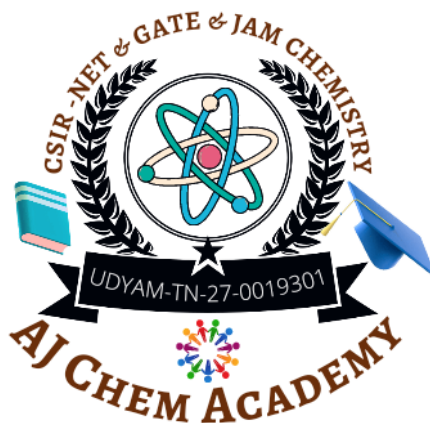


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Q.1 – Q.75 MCQ, carry Three marks each. (for each wrong answer: -1).

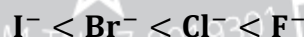
You are required to Answer All Questions.

- According to Slater's rules, the effective nuclear charge (Z_{eff}) for a 2p electron of carbon is
(a) 2.75 (b) 3.25 (c) 4.00 (d) 6.00
- According to the Lewis structure for HNNH, how many σ bonds, π bonds and lone pairs of electrons are present?

	Sigma bonds (σ) ; Pi bonds (π) ; Lone pairs of electrons (n)		
(a)	2	2	2
(b)	3	2	0
(c)	3	1	2
(d)	3	0	4

- Which set of elements has the lowest melting points?
(a) Alkali metals (b) Alkaline earth metals
(c) Transition metals (d) Lanthanide metals
- Given below are two statements:

Statement I : Hard acids form complexes with stabilities in the order :

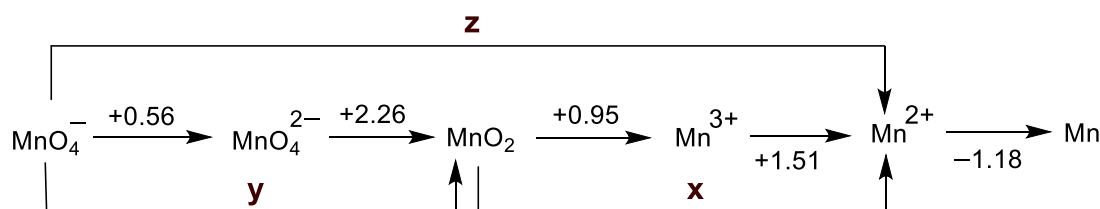


Statement II : Soft acids form complexes with stabilities in the order :



In the light of the above statements, choose the most appropriate answer from the options given below:

- both statement I and statement II are correct
 - both statement I and statement II are incorrect
 - statement I is correct but statement II is incorrect
 - statement I is incorrect but statement II is correct
- The potential diagram for manganese at $[\text{H}^+] = 1$ is given as (values are in V)



x, y and z are

x

y

z

x

y

z

(a) $\overline{+2.46}$; $\overline{+2.82}$; $\overline{+1.32}$ (b) $\overline{+1.23}$; $\overline{+1.69}$; $\overline{+1.51}$ (c) $\overline{+1.23}$; $\overline{+2.07}$; $\overline{+1.32}$ (d) $\overline{+1.23}$; $\overline{+1.38}$; $\overline{+1.51}$ 6. Which of these characteristics describe the **PCl₃ molecule**?**P. Trigonal planar shape****Q. sp³ hybridized phosphorus atom****R. Polar bonds****S. Nonpolar molecules**

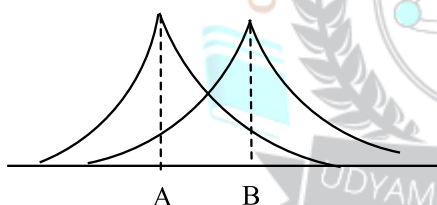
Choose the correct answer from the options given below:

(a) P and Q only

(b) Q and R only

(c) P and S only

(d) Q, R and S only

7. The correct **increasing order of bond angle** among **F₂O**, **Cl₂O** and **Br₂O** is(a) F₂O < Cl₂O < Br₂O(b) F₂O < Cl₂O = Br₂O(c) Cl₂O < F₂O < Br₂O(d) Br₂O < Cl₂O < F₂O8. What is the **ground state electronic configuration** for the **Cu atom**?(a) 1s² 2s² 2p² 3s² 3p⁶ 3d⁹ 4s²(b) 1s² 2s² 2p⁶ 3s² 3p⁶ 3d¹⁰ 4s¹(c) 1s² 2s² 2p⁶ 3s² 3p⁶ 3d⁸ 4s³(d) 1s² 2s² 2p⁶ 3s² 3p⁶ 3d⁹ 4s¹ 4p¹9. In the **molecular orbital theory**, The following graph represents(a) $\psi_{\text{bonding}} = \psi_A + \psi_B$ (b) $\psi_{\text{antibonding}} = \psi_A - \psi_B$ (c) ψ_A and ψ_B for individual hydrogen atoms

