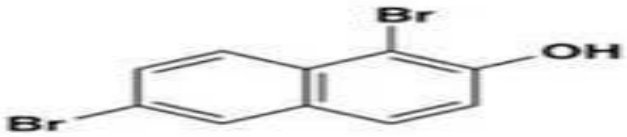
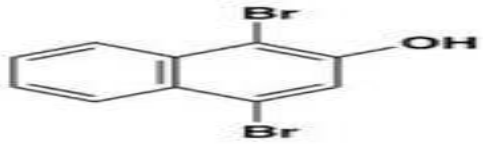
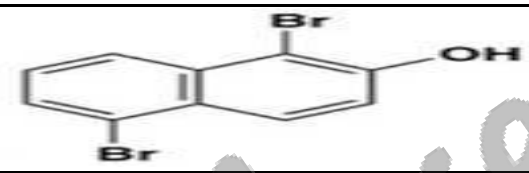
67	H2 and CO can be produced from one of the following reactions:-
Alt1	H2O reaction with C
Alt2	H2O reaction with Mn(CO)6
Alt3	H2O reaction with CO2
Alt4	H2O reaction with Na

68	Identify the correct match of monosacharide to the characteristics of the monosacharide described  (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:-

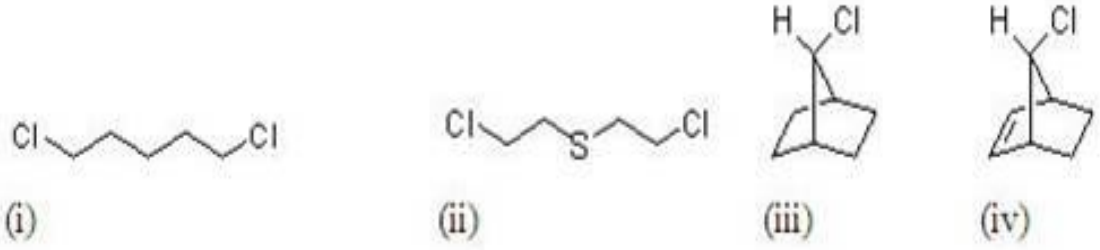
Alt1	Cu(CO)4
Alt2	Mn(CO)4
Alt3	Ru(CO)4
Alt4	Cr(CO)4

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	

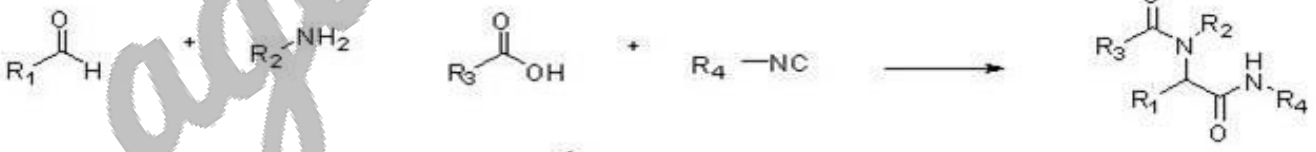
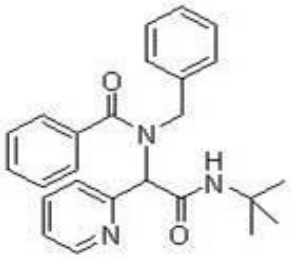
72	Which of the following is not a thermoelectric effect?
Alt1	Peltier effect
Alt2	Thomson effect
Alt3	Meissner effect
Alt4	Seebeck effect

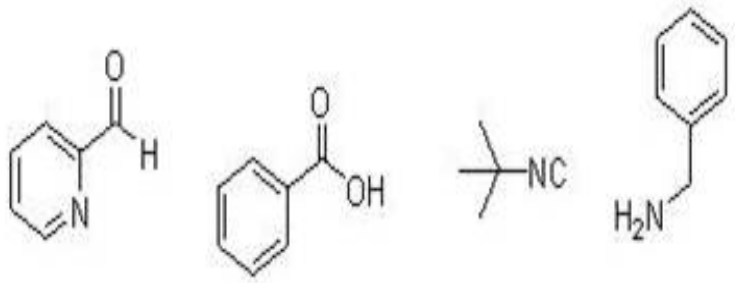
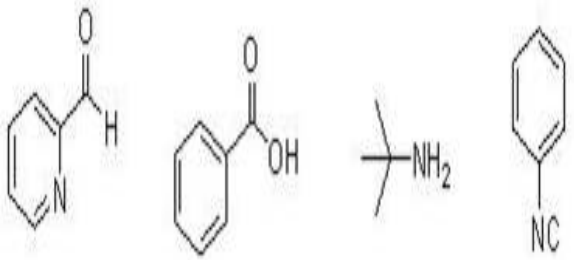
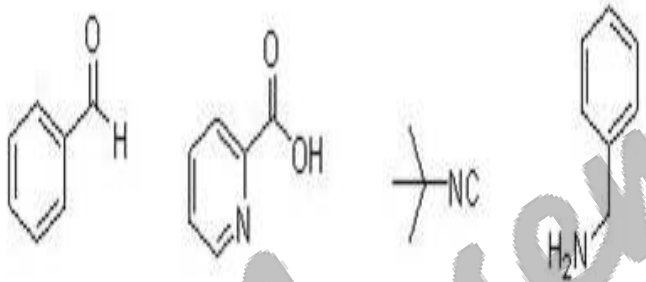
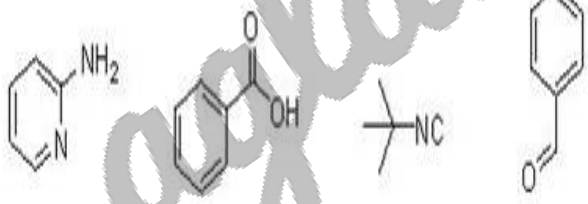
73	The total number of hyperfine lines in an isotropic EPR spectrum of V4+ ion is given by:-
Alt1	8
Alt2	6
Alt3	2
Alt4	4

