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## **Previous Year Paper**

**Chemistry - 2013**

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### Multiple Choice Questions

1. The volume of neon gas in  $\text{cm}^3$  at STP having the same number of atoms as that present in 800 mg of Ca is (At. mass : Ca =  $40 \text{ g mol}^{-1}$ , Ne =  $20 \text{ g mol}^{-1}$ )
- A. 448  
B. 896  
C. 224  
D. 112

Answer

2. The ionisation enthalpy of  $\text{He}^+$  ion is  $19.60 \times 10^{-18} \text{ J atom}^{-1}$ . The ionisation enthalpy of  $\text{Li}^{2+}$  ion will be
- A.  $84.2 \times 10^{-18} \text{ J atom}^{-1}$   
B.  $44.10 \times 10^{-18} \text{ J atom}^{-1}$   
C.  $63.20 \times 10^{-18} \text{ J atom}^{-1}$   
D.  $21.20 \times 10^{-18} \text{ J atom}^{-1}$

Answer

3. How many molecules of  $\text{CO}_2$  are formed when one milligram of 100% pure  $\text{CaCO}_3$  is treated with excess hydrochloric acid?
- A.  $6.023 \times 10^{23}$   
B.  $6.023 \times 10^{18}$   
C.  $6.023 \times 10^{21}$   
D.  $6.023 \times 10^{22}$

Answer

4. Molecular shapes of  $\text{SF}_4$ ,  $\text{CF}_4$  and  $\text{XeF}_4$  and the number of lone pairs on the central atom are respectively
- A. the same, with 1, 2 and 1  
B. the same with 1, 0 and 1  
C. different with 0, 1 and 2  
D. different with 1, 0 and 2

Answer

5. Which one of the following is not correct in respect of hybridization of orbitals?

A. The orbitals present in the valence shell are hybridized.

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C. Pure atomic orbitals are more effective in forming stable bonds than hybrid orbitals

D. It is not always that only partially filled orbitals participate in hybridization in some

cases even filled orbitals in valence shell take part.

Answer

6. Allyl cyanide molecule contains

- A. 9 sigma bonds, 4 pi bonds and no lone pair
- B. 9 sigma bonds, 3 pi bonds and one lone pair
- C. 8 sigma bonds, 5 pi bonds and one lone pair
- D. 8 sigma bonds, 3 pi bonds and two lone pairs

Answer

7. Two vessels of volumes 16.4 L and 5 L contains two ideal gases of molecular existence at the respective temperature of 27°C and 227°C and exert 1.5 and 4.1 atm, respectively. The ratio of the number of molecules of the former to that of the later is

- A. 2
- B. 1
- C. 12
- D. 13

Answer

8. When 4 g of an ideal gas A is introduced into an evacuated flask kept at 25°C, the pressure is found to be one atmosphere. If 6 g of another ideal gas B is then added to the same flask, the pressure becomes 2 atm at the same temperature. The ratio of molecular weight ( $M_A : M_B$ ) of the two gases would be

- A. 1 : 2
- B. 2 : 1
- C. 2 : 3
- D. 3 : 2

Answer

9. Which one of the following statements is correct?

- A. Ferromagnetic substance like  $ZnFe_2O_4$  becomes paramagnetic on heating
- B. NaCl is a paramagnetic salt
- C.  $CuSO_4$  is a diamagnetic salt
- D. MnO is an example of antiferromagnetic substance

Answer

10. Among the elements B, Mg, Al and K the correct order of increasing metallic character is

- A.  $B < Al < Mg < K$
- B.  $B < Mg < Al < K$
- C.  $Mg < B < Al < K$

D.  $Mg < Al < B < K$

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11. An inorganic salt (A) is decomposed on heating to give two products (B) and (C). Compound (C) is a liquid at room temperature and is neutral to litmus while the compound (B) is a colourless neutral gas. Compounds (A), (B) and (C) are

- A.  $\text{NH}_4\text{NO}_3$ ,  $\text{N}_2\text{O}$ ,  $\text{H}_2\text{O}$
- B.  $\text{NH}_4\text{NO}_2$ ,  $\text{NO}$ ,  $\text{H}_2\text{O}$
- C.  $\text{CaO}$ ,  $\text{H}_2\text{O}$ ,  $\text{CaCl}_2$
- D.  $\text{Ba}(\text{NO}_3)_2$ ,  $\text{H}_2\text{O}$ ,  $\text{NO}_2$

