

QUAID-I-AZAM UNIVERSITY, ISLAMABAD  
DEPARTMENT OF CHEMISTRY

Marks: 40

MPhil Admission Test (Fall Semester 2020)

Date: \_\_\_\_\_

Time: 60 Min.

**Inorganic/Analytical Chemistry**

Name \_\_\_\_\_ Roll No. \_\_\_\_\_ Signature \_\_\_\_\_

**Note:-** Attempt all questions. Encircle the correct option/s in each of the following statements. Forty (40) such questions will be given

- Plants look green due to the absorption of
  - Green Light
  - Blue light
  - Red light
  - Yellow light
- Center of distribution is given by
  - Mean
  - Mode
  - Average
  - Standard deviation
- Change in concentration during titration is measured by
  - Conductivity
  - Voltammetry
  - Coulometry
  - Polarography
- In Raman spectroscopy the most intense line is
  - Stoke
  - Anti-stoke
  - Rayleigh
  - none of these
- The solubility of barium sulphate at 25°C is  $1.05 \times 10^{-5} \text{ mol dm}^{-3}$ . The solubility product
  - $1.10 \times 10^{-10} \text{ mol dm}^{-1}$
  - $1.10 \times 10^{-10} \text{ mol}^2 \text{ dm}^{-6}$
  - $0.001 \text{ mol dm}^{-1}$
  - $10.5 \times 10^{-6} \text{ mol}^2 \text{ dm}^{-6}$
- Lamp used in flame photometry is
  - HCL
  - Xe
  - Deuterium
  - none of these
- Among the following, the secondary pollutant is
  - PAN
  - CO<sub>2</sub>
  - NO<sub>x</sub>
  - SO<sub>x</sub>
- Which of the following complex ion is tetrahedral?
  - [PdCl<sub>4</sub>]<sup>2-</sup>
  - [Ni(CN)<sub>4</sub>]<sup>2-</sup>
  - [NiCl<sub>4</sub>]<sup>2-</sup>
  - [AuCl<sub>4</sub>]<sup>-</sup>
- What is the order of decreasing vibrational frequency for
  - C — Cl
  - C — Br
  - C — C d) C — O
  - C — H
  - a>b>c>d>e
  - e>b>a>c>d
  - d>e>a>b>c
  - b>a>e>c>d

10. The relation between dipole magnetic moment ( $\mu$ ) and nuclear spin ( $I$ ) is given by a constant called
- i) Gyromagnetic ratio ( $\gamma$ )      ii) Planck's constant ( $h$ )  
 iii) Nuclear susceptibility ( $\chi$ )      iv) Chemical shift ( $\delta$ )
11. Which of the following has exchangeable protons with water
- i)  $\text{CH}_3\text{OH}$       ii)  $(\text{CH}_3)_3\text{N}$   
 iii)  $(\text{CH}_3)_2\text{O}$       iv)  $\text{CH}_3\text{Br}$
12. Which of the following is tetrahedral?
- i)  $[\text{PtCl}_4]^{2-}$       ii)  $[\text{PdCl}_4]^{2-}$   
 iii)  $[\text{AuCl}_4]^-$       iv)  $[\text{NiCl}_4]^{2-}$
13. Which of the following molecule has center of symmetry
- i)  $\text{CH}_4$       ii)  $\text{NH}_3$   
 iii)  $\text{H}_2$       iv)  $\text{PCl}_3$
14. Conc.  $\text{HNO}_3$  upon thermal decomposition give
- i)  $\text{NO}$       ii)  $\text{NO}_2 + \text{O}_2$   
 iii)  $\text{N}_2 + \text{O}_2$       iv)  $\text{NO}_3^-$
15.  $\text{CO}_2$  is isostructural to
- i)  $\text{HgCl}_2$       ii)  $\text{SiO}_2$   
 iii)  $\text{SO}_2$       iv)  $\text{NO}_2$
16.  $\text{MnSO}_4 \cdot 2\text{H}_2\text{O}$  has magnetic moment value
- i) 5.08      ii) 5.92  
 iii) 2.08      iv) 4.55
17. 2nd Ionization Energy trend in K, Ca, Ba is
- i)  $\text{K} > \text{Ca} > \text{Ba}$       ii)  $\text{Ba} > \text{Ca} > \text{K}$   
 iii)  $\text{Ca} > \text{K} > \text{Ba}$       iv)  $\text{K} > \text{Ba} > \text{Ca}$
18. X-ray diffraction analysis provides \_\_\_\_\_ information
- i) Qualitative      ii) Quantitative  
 iii) Both a & b      iv) None of these
19. Which one of the following does not obey 18-electron rule?
- i)  $\text{Cr}(\text{CO})_6$       ii)  $\text{Fe}(\text{CO})_5$   
 iii)  $\text{V}(\text{CO})_6$       iv)  $\text{Mn}_2(\text{CO})_{10}$
20. Alkali metals dissolve in liq.  $\text{NH}_3$  to give \_\_\_\_\_ color
- i) Red      ii) Blue  
 iii) Green      iv) None
21. A 40.0-gram sample of I-131 with half-life of 8.04 days will decay to 1/100 of its original mass in \_\_\_\_\_ days
- i) 29.4      ii) 100  
 iii) 53.4      iv) 45.43
22. The autodissociation of  $\text{POCl}_3$  will give
- (a)  $2\text{POCl}_3 \rightleftharpoons \text{POCl}_2^+ + \text{POCl}_4^-$       (b)  $2\text{POCl}_3 \rightleftharpoons \text{POCl}^+ + \text{POCl}_5^-$   
 (c)  $2\text{POCl}_3 \rightleftharpoons \text{POCl}_3^+ + \text{POCl}_3^-$       (d) none of these

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