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

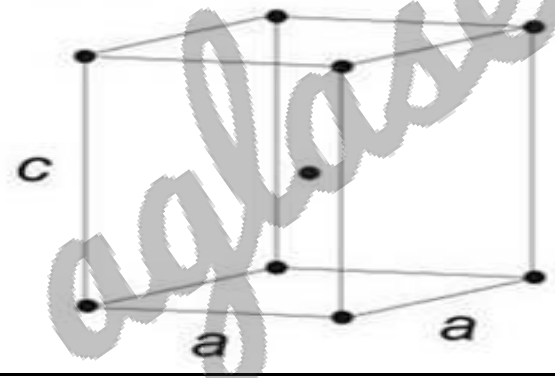
84	The rate law for the multistep chain reaction $H_2 + Br_2 \rightarrow 2\,HBr$ is $\text{Rate} = \frac{d[HBr]}{dt} = \frac{k_{r1}[H_2][Br_2]^{3/2}}{[Br_2] + k_{r2}[HBr]}$ Which of the following expresses the rate law in the limit of high pressures of bromine, Br_2?
Alt1	Rate = kr1[H2][Br2]1/2
Alt2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

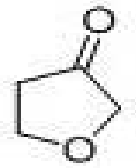
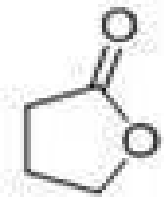
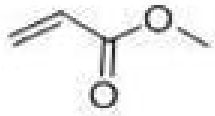
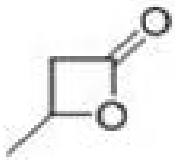
87	The number of chemical shift non equivalent protons expected in ^{1}H NMR spectrum of α-Pinene is 
Alt1	9
Alt2	7
Alt3	10
Alt4	8

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

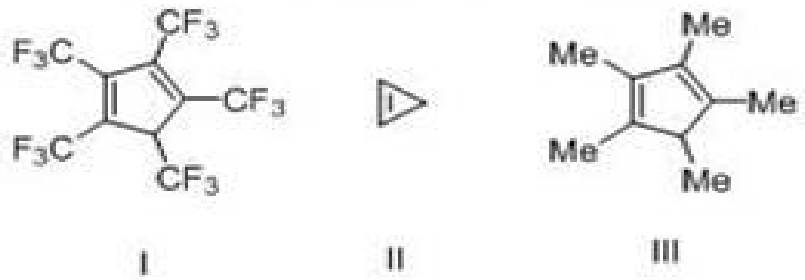
95	The bonding pattern of M(CO)x complex can be explained using one the following methods:-
Alt1	16 electron count
Alt2	18 electron count
Alt3	VSEPR
Alt4	DCD

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

Examination: **Ph.D. Chemistry**

Section 1 - Section 1

Question No.1 4.00

Bookmark

Find out the missing term:

1, 2, 3, 6, 11, 20, 37, 68, ?

- 105
- 125
- 126
- 124

Question No.2 4.00

Bookmark

Obtain the missing term.

300, 296, 287, 271, ? , 210

- 246
- 250
- 244
- None of the above

Question No.3 4.00

Bookmark

If the pressure p (system) is greater than the p (surroundings), then

- internal energy of the system increases
- work is done on the system by the surroundings
- work done on the system by the surroundings is equal to the work done on the surroundings by the system
- work is done on the surroundings by the system

Question No.4 4.00

Bookmark

The general formula of a spinel is, AB_2O_4 , where A is a divalent and B is a trivalent cation. Then Fe_3O_4 is:-

- an inverse spinel
- a mixed spinel
- not a spinel
- a normal spinel

Question No.5 4.00

Bookmark

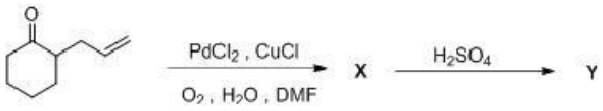
The point group for chair form of cyclohexane is:-

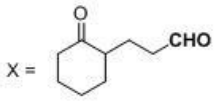
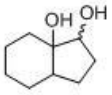
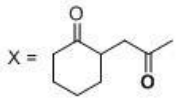
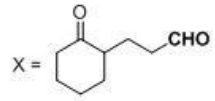
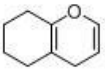
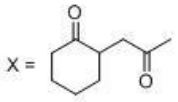
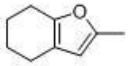
- D_{3d}
- C_{2h}
- C_{2v}
- None of these

Question No.6 4.00

Bookmark

The major products, X and Y in the following reaction sequences are



- X =  Y = 
- X =  Y = 
- X =  Y = 
- X =  Y = 

Question No.7 4.00

Bookmark

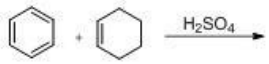
The calculated magnetic moment of Cr^{2+} ion in a weak field is:-

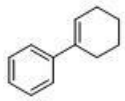
- 4.12 BM
- 4.90 BM
- 7.18 BM
- 2.80 BM

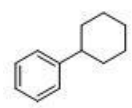
Question No.8 4.00

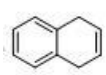
Bookmark

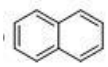
The major product obtained in the following reaction is











