



## CUET PG Forensic Science Practice Test 12 PDF

### Topic -> GENERAL CHEMISTRY (50 M.C.Q)

- Q1. According to Stark–Einstein law, the primary photochemical step involves:
- One photon per reaction chain
  - One molecule absorbing multiple photons
  - One photon activating one molecule
  - One photon activating one mole
- Q2. In Jablonski diagram, intersystem crossing occurs between:
- Same spin states
  - Different multiplicity states
  - Vibrational levels only
  - Rotational levels only
- Q3. Quantum yield greater than unity indicates:
- Thermal reaction
  - Chain reaction
  - Forbidden transition
  - Zero-order kinetics
- Q4. Fluorescence lifetime typically lies in:
- Seconds
  - Milliseconds
  - Nanoseconds
  - Minutes
- Q5. Phosphorescence differs from fluorescence because it involves:
- Spin allowed transition
  - Triplet to singlet transition
  - Vibrational relaxation
  - Internal conversion only
- Q6. Photosensitization requires:
- Lower triplet energy of sensitizer than substrate
  - Higher triplet energy of sensitizer than substrate
  - Equal singlet energy
  - Direct photon absorption by substrate
- Q7. Delocalized bonding (Resonance) leads to a decrease in:
- Molecular stability
  - Total potential energy of the molecule
  - Bond order uniformity
  - Electron mobility
- Q8. Shortest C–C bond occurs in:
- Ethane
  - Ethene
  - Ethyne
  - Benzene
- Q9. Maximum bond angle distortion from tetrahedral occurs in:
- CH<sub>4</sub>
  - NH<sub>3</sub>
  - H<sub>2</sub>O
  - CCl<sub>4</sub>
- Q10. Cyclohexane boat form is less stable due to:
- Angle strain only
  - Torsional strain only
  - Flagpole interactions
  - Hyperconjugation loss
- Q11. Phenol is more acidic than alcohol due to:
- +I effect
  - I effect
  - Resonance stabilization
  - Hydrogen bonding
- Q12. Ether cleavage by HI proceeds fastest for:
- Methyl ether
  - Primary ether
  - Tertiary ether
  - Aryl ether
- Q13. Aldehydes show greater reactivity than ketones because:
- +I effect lower
  - Steric hindrance lower
  - Resonance higher
  - Hyperconjugation absent
- Q14. Carboxylic acid dimerization occurs via:
- Ionic bonding
  - Covalent bonding
  - Double H-bonding
  - $\pi$ – $\pi$  stacking
- Q15. sp hybridization gives bond angle:
- 109.5°
  - 120°
  - 180°
  - 90°
- Q16. Across a period, electron affinity trend is mainly controlled by:
- Shielding only
  - Nuclear charge only
  - Effective nuclear charge
  - Atomic mass

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Q17. Highest second ionization energy occurs for:

- A) Na
- B) Mg
- C) Al
- D) Si

Q18. Hard acids prefer binding with:

- A) Soft bases
- B) Hard bases
- C)  $\pi$  bases
- D) Neutral ligands

Q19. Bronsted base must:

- A) Donate electron pair
- B) Accept proton
- C) Donate proton
- D) Accept electron pair

Q20. Lewis acidity increases with:

- A) Electron density
- B) Orbital availability
- C) Proton affinity
- D) Bond energy

Q21. Porphyrin ring coordinates metal via:

- A) Oxygen atoms
- B) Nitrogen atoms
- C) Sulfur atoms
- D) Carbon atoms

Q22. In hemoglobin, iron oxidation state is:

- A) 0
- B) +1
- C) +2
- D) +3

Q23. Diamagnetic substances have:

- A) One unpaired electron
- B) Paired electrons only
- C) High spin state
- D) Ferromagnetic domains

Q24. Paramagnetism is proportional to:

- A) T
- B)  $1/T$
- C)  $T^2$
- D) Independent of T

Q25. Spin-only magnetic moment formula is:

- A)  $\sqrt{n(n+1)}$  BM
- B)  $\sqrt{n(n+2)}$  BM
- C)  $n^2$  BM
- D)  $2n$  BM

Q26. L-S coupling dominates in:

- A) Heavy atoms
- B) Light atoms
- C) Lanthanides
- D) Actinides

Q27. Term symbol multiplicity equals:

- A)  $2L+1$
- B)  $2S+1$
- C)  $J+1$
- D)  $S+1$

Q28. Internal conversion is:

- A) Radiative decay
- B) Non-radiative singlet transition
- C) Triplet emission
- D) Vibronic coupling

Q29. Energy transfer without photon emission is:

- A) Fluorescence
- B) Phosphorescence
- C) Dexter transfer
- D) Scattering

Q30. Grothuss-Draper law states:

- A) All light absorbed causes reaction
- B) Only absorbed light is effective
- C) Emitted light drives reaction
- D) Reflected light reacts

Q31. Alkene stability increases with:

- A) Less substitution
- B) More substitution
- C) No hyperconjugation
- D) Less resonance

Q32. Hyperconjugation involves:

- A)  $\sigma \rightarrow \pi$  overlap
- B)  $\pi \rightarrow \pi$  overlap
- C)  $n \rightarrow \sigma$  overlap
- D)  $d \rightarrow p$  overlap

Q33. Bond energy is highest in:

- A) F-F
- B) Cl-Cl
- C) O=O
- D)  $N \equiv N$

Q34. Delocalization energy is maximum in:

- A) Butadiene
- B) Benzene
- C) Ethene
- D) Cyclobutadiene

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Q35. Aromaticity requires:

- A)  $4n$  electrons
- B)  $4n+2$  electrons
- C) Planarity only
- D)  $sp^3$  carbons

Q36. Acid strength increases with:

- A) Stronger H–A bond
- B) Weaker H–A bond
- C) Lower polarity
- D) Higher pKa

Q37. Trace elements act mainly as:

- A) Buffers
- B) Enzyme cofactors
- C) Solvents
- D) Structural lipids

Q38. Magnetic susceptibility of ferromagnets is:

- A) Small negative
- B) Small positive
- C) Very large positive
- D) Zero

Q39. In photochemical reactions rate depends on:

- A) Temperature only
- B) Light intensity
- C) Pressure only
- D) Catalyst only

Q40. Forbidden transitions become allowed due to:

- A) Spin–orbit coupling
- B) Shielding
- C) Hybridization
- D) Induction

Q41. Ketones resist oxidation due to:

- A) No  $\alpha$ -H
- B) Steric hindrance
- C) No H on carbonyl C
- D) Resonance

Q42. Strongest  $-I$  effect group:

- A)  $-CH_3$
- B)  $-Cl$
- C)  $-NO_2$
- D)  $-OH$

Q43. Cyclopropane instability is due to:

- A) No strain
- B) Angle strain
- C) Resonance
- D) Aromaticity

Q44. Ether boiling point is lower than alcohol because:

- A) Less mass
- B) No H-bond donation
- C) More polarity
- D) More branching

Q45. Triplet state has:

- A) Paired spins
- B) Parallel spins
- C) Zero spin
- D) Fractional spin

Q46. Photosensitizer must absorb:

- A) Less energy than substrate
- B) More energy than substrate
- C) Same energy
- D) No energy

Q47. Paramagnetic moment deviation occurs due to:

- A) Orbital contribution
- B) Mass effect
- C) Temperature error
- D) Pressure effect

Q48. L value for D term is:

- A) 1
- B) 2
- C) 3
- D) 4

Q49. Singlet oxygen is:

- A) Ground state
- B) Excited state
- C) Radical pair
- D) Ion

Q50. Most stable conformation of ethane is:

- A) Eclipsed
- B) Staggered
- C) Planar
- D) Twisted



## Answer Key

Q1:C, Q2:B, Q3:B, Q4:C, Q5:B, Q6:B, Q7:B, Q8:C, Q9:C, Q10:C, Q11:C, Q12:C, Q13:B, Q14:C, Q15:C, Q16:C, Q17:A, Q18:B, Q19:B, Q20:B, Q21:B, Q22:C, Q23:B, Q24:B, Q25:B, Q26:B, Q27:B, Q28:B, Q29:C, Q30:B, Q31:B, Q32:A, Q33:D, Q34:B, Q35:B, Q36:B, Q37:B, Q38:C, Q39:B, Q40:A, Q41:C, Q42:C, Q43:B, Q44:B, Q45:B, Q46:B, Q47:A, Q48:B, Q49:B, Q50:B.

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