(d) Probability function for bonding orbitals

10. In the given reaction, **Br⁻ ion** is _____,

(a) Oxidizing agent and is oxidized

(b) Oxidizing agent and is reduced

(c) Reducing agent and is oxidized

(d) Reducing agent and is reduced

11. For the **Lanthanides****P. Lanthanides display only the (+3) oxidation state****Q. Oxidation numbers (+2) and (+4) occur when they lead to a noble gas configuration****R. Oxidation numbers (+2) and (+4) are observed when they lead to a half-filled orbital****S. Yb²⁺ has a completely filled f-orbital**

Choose the correct answer from the options given below:

(a) P only

(b) Q and R only

(c) R and S only

(d) Q, R and S only

12. Given below are two statements:

Statement I : The electronic structures of the atoms in the second and third rows of transition metals always follow the pattern of the first row.

Statement II : The electronic configuration of Pd is $[\text{Kr}]4d^{10}5s^0$.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both statement I and Statement II are true
 (b) Both statement I and Statement II are false
 (c) Statement I is true but Statement II is false
 (d) Statement I is false but Statement II is true
13. $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ is a high spin complex that absorbs light at about 1000 nm, corresponding to a transition between ${}^5\text{T}_{2g}$ and ${}^5\text{E}_g$ levels. The wave number of the radiation is
 (a) 100 cm^{-1} (b) 1000 cm^{-1} (c) $10,000\text{ cm}^{-1}$ (d) $1,00,000\text{ cm}^{-1}$
14. The observed magnetic moment of a complex is 1.73 BM. The number of unpaired electrons in the complex is
 (a) 0 (b) 1 (c) 2 (d) 3
15. Given below are two statements: one is labelled as Assertion(A) and the other is labelled as Reason(R):

Assertion(A) : The binding energy of metallic lithium exceeds that of the Li_2 molecule though the Li-Li distance in the metal ($3.03\text{\AA}$) is significantly larger than in the diatomic Li_2 molecule ($2.67\text{\AA}$).

Reason(R) : The bonds in the metal are weaker, but there are more Li-Li bonds in the metal.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true and R is NOT the correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true
16. Given below are two statements:

Statement I : A solvent with a large auto protolysis constant can be used to discriminate between a wide range of acid and base



strengths.

Statement II : Water have a leveling effect that brings all stronger acids down to the acidity of H_3O^+ .

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both statement I and Statement II are true
- (b) Both statement I and Statement II are false
- (c) Statement I is true but Statement II is false
- (d) Statement I is false but Statement II is true

17. The oxidation state of iron in haemoglobin is

- (a) +1
- (b) +2
- (c) +3
- (d) 0

18. Given below are two statements:

Statement I : The Stille coupling uses stannates as the organometallic component.

Statement II : The Suzuki coupling involves organosilyl as the organometallic Component.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both statement I and Statement II are true
- (b) Both statement I and Statement II are false
- (c) Statement I is true but Statement II is false
- (d) Statement I is false but Statement II is true

19. The point group to which CH_4 belongs is

- (a) D_{4h}
- (b) C_{4v}
- (c) C_{4h}
- (d) T_d

20. A particle is considered to be nano when its radius is in the region.

- (a) 10^{-11} to 10^{-10}m
- (b) 10^{-10} to 10^{-9}m
- (c) 10^{-9} to 10^{-8}m
- (d) 10^{-8} to 10^{-7}m

21. The molecular orbital diagram for the C_2^{2-} ion would show which of the following molecular orbitals?

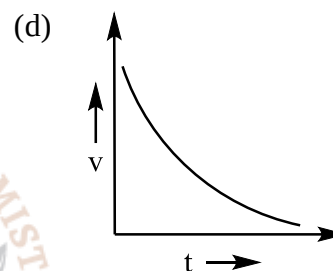
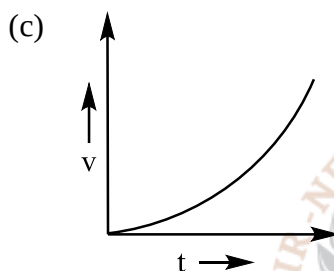
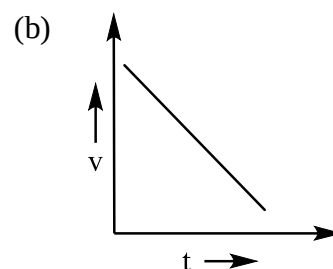
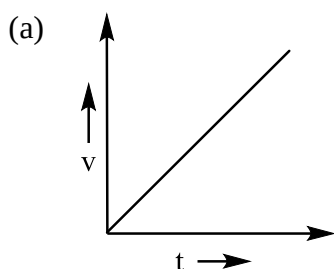
- (a) $(\sigma_{1s})^2 (\sigma_{1s}^*)^2 (\sigma_{2s})^2 (\sigma_{2s}^*)^2 (\pi_{2p})^4$
- (b) $(\sigma_{1s})^2 (\sigma_{1s}^*)^2 (\sigma_{2s})^2 (\sigma_{2s}^*)^2 (\pi_{2p})^4 (\sigma_{2p})^2$
- (c) $(\sigma_{1s})^2 (\sigma_{1s}^*)^2 (\sigma_{2s})^2 (\sigma_{2s}^*)^2 (\pi_{2p})^4 (\sigma_{2p})^2 (\pi_{2p}^*)^2$
- (d) $(\sigma_{1s})^2 (\sigma_{1s}^*)^2 (\sigma_{2s})^2 (\sigma_{2s}^*)^2 (\sigma_{2p})^2 (\pi_{2p})^4$

