29. Which of the following has the shortest bond length ?
(a) C - C (b) C = C (c) C ≡ C (d) C - H

30. The formula of Freon – 12 is –
(a) $CFCl_3$ (b) CCl_2F_2 (c) C_2F_4 (d) CF_3Cl

GROUP - B

Answer the following Questions **10 x 2 = 20**

31. Arrange the following species in order of increasing number of (i) electrons, (ii) neutrons :

(a) $_{18}Ar^{40}$ (b) $_{29}Cu^{63}$ (c) $_{27}Co^{58}$ (d) $_{19}K^{39}$

32. State what happens when hydrochloric ac d solution is added to silver nitrate solution. To this mix is finally added an excess ammonium hydroxide solution. Write down the equation and formula of the final product.

33. A vessel contains 4 g oxygen at N T P . Calculate the volume of the gas.

34. Find the empirical formula of Mustard Gas which consists of 30.20 % carbon , 5.07 % hydrogen, 44.58 % chlorine and 20.16 % sulphur.

35. How would you separate a mix of chalk powder, iron filings and naphthalene ?

36. What happens when propanoic acid reacts with sodium carbonate ? Write down the equation.

37. How many (i) oxygen molecules and (ii) electrons are present in 0.09 g water ?

38. Give the chemical formula of common alum. What ions does it give in aqueous solution ?

39. Write down the structural formula of the (i) aldehyde formed by the catalytic oxidation of ethanol, (ii) the alkane formed by the dehydration of ethanol.

40. Write down the balanced chemical equation for the complete combustion of (i) C_6H_6 (ii) $C_2H_6O_2$.

TCS

CHEMISTRY APTITUDE TEST : STAGE I : 2014

Full Marks – 50 Time – 90 m

Answer all the Questions. There are 30 MCQ (1-30) in **Group A,** each of 1 mark. Each MCQ has been provided with four alternative answers. **Shade the correct answer with ball point pen** in the appropriate box in the Answer-script. Overwriting in shading is liable to cancel the relevant answer. **0.25 mark will be deducted** for wrong answer to each MCQ. **Group B** contains 10 (31-40) Questions each of 2 marks – **answer these questions in the space provided for in the Answer-script.**

GROUP - A

Each question is provided with four alternative answers. Shade the appropriate box in the answer-script with a ball point pen. Don't overwrite while shading .....1x30 =30.

1. Example of a homogeneous mix or solution is-
(a) "7 –Up" (b) Liquid oxygen (c) Distilled water (d) Muddy water

2. Nail polish remover contains –
(a) Acetone (b) Benzene (c) Acetic acid (d) Petroleum ether

3. Aqueous solution of which of the following salts will be acidic in nature ?
(a) $NaHCO_3$ (b) NaCl (c) NH_4Cl (d) CH_3COONa

4. Normal temperature and pressure (NTP) or Standard temperature and pressure (STP) is –
(a) 0^0 C, 1 atmosphere pressure (b) 273 K, 760 mm of Hg (c) 0^0 C, 1 Pascal (d) All of these

5. Which of the following ions is the smallest in size ?
(a) F^- (b) Mg^{2+} (c) Na^+ (d) N^{3-}

6. The number of water molecules present in one drop of water molecule (volume, 0.0018 ml) at 4 C is-
(a) 1.568×10^3 (b) 6.023×10^{19} (c) 4.84×10^{17} (d) 6.023×10^{23}

7. pH of three solutions P, Q and R are 13, 6 and 2 respectively. Which of these solutions will liberate ammonia from ammonium sulphate ?
(a) P (b) Q (c) R (d) None of these

8. How many carbon atoms are present in 2,2-dimethylpropane ?
(a) 2 (b) 3 (c) 4 (d) 5

9. Which of the following solutions can absorb carbon monoxide under ordinary conditions ?
(a) Aqueous baryta solution (b) Lime water (c) Ferrous sulphate solution (d) Ammoniacal cuprous chloride solution

10. The element used in Thermit process and whose oxide is amphoteric in nature, is –
(a) Mn (b) Al (c) Zn (d) Fe

11. Which of the following fertilizer has the highest percentage of nitrogen ?
(a) Calcium ammonium nitrate (b) ammonium nitrate (c) Calcium nitrate (d) Urea

12. Identify 'X' in the nuclear reaction :
$_5B^{10} + {}_2He^4 \dashrightarrow {}_7N^{13} + X$,
(a) Proton (b) Electron (c) Neutron (d) Positron

13. Which of the following molecule is not linear ?
(a) CO_2 (b) SO_2 (c) C_2H_2 (d) $MgCl_2$

14. Atomic number of four elements A, B, C and D are 6, 8, 10, 12 respectively. Identify the two elements that form an ionic bond/ compound.
(a) A and D (b) B and C (c) A and C (d) B and D

15. Which element is found in the anode mud ?
(a) Aluminium (b) Gold (c) Iron (d) Magnesium

16. Epsom salt is chemically known as –
(a) Copper sulphate (b) Magnesium sulphate (c) Ferrous sulphate (d) Calcium sulphate

17. Chemical element aluminium has been named after-
(a) Alum (b) Alumina (c) Aluminon (d) None of these

18. One ml of a certain gas at NTP is as heavy as 4 ml of oxygen. The molar mass of the gas is –
(a) 128 (b) 64 (c) 32 (d) 16

19. Which metallic element is present in Grignard Reagent ?
(a) Calcium (b) Sodium (c) Magnesium (d) Potassium

20. Chemical formula of "Tear gas" is –
(a) $COCl_2$ (b) CCl_3NO_2 (c) N_2O (d) None of these

21. Number of lone pair of electrons present in water molecule, is –
(a) 1 (b) 2 (c) 3 (d) 4

22. 18-carat gold means –
(a) 18 % gold (b) 36 % gold (c) 48 % gold (d) 75 % gold

23. The correct increasing order of electron affinity amongst three halogens, is
(a) F > Cl > Br (b) F > Br > Cl (c) Cl > F > Br (d) Br > Cl > F

24. Tincture of iodine is prepared by dissolving iodine in –
(a) Potassium iodide (b) Acetone (c) Water (d) Alcohol

25. Which of the following contains an aldehyde group (-CHO) ?
(a) C_2H_6O (b) $C_2H_4O_2$ (c) C_2H_4O (d) C_3H_8O

26. The value of Universal Gas Constant, R in litre-atmosphere degree^{-1} mole^{-1} unit, is –
(a) 1.987 (b) 82.00 (c) 0.082 (d) 8.200

27. Radioactivity was first discovered by –
(a) Ernest Rutherford (b) Henri Becquerel (c) Niels Bohr (d) Marie Curie

28. Which of the following alcohol is used in dynamite ?
(a) Ethyl alcohol (b) Glycerol (c) Glycol (d) Methyl alcohol