Answer

12. In the dichromate dianion, the nature of bonds are
- A. for equivalent Cr-O bonds
  - B. six equivalent Cr-O bonds and one O-O bond
  - C. six equivalent Cr-O bonds and one Cr-Cr bond
  - D. six equivalent Cr-O bonds and one Cr-O-Cr bond

Answer

13. At constant external pressure of one atmosphere, 4 moles of a metallic oxide  $\text{MO}_2$  undergoes complete decomposition at  $227^\circ\text{C}$  in an open vessel according to the equation
- $$2\text{MO}_2 (\text{s}) \rightarrow 2\text{MO} (\text{s}) + \text{O}_2 (\text{g})$$

The work done by the system in kJ is ( $R = 8.3 \text{ kJ mol}^{-1}$ )

- A. -16.6
- B. -24.9
- C. -33.2
- D. -4.15

Answer

14. A certain reaction has a  $\Delta H$  of 12 kJ and a  $\Delta S$  of  $40 \text{ JK}^{-1}$ . The temperature above which the reaction becomes spontaneous is
- A.  $27^\circ\text{C}$
  - B. 27 K
  - C.  $300^\circ\text{C}$
  - D. 30 K

Answer

15. The sum of pH and  $\text{pK}_b$  for a basic buffer solution is 13. The ratio of the concentration of the base to that of the salt is
- A. 10
  - B. 1
  - C. 0.05
  - D. 0.1

16. Two equilibria,  $AB \rightleftharpoons A + B$ , are simultaneously maintained in a solution with equilibrium

constants,  $K_1$  and  $K_2$  respectively. The ratio of  $[A^+]$  to  $[AB_2^-]$  in the solution is  
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- A. directly proportional to  $[B^-]$
- B. inversely proportional to  $[B^-]$
- C. directly proportional to the square of  $[B^-]$
- D. inversely proportional to the square of  $[B^-]$

Answer

17. A current strength of 9.65 A is passed through excess fused  $AlCl_3$  for 5 h. How many litres of chlorine will be liberated at STP? ( $F = 96500$  C)

- A. 2.016
- B. 1.008
- C. 11.2
- D. 20.16

Answer

18. Amongst the following ions which one has the highest magnetic moment value? (At. no. Co = 27, Ni = 28)

- A.  $[Co(NH_3)_6]^{3+}$
- B.  $[CoF_6]^{3-}$
- C.  $[NiCl_4]^{2-}$
- D.  $[Ni(CN)_4]^{2-}$

Answer

19. The colour of the solution/ precipitate obtained in the elemental analysis of an organic compound and the molecule/ion responsible for the colour are given below. Choose the incorrectly matched pair.

- A. Prussian blue -  $Fe_4[Fe(CN)_6]_3 \cdot xH_2O$
- B. Yellow -  $(NH_4)_2MoO_4$
- C. Violet colour -  $[Fe(CN)_5NOS]^{4-}$
- D. Blood red colour -  $[Fe(SCN)]^{2+}$

Answer

20. Among the following amines, which one has the highest pK<sub>a</sub> value in aqueous solution?

- A. Methanamine
- B. N, N-dimethylaniline
- C. Ethanamine
- D. Benzenamine

Answer

21. In Solvay process of manufacture of sodium carbonate, the by-product is. Join [www.zigya.com](http://www.zigya.com)

B.  $\text{NaHCO}_3$ 

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C.  $\text{CaCl}_2$ D.  $\text{CO}_2$ 

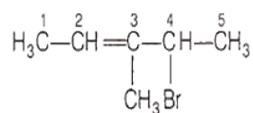
Answer

22. The correct formula of borax is

A.  $\text{Na}_2[\text{B}_4\text{O}_4(\text{OH})_3] \cdot 9\text{H}_2\text{O}$ B.  $\text{Na}_2[\text{B}_4\text{O}_5(\text{OH})_4] \cdot 8\text{H}_2\text{O}$ C.  $\text{Na}_2[\text{B}_4\text{O}_6(\text{OH})_5] \cdot 7\text{H}_2\text{O}$ D.  $\text{Na}_2[\text{B}_4\text{O}_7(\text{OH})_6] \cdot 6\text{H}_2\text{O}$ 