22. Which one of these hydrogen atom spectra are observed in the visible region?

- (a) $n = 3 \rightarrow n = 2$ (b) $n = 4 \rightarrow n = 3$ (c) $n = 2 \rightarrow n = 1$ (d) $n = 5 \rightarrow n = 4$

23. Identify the graph which shows variable **positive acceleration**

[v = velocity, t = time].

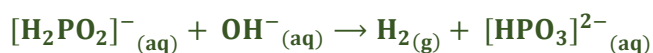


24. Gases P, Q, R and S obey the **vander Waals** equation with 'a' and 'b' values as given (**liter-atm system of units of**)

	P	Q	R	S
a	6	6	6	6
b	1	2	3	4

The gas _____ has the **highest critical temperature**.

- (a) Q (b) R (c) P (d) S
25. Calculate the **number of molecules** with **translational energy** $E_{\text{trans}} = 3.0 \text{ kT}$ relative to that with $E_{\text{trans}} = 2.0 \text{ kT}$. (**Given : $e = 2.72$**)
- (a) 0.37 (b) 0.61 (c) 1.64 (d) 2.72
26. The reaction between **hydroxide ion (OH^-)** and **phosphinate ions (H_2PO_2^-)** has been studied by following the initial rate of formation of the gaseous product.



The results are tabulated below:

S.No	Initial concentration of $[\text{H}_2\text{PO}_2]^-_{(\text{aq})}/\text{mol dm}^{-3}$	Initial concentration of $\text{OH}^-_{(\text{aq})}/\text{mol dm}^{-3}$	Initial rate of $\text{H}_{2(\text{g})}$ evolution $10^{-3} \text{ dm}^3 \text{ min}^{-1}$
1	0.6	1.0	2.3

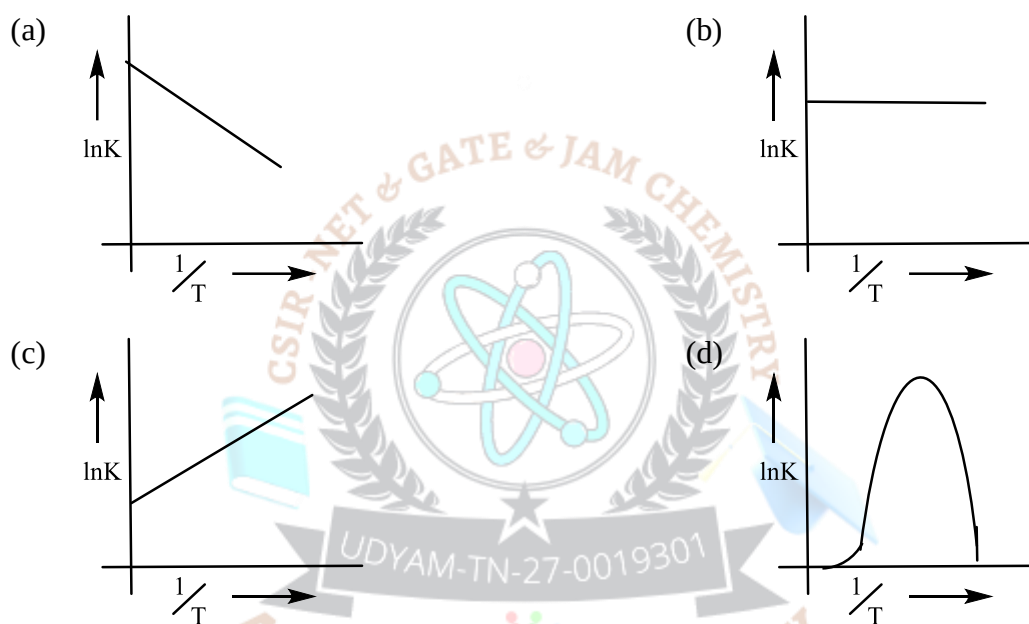
2	0.6	2.0	9.5
3	0.1	6.0	14.4
4	0.2	6.0	28.7

What is the overall reaction order?