Question No.9 4.00

Bookmark

The pair of lanthanides with the highest third-ionization energy is

- Eu, Gd
- Eu, Yb
- Lu, Yb
- Dy, Yb

Question No.10 4.00

Bookmark

Based on the given information, answer the following question.
1. Six friends P,Q,R,S,T and U are memebers of a club and play different games of Football, Cricket, Tennis, Basketball, Badminton and Volleyball
2. T who is taller than P and S plays Tennis.
3. The tallest among them plays Basketball.
4. The Shortest among them plays volleyball.
5. Q and S neither play Volleyball nor Basketball.
6. R plays Volleyball
7. T is between Q who plays Football and P in order of height

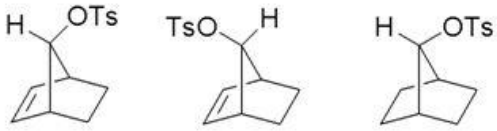
What does S Play?

- Cricket
- Badminton
- Either Cricket or Badminton
- None of the above

Question No.11 4.00

Bookmark

Arrange the following in the increasing rate of acetolysis reaction



(A) (B) (C)

- (B) > (A) > (C)
- (C) > (B) > (C)
- (A) > (B) > (C)
- (C) > (A) > (B)

Question No.12 4.00

Bookmark

Which of the following is an *arachno borane* ?

- $[B_6H_{12}]$
- $[B_5H_9]$
- $[B_2H_6]$
- $[B_6H_6]^{2-}$

Question No.13 4.00

Bookmark

Choose the correct meaning of the italicized idiom.
Sheela's work seems to be a *Penelope's web.*

- Endless
- Difficult
- Declining
- In her best form

Question No.14 4.00

Bookmark

Which of the following is not a Van der Waal force?

- Dipole induced- dipole force
- London dispersion force
- Hydrogen bonding
- Dipole -dipole interaction

Question No.15 4.00

Bookmark

Statements: Some bats are snakes, No snake is dangerous
Conclusion:
I. Some dangerous animals are snakes
II. Some bats are not dangerous.

- If only conclusion II follows
- If either I or II follows
- If neither I nor II follows
- If only conclusion I follows

Question No.16 4.00

Bookmark

Choose the correct meaning of the italicized idiom.

Anil got me into trouble by giving a *false colour* to my statement.

- Giving good impression
- Giving a wrong character
- Colouring the sentence
- Giving a wrong colour box

Question No.17 4.00

Bookmark

Boron nitride has a structure similar to

- Graphite
- NaCl
- Diamond
- Fullerene

Question No.18 4.00

Bookmark

Among the following complexes

A. $[Co(Ox)_3]^{3-}$, B. *trans*-$[CoCl_2(en)_2]^+$, C. $[Cr(EDTA)]^-$ the chiral one(s) is/are,

- A and C
- C and B
- A and B
- C only

Question No.19 4.00

Bookmark

In a code language, 321 means "Hot Black Coffee", 536 means "Very Hot Summer", and 589 means "Summer and Winter". Which digit stands for "Very" ?

- 5
- 9
- 3
- 6

Question No.20 4.00

Bookmark

When an aqueous solution of zinc sulphate is subjected to electrolysis, 280 ml of oxygen gas at STP is liberated at anode. Calculate the quantity of electricity passed through the electrolyte

- 0.005 F
- 5 F
- 0.05 F
- 0.5 F

Question No.21 4.00

Bookmark

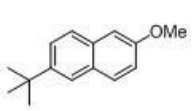
Choose the best antonym of the italicized word.
Ravi and Raghu are really *obstinate* men.

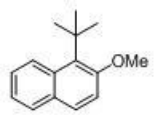
- understanding
- considerate
- friendly
- compliant

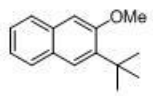
Question No.22 4.00

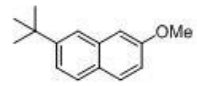
Bookmark

The major product obtained in the following reaction is









Question No.23 4.00

Bookmark

The violet colour of $[Ti(H_2O)_6]^{3+}$ is due to:-

- metal to ligand charge transfer transition
- d-d transition
- ligand to metal charge transfer transition
- f-f transition

Question No.24 4.00

Bookmark

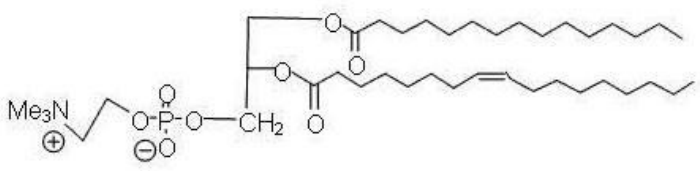
The bonding pattern of M(CO)x complex can be explained using one the following methods:-

- 18 electron count
- 16 electron count
- DCD
- VSEPR

Question No.25 4.00

Bookmark

What type of molecule is the following structure?