Answer

23. The correct IUPAC name of the following compound is



A. 4-bromo-3-methylpent-2-ene

B. 2-bromo-3-methylpent-4-ene

C. 3-methyl- 4-bromopent-2-ene

D. 3-methyl-2-bromopent-4-ene

Answer

24. Which one among the following cannot exhibit enantiomerism?

A. Diphenyl methanol

B. 1-bromo-2-chlorobutane

C. 2-butanol

D. Tartaric acid

Answer

25. The total number of acyclic structural isomers possible for compound with molecular formula  $\text{C}_4\text{H}_{10}\text{O}$  is

A. 9

B. 7

C. 5

D. 6

Answer

26. An organic compound A containing nitrogen, on acid catalysed hydrolysis produces a water soluble organic compound B and a gaseous compound C. When methyl magnesium bromide is slowly added to A in 1: 1 ratio and hydrolysed, it produces a compound which can be obtained by dry distillation of the calcium salt of B. The compound A is

A. N-methylmethanamide

D. N, N-dimethylmethanamide

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Answer

27. Which of the following noble gases has the highest positive electron gain enthalpy value?

- A. Helium
- B. Krypton
- C. Argon
- D. Neon

Answer

28. Oxyacids of phosphorus and the starting materials for their preparation are given below.

| Oxyacid                             | Materials for preparation                          |
|-------------------------------------|----------------------------------------------------|
| A. $\text{H}_3\text{PO}_2$          | i. Red P + alkali                                  |
| B. $\text{H}_3\text{PO}_3$          | ii. $\text{P}_4\text{O}_{10} + \text{H}_2\text{O}$ |
| C. $\text{H}_3\text{PO}_4$          | iii. $\text{P}_2\text{O}_3 + \text{H}_2\text{O}$   |
| D. $\text{H}_4\text{P}_2\text{O}_6$ | iv. White P + alkali                               |

Choose the correct answer from the codes given below

- A. A - iv; B - iii; C - ii; D - i
- B. A - i; B - iii; C - ii; D - iv
- C. A - iv; B - iii; C - i; D - ii
- D. A - ii; B - iii; C - i; D - iv

Answer

29. Which one of the following metals has a different lattice from those of the others?

- A. Fe
- B. Co
- C. Ni
- D. Cu

Answer

30. In neutral or faintly alkaline medium, thiosulphate is quantitatively oxidized by  $\text{KMnO}_4$  to

- A.  $\text{SO}_3^{2-}$
- B.  $\text{SO}_4^{2-}$
- C.  $\text{SO}_2$
- D.  $\text{SO}_5^{2-}$

Answer

31. If the elevation in boiling point of a solution of non-volatile, non-electrolytic and non-associating

solute in a solvent ( $K_b = x \text{ K kg mol}^{-1}$ ) is  $y \text{ K}$ , then the depression in freezing point of solution of  
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A.  $2xzy$   
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B.  $yzx$

C.  $xzy$

D.  $yz2x$

Answer

32. The vapour pressure of pure benzene and toluene at a particular temperature are 100 mm and 50 mm respectively. Then the mole fraction of benzene in vapour phase in contact with equimolar solution of benzene and toluene is

A. 0.67

B. 0.75

C. 0.33

D. 0.50

Answer

33. When the total cell emf of a volatic cell is greater than zero, which of the following is true about the reaction quotient  $Q$  and free energy change  $\Delta G$  for the cell reaction?

A.  $Q$  is less than one and  $\Delta G$  is greater than zero

B.  $Q$  is greater than one and  $\Delta G$  is greater than zero

C.  $Q$  is greater than one and  $\Delta G$  is less than zero

D.  $Q$  is zero and  $\Delta G$  is greater than zero

Answer

34. The reaction,  $A + B \rightarrow \text{products}$  is first order with respect to  $A$  and second order with respect to  $B$ . When 1.0 mole each of  $A$  and  $B$  were taken in one litre flask, the initial rate of the reaction is  $1.0 \times 10^{-2} \text{ mol L}^{-1} \text{ s}^{-1}$ . The rate of the reaction when 50% of the reactants have been converted into products is

A.  $1.00 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$

B.  $0.05 \times 10^{-2} \text{ mol L}^{-1} \text{ s}^{-1}$

C.  $1.25 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$

D.  $4.00 \times 10^{-2} \text{ mol L}^{-1} \text{ s}^{-1}$

Answer

35. For the following reaction,



the rate law is  $\text{Rate} = k [\text{NO}_2]^2$ . If 0.1 mole of gaseous carbon monoxide is added at constant temperature to the reaction mixture which of the following statement is true?