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

27. If temperature becomes infinite then identify the correct pattern of the plot

$\ln k$ (k is a rate constant) v/s $\frac{1}{T}$; using Arrhenius equation $[k = Ae^{-\frac{E_a}{RT}}]$



28. Consider a system consisting of 1 mole of a monoatomic gas contained in a piston. What is the temperature change of the gas if $q = 50 \text{ J}$ and $W = -100 \text{ J}$?

(Given: $R = 8.31 \text{ JK}^{-1}\text{mol}^{-1}$)

- (a) -12°C (b) -4°C (c) 4°C (d) 12°C

29. For a cyclic irreversible process, the total work done by the system is:

- (a) always positive (b) always negative (c) equal to zero (d) equal to infinity

30. Which of the following are NOT state functions?

$q + w$	q	w	$H - TS$	$q - w$
<u>P</u>	<u>Q</u>	<u>R</u>	<u>S</u>	<u>T</u>

Choose the most appropriate answer from the options given below:

- (a) P and S only (b) Q and T only (c) Q, R and S only (d) Q, R and T only

31. A solution is prepared by dissolving solute-P in solvent-Q, and it is found that

$\Delta_{\text{mix}} H > 0$; this indicates that:

- (a) P-Q interaction is same as in P-P and Q-Q interactions in the pure liquids
 (b) P-Q interaction is less as compared to P-P and Q-Q interactions in the pure liquids
 (c) P-Q interaction is more as compared to P-P and Q-Q interactions in the pure liquids
 (d) None of the above

32. Match List I with List II :

	List I		List II
P.	Optical Rotation	I.	Stalagmometer
Q.	Refractive Index	II.	Polarimeter
R.	Relative Viscosity	III.	Abbe Refractometer
S.	Surface Tension	IV.	Ostwald Viscometer

Choose the correct answer from the options given below:

P	Q	R	S	P	Q	R	S		
(a)	II	III	IV	I	(b)	II	IV	III	I
(c)	I	IV	II	III	(d)	III	I	II	IV

33. What is the effect of pressure in the following equilibrium reaction:



- (a) Reaction moves in the forward direction with increasing pressure
 (b) Reaction moves in the backward direction with increasing pressure
 (c) Reaction remains unaltered with increasing pressure
 (d) None of the above
34. When a sample of NO_2 is placed in a container, this equilibrium is rapidly established : $2\text{NO}_{2(g)} \rightleftharpoons \text{N}_2\text{O}_{4(g)}$

If this equilibrium mixture is a darker colour at high temperature and at low pressures, which one of these statements about the reaction is true?

- (a) The reaction is endothermic and N_2O_4 is darker in colour than NO_2
 (b) The reaction is endothermic and NO_2 is darker in colour than N_2O_4
 (c) The reaction is exothermic and N_2O_4 is darker in colour than NO_2
 (d) The reaction is exothermic and NO_2 is darker in colour than N_2O_4
35. Correct order of ionic conductance at infinite dilution is:
- (a) $\text{H}^+ > \text{K}^+ > \text{Na}^+ > \text{Li}^+$ (b) $\text{K}^+ > \text{Na}^+ > \text{Li}^+ > \text{H}^+$
 (c) $\text{Na}^+ > \text{K}^+ > \text{H}^+ > \text{Li}^+$ (d) $\text{H}^+ > \text{Na}^+ > \text{K}^+ > \text{Li}^+$
36. Determine the Miller indices for a plane when intercepts along the axes are $2a, 3b, 2c$.

- (a) (2, 3, 2) (b) (3, 2, 3) (c) (2, 3, 3) (d) (3, 3, 2)

37. Match List I with List II :

	List I		List II
P.	Triclinic	I.	$a \neq b \neq c$; $\alpha = \beta = 90^\circ$; $\gamma \neq 90^\circ$
Q.	Monoclinic	II.	$a \neq b \neq c$; $\alpha \neq \beta \neq \gamma = 90^\circ$
R.	Orthorhombic	III.	$a = b \neq c$; $\alpha = \beta = \gamma = 90^\circ$
S.	Tetragonal	IV.	$a \neq b \neq c$; $\alpha = \beta = \gamma = 90^\circ$

Choose the correct answer from the options given below:

P	Q	R	S		P	Q	R	S	
(a)	II	I	IV	III	(b)	I	III	IV	II
(c)	II	III	I	IV	(d)	IV	I	III	II

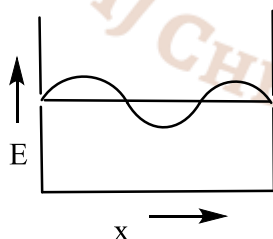
38. The process of removing ions/molecules from a sol by diffusion through a permeable membrane is called

- (a) Ultra-filtration (b) Dialysis (c) Electrodialysis (d) Electrophoresis

39. The order of interatomic distances in B_2 , B_2^- , B_2^+ is

- (a) $B_2 < B_2^+ < B_2^-$ (b) $B_2^+ < B_2 < B_2^-$
 (c) $B_2^- < B_2 < B_2^+$ (d) $B_2 < B_2^- < B_2^+$

40. A wave function for the particle in a box is sketched below: What is the value of the quantum number, x?



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

41. Given below are two statements : one is labelled as Assertion(A) and the other is labelled as Reason(R) :

Assertion(A) : The density of diamond is much higher than that of ice though both solids adopt analogous structures.

