

**University of Mumbai**  
**Examination 2020 under cluster PCOE**

Program: Chemical Engineering

Curriculum Scheme: Rev2016

Examination: Second Year Semester III

Course Code: CHC302 Course Name: Engineering Chemistry-I

Time: 1 hour

Max. Marks: 50

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For the students:- All the Questions are compulsory and carry equal marks .

|           |  |
|-----------|--|
| Q1.       | In photochemical reactions, absorption of _____ radiation takes place. |
| Option A: | UV   |
| Option B: | UV & Visible   |
| Option C: | UV & Visible & X-rays  |
| Option D: | UV & Visible & IR  |
|           |  |
| Q2.       | Calculate the bond order of NO molecule-                               |
| Option A: | 2  |
| Option B: | 1.5  |
| Option C: | 2.5  |
| Option D: | 3  |
|           |  |
| Q3.       | The EAN of Cu in $[\text{Cu}(\text{CN})_4]^{3-}$ is-                   |
| Option A: | 54   |
| Option B: | 36   |
| Option C: | 32   |
| Option D: | 56   |
|           |  |
| Q4.       | Geometry of xenon tetrafluoride is-                                    |
| Option A: | Trigonal bipyramid   |
| Option B: | Octahedral   |
| Option C: | Tetrahedral  |
| Option D: | Square planar  |
|           |  |
| Q5.       | The order of stability of Carbocation is-                              |
| Option A: | Benzyl carbocation > Allyl carbocation > Ethyl carbocation             |
| Option B: | Ethyl carbocation > Allyl Carbocation > Benzyl carbocation             |
| Option C: | Ethyl carbocation > Benzyl carbocation > Allyl Carbocation             |
| Option D: | Allyl Carbocation > Benzyl carbocation > Ethyl carbocation             |
|           |  |
| Q6.       | $\Delta G$ for photochemical spontaneous reaction -----                |
| Option A: | Is negative  |
| Option B: | Is positive  |
| Option C: | May be positive or negative  |
| Option D: | Can be zero  |
|           |  |
| Q7.       | Geometric isomerism can not occur in complexes                         |
| Option A: | $\text{M}(\text{aa})_2\text{b}_2$                                      |
| Option B: | $\text{Ma}_6$  |

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| Option C: | Mabcdef   |
| Option D: | $M(ab)_3$   |
|           |   |
| Q8.       | During Friedel Craft's methylation of toluene m-xylene is formed at elevated temperature. Which type of product is it known as? |
| Option A: | Kinetically controlled product  |
| Option B: | Equilibrium controlled product  |
| Option C: | Rate controlled product   |
| Option D: | By product  |
|           |   |
| Q9.       | IUPAC name of given coordination compound $NH_4[Cr(NH_3)_2(NCS)_4]$ is--  |
| Option A: | tetra ammonium tetra thiocyanato-N diammine chromate (III)  |
| Option B: | Ammonium tetra thiocyanato-N diammine chromate (III)  |
| Option C: | Ammonium diammine tetrathiocyanato-N Chromate (III)   |
| Option D: | Ammonium tetra thiocyanato diammine chromium (III)  |
|           |   |
| Q10.      | The bond order of $Be_2$ is---  |
| Option A: | 2   |
| Option B: | 3   |
| Option C: | 0   |
| Option D: | 2.5   |
|           |   |
| Q11.      | Which of the following statements regarding Friedel-Crafts reactions is wrong?  |
| Option A: | Alkylation of benzene with an alkyl chloride requires only a catalytic amount of a Lewis acid such as aluminum chloride.        |
| Option B: | Alkylation of benzene with an alcohol requires only a catalytic amount of a Brønsted acid such as phosphoric acid.              |
| Option C: | Acetylation of benzene with acetyl chloride requires only a catalytic amount of a Lewis acid.                                   |
| Option D: | Acetylation of benzene with acetic anhydride requires more than one equivalent of a Lewis acid.                                 |
|           |   |
| Q12.      | Which is the incorrect statement from the following....   |
| Option A: | Transition state is definite molecular species  |
| Option B: | Transition state has the highest free energy in course of reaction  |
| Option C: | Transition state is less stable than intermediate   |
| Option D: | Transition state cannot be isolated   |
|           |   |
| Q13.      | Sulphonation of Naphthalene gives $\alpha$ -isomer as a major product at what $^{\circ}C$ ?                                     |
| Option A: | 160   |
| Option B: | 80  |
| Option C: | 120   |
| Option D: | 40  |
|           |   |
| Q14.      | Factors that affect the stability of carbanions-  |
| Option A: | Resonance   |
| Option B: | s-character of the carbon bearing negative charge   |
| Option C: | Hyper conjugation   |