A. Both  $k$  and the reaction rate remain the same

B. Both  $k$  and the reaction rate increase

C. Both  $k$  and the reaction rate decrease

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Answer

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36. Which one of the following is an example for multimolecular colloid?

- A. Sulphur sol in water
- B. Aqueous starch sol
- C. Aqueous enzyme sol
- D. Alcoholic polystyrene sol

Answer

37. Which one of the following halogen compounds is difficult to be hydrolysed by  $S_N1$  mechanism?

- A. Tertiary butyl chloride
- B. Isopropyl chloride
- C. Benzyl chloride
- D. Chlorobenzene

Answer

38. Compound 'A' of molecular formula  $C_4H_{10}O$  on treatment with Lucas reagent at room temperature gives compound 'B'. When compound 'B' is heated with alcoholic KOH, it gives isobutene. Compound 'A' and 'B' are respectively

- A. 2-methyl-2-propanol and 2-methyl-2-chloropropane
- B. 2-methyl-1-propanol and 1-chloro-2-methylpropane
- C. 2-methyl- 1-propanol and 2-methyl-2-chloropropane
- D. butan-2-ol and 2-chlorobutane

Answer

39. Salicylaldehyde can be prepared from phenol by

- A. Scholten-Baumann reaction
- B. Kolbe's reaction
- C. Reimer-Tiemann reaction
- D. Perkin reaction

Answer

40. Which one of the following is not an allylic halide?

- A. 4-bromopent-2-ene
- B. 3-bromo-2-methylbut-1-ene
- C. 1-bromobut-2-ene
- D. 4-bromobut-1-ene

Answer

41. One mole of alkene on ozonolysis gives 2 moles of butanone. The alkene is

- A. 3, 4-dimethylhex-2-ene
- B. 2, 3-dimethylhex-3-ene
- C. 3, 4-dimethylhex-3-ene

- D. 2, 3-dimethylhex-2-ene

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42. The compound that neither forms semicarbazone nor oxime is

A.  $\text{HCHO}$  Study, Assignments, Solved Previous Year Papers . Questions and Answers. Free Forever.

B.  $\text{CH}_3\text{COCH}_3$

C.  $\text{CH}_3\text{CHO}$

D.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$

Answer

43. Isopropylbenzene is oxidized in the presence of air to compound 'A'. When compound 'A' is treated with dilute mineral acid, the aromatic product formed is

A. phenol

B. benzene

C. benzaldehyde

D. acetophenone

Answer

44. Positive carbylamine test is shown by

A. N, N-dimethylaniline

B. triethylamine

C. N-methylaniline

D. *p*-methylbenzylamine

Answer

45. How many amino acids are present in insulin?

A. 25

B. 51

C. 20

D. 22

Answer

46. The repeating unit present in nylon-6 is

A.  $-\text{NH}(\text{CH}_2)_6\text{NHCO}(\text{CH}_2)_4\text{CO}-$

B.  $-\text{CO}(\text{CH}_2)_5\text{NH}-$  or  $-\text{CO}(\text{CH}_2)_6\text{NH}-$

C.  $-\text{CO}(\text{CH}_2)_4\text{NH}-$

D.  $-\text{NH}(\text{CH}_2)_4\text{NHCO}(\text{CH}_2)_6\text{CO}-$

Answer

47. Which one of the following is not correct?

A. D-(-)-fructose exists in furanose structure

B. D-( + )-glucose exists in pyranose structure

C. In sucrose the two monosaccharides are held together by peptide linkage

D. Maltose is a reducing sugar

Answer

48. How many times oxyhaemoglobin is less stable than carboxyhaemoglobin? Join [www.zigya.com](http://www.zigya.com)

B. 200

C. 500

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D. 300

Answer