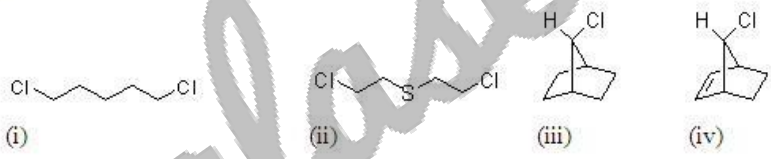


- A phospholipid
- A protein
- A carbohydrate
- A nucleic acid

Question No.26 4.00

Bookmark

Which of the following statements is true regarding the rate of hydrolysis of the following substrates:



(i) (ii) (iii) (iv)

- (ii) and (iv) faster than (i) and (iii)
- (i) and (iii) faster than (ii) and (iv)
- (i) and (ii) faster than (iii) and (iv)
- (iii) and (iv) faster than (i) and (ii)

Question No.27 4.00

Bookmark

$L_2Ir(CO)Cl$ reaction with H_2 is called:-

- oxidation reaction
- substitution reaction
- sigma bond metathesis
- oxidative addition

Question No.28 4.00

Bookmark

Ramesh had a cold and couldn't go to the party, so I bought him a cake to make up for his_____

- disappointment
- disgust

- depression
- disillusion

Question No.29 4.00

Bookmark

The reaction of Potassium phthalimide with Ethyl Chloroacetate followed by hydrolysis results in:-

- Glycine
- Leucine
- Alanine
- Valine

Question No.30 4.00

Bookmark

In perturbation theory, the ground state energy for constant perturbation is accurate from:-

- Perturbation theory will not lead to meaningful solution.
- Energy is proportional to the order of the perturbation.
- Second order perturbation.
- First order perturbation.

Question No.31 4.00

Bookmark

The hydrolysis of t-bromobutane, C_4H_9Br, by hydroxide, OH-, ions in aqueous solution follows an S_N1 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?

- Rate = $k[OH^-]$
- Rate = $k[C_4H_9Br]$
- Rate = $k[C_4H_9Br]^2$
- Rate = $k[C_4H_9Br][OH^-]$

Question No.32 4.00

Bookmark

The orange red colour of dichromate ions in solution is due to the

- Bent Cr-O-Cr bond
- Charge transfer transition
- d to d transition
- Dianionic charge

Question No.33 4.00

Bookmark

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

(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

- (a) - (ii); (b) - (iii); (c) - (iv); (d) - (i)
- (a) - (iii); (b) - (iv); (c) - (i); (d) - (ii)
- (a) - (i); (b) - (ii); (c) - (iii); (d) - (iv)
- (a) - (iv); (b) - (i); (c) - (ii); (d) - (iii)

Question No.34 4.00

Bookmark

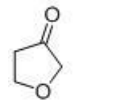
Predict the geometry of a molecule in which the bonding may be described using the hydridization model as being made up of sp^3 hybrid orbitals on the central atom:-

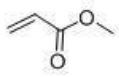
- octahedral
- square planar
- trigonal bipyramidal
- tetrahedral

Question No.35 4.00

Bookmark

A compound with molecular formula $C_4H_6O_2$ shows band at 1770 cm^{-1} in IR spectrum and peaks at 178, 68, 28 and 22 ppm in ^{13}C NMR. The correct structure of the compound is





Question No.36 4.00

Bookmark

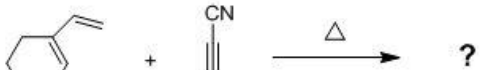
Laporte selection rule does not affect

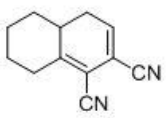
- Square planar geometry
- Tetrahedral geometry
- Octahedral geometry
- All of these

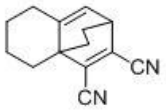
Question No.37 4.00

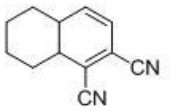
Bookmark

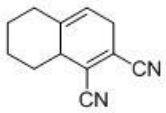
Which of the following is the most likely product of the Diel's Alder reaction.











Question No.38 4.00

Bookmark

Choose the best synonym of the italicized word.
Each one of us is the subject of *derision* at some time or the other in our life.

- laughter
- irony
- ridicule
- criticism

Question No.39 4.00

Bookmark

The complexes $[Cu(NH_3)_4]$ $[PtCl_4]$ and $[Pt(NH_3)_4]$ $[CuCl_4]$ represents an example of:-

- coordination isomerism
- linkage isomerism
- geometrical isomerism
- ionisation isomerism

Question No.40 4.00

Bookmark

When Al_4C_3 reacts with H_2O, the major product is:-

- propyne
- propane
- methane
- ethyne

Question No.41 4.00

Bookmark

The electronic spectra of $[Cr(en)_3]^{3+}$ has the following features:-

- $CT < \nu_1 < \nu_2$
- $CT > \nu_1 < \nu_2$

- $CT < v_1 > v_2$
- $CT > v_1 > v_2$

Question No.42 4.00

Bookmark

The first step in the Wilkinson's catalytic cycle is:-

- decomplexation
- PPh_3 dissociation
- Cl dissociation
- oxidation

Question No.43 4.00

Bookmark

The ordering of the occupied d-orbital energies in an octahedral complex on tetragonal elongation is expected to be:-

- $dx^2\text{-}y^2 > dz^2 > dxy > dyz, dxz$
- $dxy > dyz, dxz > dz^2 > dx^2\text{-}y^2$
- $dx^2\text{-}y^2 > dxy > dz^2 > dyz, dxz$
- $dx^2\text{-}y^2 < dz^2 < dxy > dyz, dxz$

Question No.44 4.00

Bookmark

Choose the missing term: 3F,6G,11I,18L, ?

- 26N
- 27P
- 27O
- 28Q

Question No.45 4.00

Bookmark

Which one of the following ground state term will not have Jahn-Teller distortion?

- $^2T_{2g}$
- ^2E_g (low spin)
- $^3T_{1g}$
- $^1A_{1g}$ (low spin)

Question No.46 4.00

Bookmark

Which of the following has zero crystal field stabilization energy in octahedral field?