Reason(R) : The lattice of ice is held by hydrogen bonds which are significantly weaker than the covalent C–C bonds in diamond.

In the light of the above statements, choose the correct answer from the options given below :

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true but R is the NOT correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true
42. Considering the given nuclear reaction: $^{238}\text{U}_{92} + ^4\text{He}_2 \rightarrow ^M\text{X}_A + ^1\text{n}_0$
 Number of neutrons present in nucleus of X are
 (a) 147 (b) 238 (c) 94 (d) 162
43. A commercial FM radio station operates at 100 MHz. The wavelength, λ , for the radio wave is (Given : $c = 3 \times 10^8 \text{ ms}^{-1}$)
 (a) $3 \times 10^{12} \text{ m}$ (b) 3 m (c) 3 nm (d) 300 nm
44. For the following electrochemical cell
 $\text{Cu}_{(s)}|\text{Cu}^{2+}_{(\text{aq})}(1.00 \text{ mol dm}^{-3})||\text{Zn}^{2+}_{(\text{aq})}(1.00 \text{ mol dm}^{-3})|\text{Zn}_{(s)}$
 Choose the correct option in the light of the following standard electrode potentials:
- | Half-reaction | E°/V |
|---|--------------------|
| $\frac{1}{2}\text{Cu}^{2+}_{(\text{aq})} + \text{e}^- \rightarrow \frac{1}{2}\text{Cu}_{(s)}$ | +0.34 V |
| $\frac{1}{2}\text{Zn}^{2+}_{(\text{aq})} + \text{e}^- \rightarrow \frac{1}{2}\text{Zn}_{(s)}$ | -0.76 V |
- (a) The potential of the cell is -1.10 V and the zinc electrode is negative
 (b) The potential of the cell is +1.10 V and the zinc electrode is negative
 (c) The potential of the cell is -1.10 V and the zinc electrode is positive
 (d) The potential of the cell is +1.10 V and the zinc electrode is positive
45. If $\Delta H^\circ_{\text{vap}} = 30.8 \text{ kJ mol}^{-1}$ and $\Delta S^\circ_{\text{vap}} = 87.2 \text{ J mol}^{-1}\text{K}^{-1}$ for benzene, what is the boiling point of benzene? Assume that $\Delta H^\circ_{\text{vap}}$ and $\Delta S^\circ_{\text{vap}}$ are independent of temperature.
 (a) 0.35 °C (b) 353 °C (c) 80 °C (d) 1.0 °C
46. The phosphorescence wavelength is
 (a) longer than the absorption wavelength (b) equal to the absorption wavelength
 (c) shorter than the absorption wavelength (d) equal to the fluorescence wavelength
47. Which of the following statements is false?
 (a) There are four vibration modes in carbon dioxide
 (b) The IR spectrum of CO_2 shows only two absorption bands
 (c) IR active vibration bands must have a change in dipole moment

(d) The bending mode of CO_2 is IR inactive

48. Given below are two statements:

Statement I : Every molecule has a vibrational Raman spectrum.

Statement II : In vibrational Raman spectra, stokes lines are more intense than anti-stokes lines.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are true
- (b) Both Statement I and Statement II are false
- (c) Statement I is true but Statement II is false
- (d) Statement I is false but Statement II is true

49. When two σ -bonds on the same carbon cleave, the following chargeless carbon species will be formed with six electrons in the valence shell.

- (a) Benzyne only
- (b) Carbene only
- (c) Nitrene
- (d) Both carbene and benzyne

50. Given below are two statements : one is labelled as Assertion(A) and the other is labelled as Reason(R) :

Assertion(A) : Cyclopropane is more prone to undergo ring-opening reaction than cyclobutane.

Reason(R) : According to Bayer strain theory, cyclobutane is more highly strained than cyclopropane.

In the light of the above statements, choose the correct answer from the options given below :

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true and R is NOT the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

51. Given below are two statements:

Statement I : E_2 reaction follows second-order kinetics and not accompanied by rearrangements.

Statement II : E_2 reaction shows large hydrogen isotope effect.