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| Option D: | Both A and B  |
| Q15.      | Carbon in the triplet carbenes is .....hybridised   |
| Option A: | sp <sup>3</sup>   |
| Option B: | sp <sup>2</sup>   |
| Option C: | sp  |
| Option D: | None  |
| Q16.      | Michael reaction takes place via formation of....   |
| Option A: | Carbocation   |
| Option B: | Carbanion   |
| Option C: | Carbene   |
| Option D: | Carbon free radical   |
| Q17.      | Which of the following is the correct order of increasing field strength of ligands to form coordination compounds? |
| Option A: | SCN <sup>-</sup> < F <sup>-</sup> < C <sub>2</sub> O <sub>4</sub> <sup>2-</sup> < CN <sup>-</sup>                   |
| Option B: | SCN <sup>-</sup> < F <sup>-</sup> < CN <sup>-</sup> < C <sub>2</sub> O <sub>4</sub> <sup>2-</sup>                   |
| Option C: | F <sup>-</sup> < SCN <sup>-</sup> < C <sub>2</sub> O <sub>4</sub> <sup>2-</sup> < CN <sup>-</sup>                   |
| Option D: | CN <sup>-</sup> < C <sub>2</sub> O <sub>4</sub> <sup>2-</sup> < SCN <sup>-</sup> < F <sup>-</sup>                   |
| Q18.      | Stark Einstein law states that:   |
| Option A: | Only that light which is absorbed by a system can bring about a photochemical change                                |
| Option B: | For each photon of light absorbed by a chemical system, all molecules are activated for subsequent reaction.        |
| Option C: | For each photon of light absorbed by a chemical system, few molecules are activated for subsequent reaction.        |
| Option D: | For each photon of light absorbed by a chemical system, only one molecule is activated for subsequent reaction.     |
| Q19.      | Zinc deficiency causes  |
| Option A: | impaired growth in humans   |
| Option B: | Suffocation   |
| Option C: | Headache  |
| Option D: | Nervous disorder  |
| Q20.      | Heme molecule with ----ion combines with higher amount of oxygen.   |
| Option A: | Ferrous   |
| Option B: | Ferric  |
| Option C: | Iron  |
| Option D: | Copper  |
| Q21.      | The geometry of Iron Pentacarbonyl is--   |
| Option A: | Tetrahedral   |
| Option B: | Square planar   |
| Option C: | Trigonal bipyramidal  |
| Option D: | Square pyramidal  |

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| Q22.      | Nitration of naphthalene is a -                                 |
| Option A: | Kinetically controlled reaction                                 |
| Option B: | Thermodynamically controlled reaction                           |
| Option C: | Hyper conjugation   |
| Option D: | None of the above   |
| Q23.      | The phosphorescence is otherwise known as                       |
| Option A: | delayed fluorescence  |
| Option B: | Electroluminescence   |
| Option C: | bioluminescence   |
| Option D: | chemiluminescence   |
| Q24.      | The CFSE value of $d^7$ octahedral complex in strong field is-- |
| Option A: | $-8Dq+2P$   |
| Option B: | $-8Dq+3P$   |
| Option C: | $-18Dq+3P$  |
| Option D: | $-18Dq+2P$  |
| Q25.      | Molecular geometry of $SF_4$ is--                               |
| Option A: | Plane triangle  |
| Option B: | Octahedral  |
| Option C: | Trigonal bipyramidal  |
| Option D: | Pentagonal bipyramid  |