- Co^{3+} (low spin)
- Fe^{3+} (high spin)
- Cr^{3+} (high spin)
- Fe^{3+} (low spin)

Question No.47 4.00

Bookmark

The coenzyme that is involved in the reduction of a double bond in fatty acid biosynthesis is:-

- Pyridoxa
- $FADH_2$
- Biotin
- NADH

Question No.48 4.00

Bookmark

Identify the underlined part of speech:
Sorry, I don't know any foreign languages

- adjective
- pronoun
- noun
- adverb

Question No.49 4.00

Bookmark

The spectroscopic ground state term symbolsfor the octahedral aqua complexes of Mn(II),Cr(III) and Cu(II), respectively, are

- ^2H, ^2H and ^2D
- ^2H, ^4F and ^2D
- ^6S, ^4F and ^2P
- ^6S, ^4F and ^2D

Question No.50 4.00

Bookmark

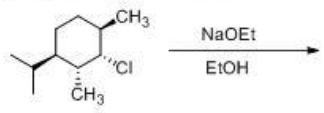
Good restaurants serving pure vegetarian food are very hard to _____.

- come by
- get in
- take to
- go through

Question No.51 4.00

Bookmark

The major product formed in the following reaction is



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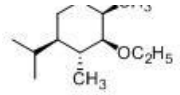
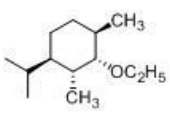
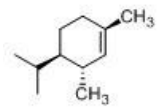
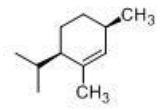




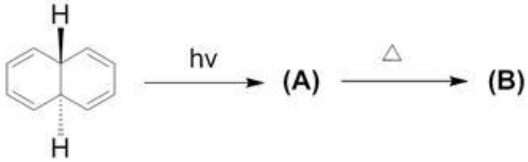


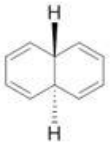


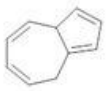
Question No.52 4.00

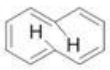
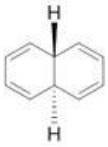
Bookmark

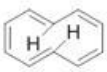
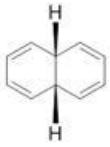
Identify the correct answers



○ (A)  (B) 

○ (A)  (B) 

○ (A)  (B) 

○ (A)  (B) 

Question No.53 4.00

Bookmark ☐

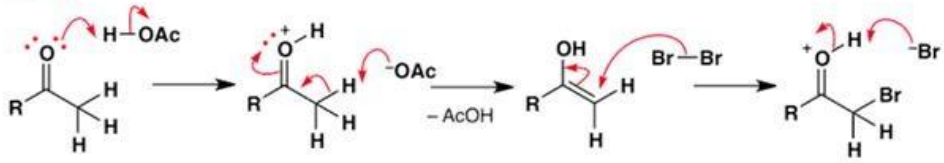
The number of bridging ligand(s) and metal metal bond(s) present in the complex $[Ru_2(\eta^5\text{–}Cp)_2(CO)_2(Ph_2PCH_2PPh_2)]$ (obeys 18-electron rule) respectively are

- ○ 0 and 1
- ○ 3 and 1
- ○ 1 and 2
- ○ 2 and 1

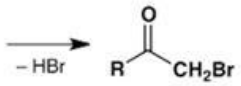
Question No.54 4.00

Bookmark ☐

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?



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



- Stage 4
- Stage 1
- Stage 3
- Stage 2

Question No.55 4.00

Bookmark

Among, RO^-, $AsMe_3$, ROR', CN^-, RCO_2^-, SCN^-, the set of ligands with good π-acceptor nature are:-

- RO^-, RCO^{2-}, $AsMe_3$
- RO^-, RCO_2^-, SCN^-
- RO^-, ROR', RCO_2^-
- $AsMe_3$, CN^-, SCN^-

Question No.56 4.00

Bookmark

$Fe(CO)_4$ is isolobal to:-

- $Mn(CO)_4$
- $Ru(CO)_4$
- $Cu(CO)_4$
- $Cr(CO)_4$

Question No.57 4.00

Bookmark

Which of the following is true for melting?

- exothermic process
- irreversible process
- endothermic process
- None of these

Question No.58 4.00

Bookmark

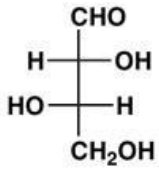
$[MnO_4]^-$ is deep purple in color whereas $[ReO_4]^-$ is colorless. This is due to greater energy required for

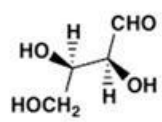
- d–d transitions in the Re compound compared to the Mn compound
- d–d transitions in the Mn compound compared to the Re compound
- charge transfer from O to Mn compared to O to Re
- charge transfer from O to Re compared to O to Mn

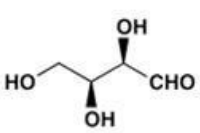
Question No.59 4.00

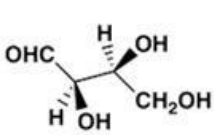
Bookmark

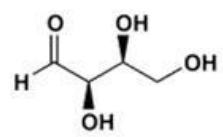
Which is the enantiomer of the following molecule?