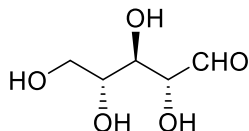
In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are true



- (b) Both Statement I and Statement II are false
 (c) Statement I is true but Statement II is false
 (d) Statement I is false but Statement II is true

52. The absolute configuration (R/S configuration) of the following molecule is



- (a) 2R, 3R, 4R (b) 2R, 3S, 4R
 (c) 2S, 3R, 4R (d) 2R, 3R, 4S

53. Match List I with List II :

	List I		List II
P		I	Aromatic
Q		II	Anti-aromatic
R		III	Homo-aromatic
S		IV	Non-aromatic

Choose the correct answer from the options given below:

P	Q	R	S	P	Q	R	S
(a) II ; III ; I ; IV	(b) IV ; II ; I ; III						
(c) I ; II ; III ; IV	(d) III ; II ; I ; IV						

54. Given below are two statements:

Statement I : The rate of S_N1 reaction depends on both the carbon skeleton and the nucleophile.

Statement II : The rate of S_N2 reaction depends on the carbon skeleton, the leaving group and the nucleophile.

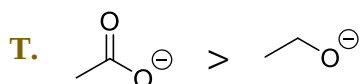
In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are true
 (b) Both Statement I and Statement II are false

(c) Statement I is true but Statement II is false

(d) Statement I is false but Statement II is true

55. Which of the following trends of nucleophilicity is **not correct**?



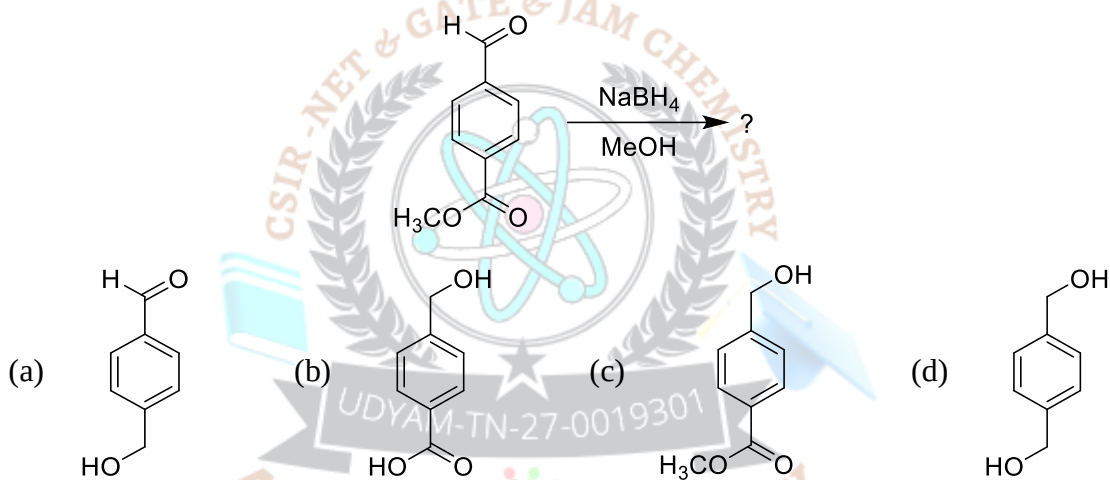
(a) P and R only

(b) P and T only

(c) Q and S only

(d) R and T only

56. The **major product** of the following reaction is



57. The reaction between **methylbromide** and **sodium t-butoxide** delivers

(a) t-butyl methyl ether

(b) t-butyl alcohol

(c) dimethyl ether

(d) di-t-butyl ether

58. Match List I with List II :

	List I		List II
P.	Aldehyde + NH_2OH	I.	Semicarbazone
Q.	Aldehyde + $\text{NH}_2\text{-NH}_2$	II.	Phenylhydrazone
R.	Aldehyde + PhNH-NH_2	III.	Oxime
S.	Aldehyde + $\text{NH}_2\text{-NHCONH}_2$	IV.	Hydrazone

Choose the correct answer from the options given below:

	P	Q	R	S
(a)	III	IV	II	I
(b)	III	I	II	IV
(c)	IV	III	I	II
(d)	I	IV	II	III

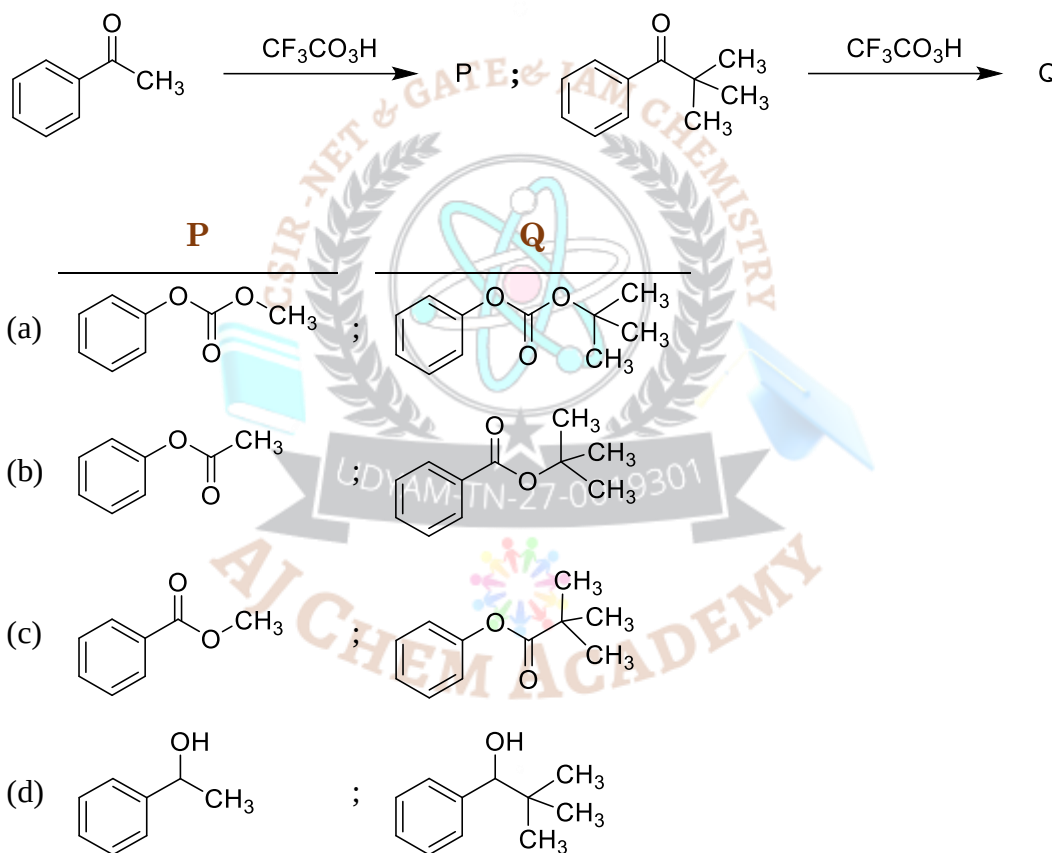
59. Given below the following statements

- P.** p-nitrophenol is more acidic than phenol
Q. p-nitrophenol is less acidic than 3,5-dimethyl-4-nitro-phenol
R. Phenols acidity is based on the stability of the corresponding conjugate bases
S. p-methoxyphenol is more acidic than phenol
T. Phenols are more acidic than alcohols

Choose the correct answer from the options given below:

- (a) P, Q, R, T only (b) P, Q, S, T only (c) P, R, T only (d) P, T only

60. The **major products** of the following reactions respectively are,

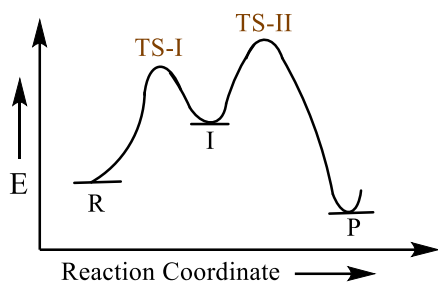


61. The **order of acidity** of the following **carboxylic acids** is,



- (a) S > R > Q > P (b) S > R > P > Q
 (c) P > Q > R > S (d) Q > P > R > S

62. The **first** and **second steps** of the below two-step reaction respectively are,



- (a) Endothermic and Endothermic
 (b) Endothermic and Exothermic
 (c) Exothermic and Exothermic
 (d) Exothermic and Endothermic

63. The **major product** formed in the reaction between **n-butane** and **chlorine** under **photochemical condition** is

- (a) 1-chlorobutane (b) 1,2-dichlorobutane (c) 2-chlorobutane (d) 1,3-dichlorobutane

64. Given below are two statements:

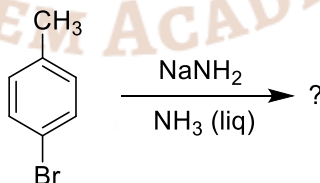
Statement I : Any molecule which has a plane of symmetry or a centre of symmetry is achiral.