Question No.60 4.00

Bookmark

The non-Planarity of Si2H4 is associated with:-

- Inert pair effect
- Weak Si-H bonds
- Weak Si-Si pi bonds
- Steric repulsion

Question No.61 4.00

Bookmark

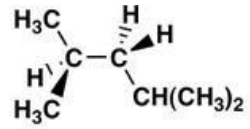
The numbers of radial nodes of 3d orbital is:-

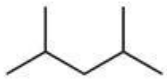
- 2
- 3
- 1
- 0

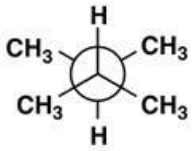
Question No.62 4.00

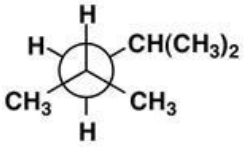
Bookmark

Which compound is different from the others?









Question No.63 4.00

Bookmark

Based on the information given, answer the below question.
1. A,B,C,D,E and F are travelling in a bus.
2. There are two reporters, two mechanics, one photographer and one writer in the group.
3. Photographer A is married to D who is a reporter.
4. The writer is married to B who is of the same profession as that of F.
5. A,B,C,D are two married couples and no one in this belong to the same profession.
6. F is the brother of C.

How is C related to F?

- Brother-in-law
- Cannot be determined
- Sister
- Brother

Question No.64 4.00

Bookmark

Choose the correct meaning of the italicized idiom.
He had great difficulty to *save his bacon* when he was blackmailed.

- Save pork
- Put bacon in the refrigerator
- Escape death
- Threaten somebody

Question No.65 4.00

Bookmark

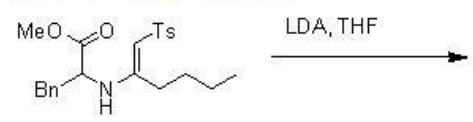
The most stable hydride of the following is

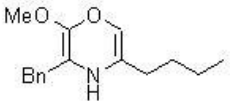
- NaH
- LiH
- KH
- CsH

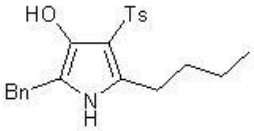
Question No.66 4.00

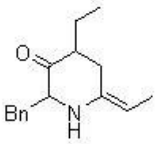
Bookmark

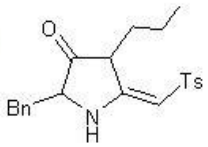
The product of the following reaction is :



(i) 

(ii) 

(iii) 

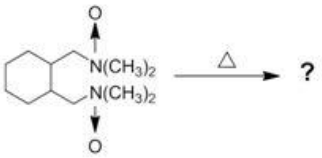
(iv) 

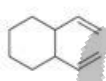
- (i) only
- a mixture of (i) and (ii)
- (ii) only
- a mixture of (iii) and (iv)

Question No.67 4.00

Bookmark

Identify the correct product.



- 
- 
- 
- 

Question No.68 4.00

Bookmark

It takes eight hours for a 600 km journey, if 120 km is done by train and the rest by car. It takes 20 minutes more, if 200 km is done by train and the rest by car. The ratio of the speed of the train to that of the cars is:

- 1:2
- 2:3
- 3:4
- 1:4

Question No.69 4.00

Bookmark

The ground state term symbol for O_2^{2+} molecule is:-

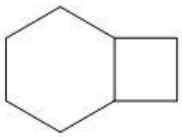
- $^2\Pi_g$

- $^3\Sigma_g^-$
- $^3\Pi_u$
- $^1\Sigma_g^+$

Question No.70 4.00

Bookmark

IUPAC nomenclature of the following compound is



- Bicyclo [4.2.0] octane
- Bicyclo [4.2.2] octane
- Bicyclo [6.2.0] octane
- Bicyclo [6.2.2] octane

Question No.71 4.00

Bookmark

Use molecular orbital theory to determine the bond order for the O_2^+ ion in its ground state:-

- 2
- 3
- 2 ½
- 1 ½

Question No.72 4.00

Bookmark

Aluminum chloride melts at a much lower temperature than that of sodium chloride, because:-

- aluminum chloride is polymeric
- aluminum chloride is dimeric
- Al-Cl bond is highly covalent while NaCl is ionic
- the Al-Cl bond is more ionic than that of Na-Cl

Question No.73 4.00

Bookmark

$M(CH_2CHCH_2)$ complex does not have interaction between:-

- LGO with d_{xy} and $d_{x^2-y^2}$
- LGO with d_{xz} and d_{yz}
- LGO with d_{xz} and $d_{x^2-y^2}$
- LGO with d_{xz} and d_{z^2}

Question No.74 4.00

Bookmark

The oxidation state of iron in Haemoglobin is

- 1

- 0
- 3
- 2

Question No.75 4.00

Bookmark

The number of chemical shift non equivalent protons expected in ^{1}H NMR spectrum of α-Pinene is

- 8
- 9
- 7
- 10

Question No.76 4.00

Bookmark

The structures of XeF_2 and XeO_2F_2 respectively are

- linear, square planar
- bent, tetrahedral
- linear, see-saw
- bent, see-saw

Question No.77 4.00

Bookmark

Study the following information carefully and answer the question below it

The Director of an MBA college has decided that six guest lectures on the topics of Motivation, Decision Making, Quality Circle, Assessment Centre, Leadership and Group Discussion are to be organised on each day from Monday to Sunday.
(i) One day there will be no lecture (Saturday is not that day), just before that day Group Discussion will be organised.
(ii) Motivation should be organised immediately after Assessment Centre.
(iii) Quality Circle should be organised on Wednesday and should not be followed by Group Discussion
(iv) Decision Making should be organised on Friday and there should be a gap of two days between Leadership and Group Discussion

How many lectures are organised between Motivation and Quality Circle?

- Three
- Two

- Two
- One
- Four

Question No.78 4.00

Bookmark

Assertion: - India's president is appointed on a five-year term

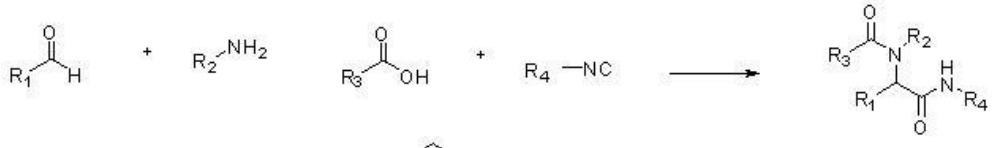
Reason: -PratibhaPatil was appointed as India's first woman president in 2007

- A is true but R is false
- Both A and R are true and R is not the correct explanation of A
- Both A and R are true and R is the correct explanation of A
- A is false but R is true

Question No.79 4.00

Bookmark

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:



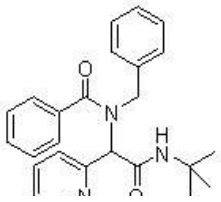
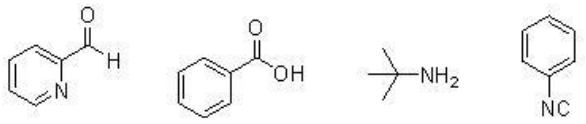
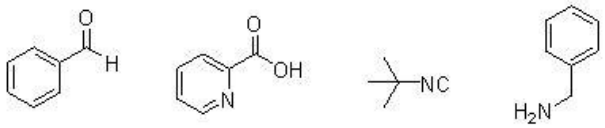
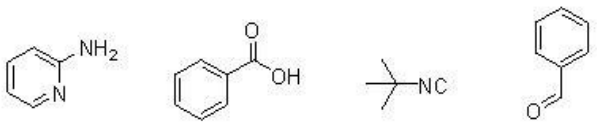
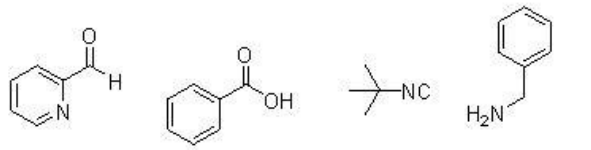


Fig.A

- 
- 
- 
- 

Question No.80 4.00

Bookmark

The biological role of ferritin is:-

- iron storage
- electron transfer
- oxygen storage
- metal transport

Question No.81 4.00

Bookmark

What is the symmetry of the antibonding molecular orbital formed by a linear combination of the p_x or p_y atomic orbitals in a homonuclear diatomic molecule?

- π_u
- σ_g
- σ_u

- π_q

Question No.82 4.00

Bookmark

H_2 and CO can be produced from one of the following reactions:-

- H_2O reaction with CO_2
- H_2O reaction with C
- H_2O reaction with $Mn(CO)_6$
- H_2O reaction with Na

Question No.83 4.00

Bookmark

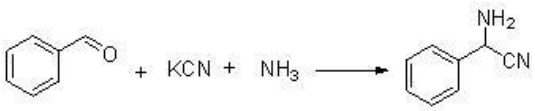
The higher stability of cis dichloro ethylene compared to its trans form is due to:-

- Steric repulsion
- Inter-halogen attraction from weak interactions
- Hydrogen bonding
- Hyper-conjugation

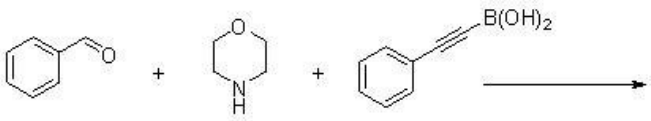
Question No.84 4.00

Bookmark

Based on the following reaction:



the product of the following reaction would be:



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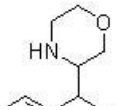
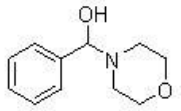
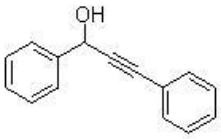
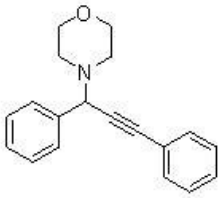








Question No.85 4.00

Bookmark

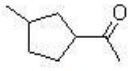
For a d^9 *ion the singly occupied orbital is:-*

- a_{1g}
- b_{2g}
- e_g
- b_{1g}

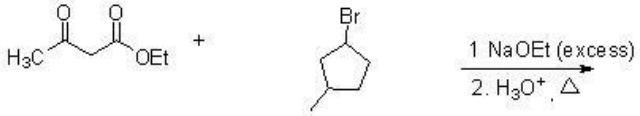
Question No.86 4.00

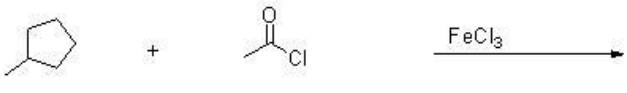
Bookmark

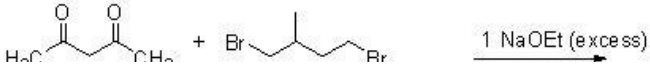
Which of the following reactions will result in the formation of the product (P) given below:

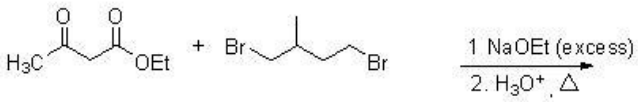


P









Question No.87 4.00

Bookmark

Reduction of $[Co(NH_3)_5Cl]^{2+}$ by $[Cr(H_2O)_6]^{2+}$ is faster owing to:-

- presence of Cl-
- presence of water
- presence of amine
- high oxidation state

Question No.88 4.00

Bookmark

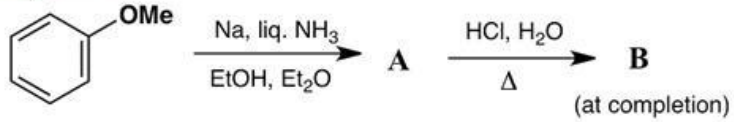
The substitution reaction in $[Co(NH_3)_5Cl]^{2+}$ is faster in the presence of:-

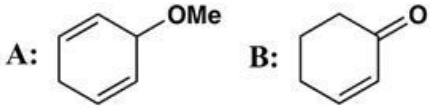
- OH^-
- Pressure
- Photo light
- Metal catalyst

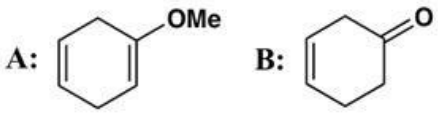
Question No.89 4.00

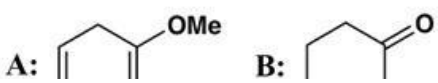
Bookmark

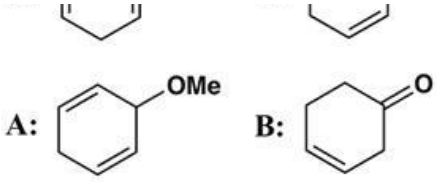
Which combination of compounds in (A)-(D) identifies A and B in the following reaction sequence?











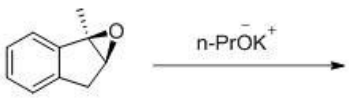
○ A:

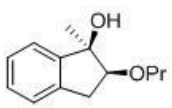
B:

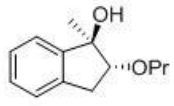
Question No.90 4.00

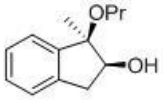
Bookmark ☐

The major product formed in the following reaction is

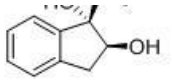


○ 

○ 

○ 

○ 



Question No.91 4.00

Bookmark

Select the option which improves the underlined part of the sentences.
The Prime Minister called on the President.

- in
- No improvement
- by
- to

Question No.92 4.00

Bookmark

In the following reactions,

(i) $Mn_2(CO)_{10} + Na \rightarrow X$

(ii) $X + CH_3COCl \rightarrow Y$ The X and Y respectively are:-

- $[Mn(CO)_5]^-$, $CH_3C(O)Mn(CO)_5$
- $[Mn(CO)_4]^{2-}$, $[CH_3C(O)Mn(CO)_5]^-$
- $[Mn(CO)_4]^{2-}$, $[ClMn(CO)_5]^-$
- $[Mn(CO)_5]^-$, $ClMn(CO)_5$

Question No.93 4.00

Bookmark

Which of the following is an example of extensive property:-

- specific heat at constant volume
- enthalpy

- pressure
- temperature

Question No.94 4.00

Bookmark

The number of normal modes of vibration in H_2S molecule is:-

- 3
- 1
- 2
- 4

Question No.95 4.00

Bookmark

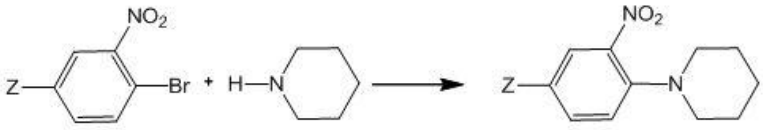
Huckel theory explains stability difference between:-

- Planar vs twisted bi-phenyl
- Benzene vs Dewar benzene
- Anthracene vs phenanthrene
- s-cis vs s-transbuta-diene

Question No.96 4.00

Bookmark

The correct order of the rate constants for the following series of reactions (Z = CF_3/CH_3/OCH_3) is



- $OCH_3 > CF_3 > CH_3$
- $CF_3 > CH_3 > OCH_3$
- $CH_3 > OCH_3 > CF_3$
- $CF_3 > OCH_3 > CH_3$

Question No.97 4.00

Bookmark ☐

Which of the following dimethylcyclobutane is chiral?

- cis-1,3-dimethylcyclobutane
- cis- 1,2-dimethylcyclobutane
- trans-1,2-dimethylcyclobutane
- trans-1,3-dimethylcyclobutane

Question No.98 4.00

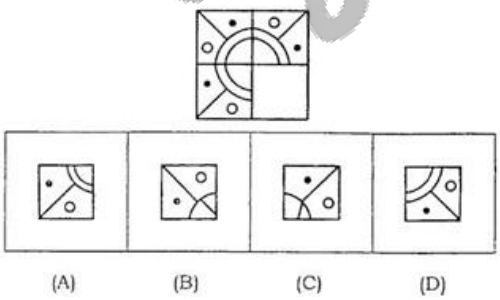
Bookmark ☐

Cis-$Pt(Cl)_2(NH_3)_2$ from one of the following complexes:-

- $PtCl_4$
- Pt, NH_3 and Cl
- $Pt(NH_3)_4$
- $Pt(NH_2)_4$

Question No.99 4.00

Bookmark ☐

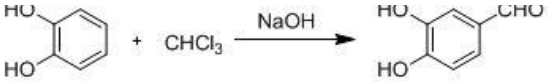


- D
- B
- C
- A

Question No.100 4.00

Bookmark ☐

Intermediate involved in the following reaction is



- CCl_4
- CCl_3
- CH_2Cl_2
- CCl_2