Statement II : Compounds that contain stereogenic centres but are themselves achiral are called meso-compounds.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are true
 (b) Both Statement I and Statement II are false
 (c) Statement I is true but Statement II is false
 (d) Statement I is false but Statement II is true

65. The **major product(s)** of the following reaction is(are)?



- (a) (b) (c) (d) and

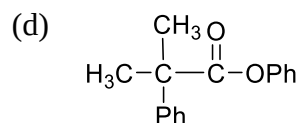
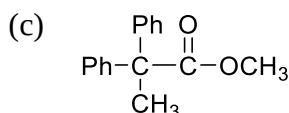
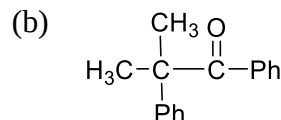
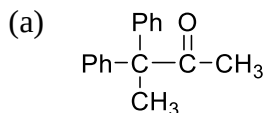
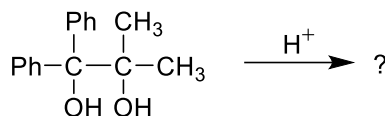
66. Consider the following statements

- P.** The addition of HBr to unsymmetrical alkenes is Markovnikov addition
Q. In the presence of peroxides, Anti-Markovnikov product is formed
R. E₂ elimination at bridgehead position is easy to occur
S. S_N2 reaction at vinylic positions is difficult to occur

Choose the correct answer from the options given below:

- (a) P, Q and R only (b) P and S only (c) Q and S only (d) P, Q and S only

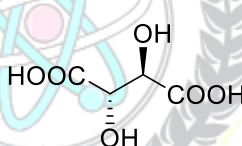
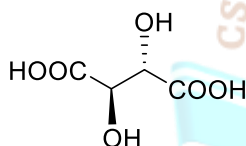
67. The **major product** of the following rearrangement reaction is



68. The **Claisen condensation** of **ethyl acetate** in the presence of **sodium ethoxide** delivers

- (a) $\text{CH}_3\text{COCH}_2\text{COCH}_3$ (b) $\text{CH}_3\text{COCH}_2\text{CO}_2\text{Et}$ (c) $(\text{CH}_2\text{CO}_2\text{Et})_2$ (d) $\text{CH}_3\text{COCH}_2\text{CO}_2\text{H}$

69. How the following compounds are **related to each other**?



- (a) Diastereomers
(b) Enantiomers
(c) Identical
(d) Epimers

70. The **stereochemical requirement** for **E2 elimination** is :

- (a) syn-periplanarity (b) anti-periplanarity
(c) Both syn and anti periplanarity (d) No stereochemical requirement

71. Given below are two statements, one is labelled as **Assertion(A)** and the other is labelled as **Reason(R)** :

Assertion(A) : In ethylene glycol, skew conformation is more stable than staggered conformation.

Reason(R) : staggered conformation is unstable due to steric hindrance.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

72. Given below are two statements, one is labelled as **Assertion(A)** and the other is

labelled as **Reason(R)** :

Assertion(A) : Methoxymethyl chloride undergoes hydrolysis more than 10^4 times Faster than methyl chloride.

Reason (R) : Methoxymethyl chloride undergoes S_N1 mechanism.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true and R is NOT the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

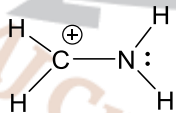
73. Consider the following reactions involving S_N2 mechanism:



Which of the above reactions will be accelerated upon increasing solvent ionizing power:

- (a) Only P
- (b) Only Q
- (c) Only R
- (d) Both P and R

74. Given below are two statements:

Statement I :  is stabilized by resonance.

Statement II : In the above structure, formal charges on C and N are +1 and -1 respectively.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are true
 - (b) Both Statement I and Statement II are false
 - (c) Statement I is true but Statement II is false
 - (d) Statement I is false but Statement II is true
75. Reaction of **Z-2-phenyl-2-butene** with bromine leads to 63% anti addition and 37% syn addition, while that of **Z-2-butene** leads to 100% anti addition. This can be explained as :

P. Formation of an intermediate three membered ring cation (bromonium ion)

- Q.** Interaction of π -bond of the alkene and diatomic bromine molecule leads to polarization of bromine molecule.
- R.** Bromonium ion is more stable than the corresponding open carbocation intermediate.
- S.** Bromonium ion is less stable than the corresponding open carbocation Intermediate.

Correct answer is:

- (a) P and R (b) P and S (c) P, Q and R (d) S only

Answer Key

Q.No	Ans	Q.No	Ans	Q.No	Ans	Q.No	Ans	Q.No	Ans
1.	b	16.	a	31.	b	46.	a	61.	b
2.	c	17.	b	32.	a	47.	d	62.	b
3.	a	18.	c	33.	c	48.	a	63.	c
4.	a	19.	d	34.	d	49.	b	64.	a
5.	b	20.	c	35.	a	50.	c	65.	b
6.	b	21.	b	36.	b	51.	a	66.	d
7.	a	22.	a	37.	a	52.	a	67.	a
8.	b	23.	c	38.	b	53.	d	68.	b
9.	c	24.	c	39.	c	54.	d	69.	c
10.	c	25.	a	40.	c	55.	d	70.	b
11.	d	26.	c	41.	a	56.	c	71.	c
12.	d	27.	b	42.	a	57.	a	72.	a
13.	c	28.	b	43.	b	58.	a	73.	b
14.	b	29.	b	44.	c	59.	c	74.	c
15.	a	30.	d	45.	c	60.	b	75.	d



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