Odisha Joint Entrance Examination 2014

Pharmacy/ BAMS/ BHMS/MCA-dual degree

Time : 01 hr. **Full marks: 240**

Answer all the questions

1. Aqueous solution of an organic compound "A" on electrolysis liberates acetylene and CO_2 at anode. "A" is:

   a) potassium citrate
   b) potassium acetate
   c) potassium succinate
   d) potassium maleate

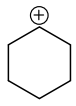
2. Which of the following reagent used for the conversion of 3-hexyne into *trans*-3-hexene?

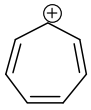
   a) $NaBH_4$
   b) H_2, PtO_2
   c) Na, liq. NH_3/ C_2H_5OH
   d) H_2, Pd-BaSO4, quinoline

3. Propene can be converted into 1-propanol by oxidation. Indicate which set of reagents amongst the following is most suitable for the above conversion.

   a) alkaline $KMnO_4$
   b) OsO_4, $NaHSO_4$
   c) B_2H_6 and alkaline H_2O_2
   d) dil. H_2SO_4 at 140 ^{0}C

4. Arrange the following carbocations in order of decreasing stability:


(I)

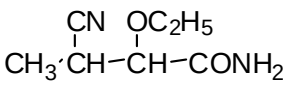

(II)


(III)


(IV)

   a) (II) > (IV) > (I) > (III)
   b) (II) > (I) > (III) > (IV)
   c) (I) > (II) > (III) > (IV)
   d) (II) > (III) > (IV) > (I)

5. Correct IUPAC name of the given compound

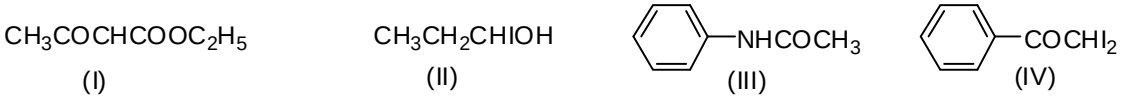


   a) 3-cyano-2-ethoxybutanamide
   b) 2-methyl-3-ethoxy-3-carbamoylpropanenitrile

c) ethoxy-1-carbamoyl-2-cyanopropane

d) 3-carbmoyl-3-ethoxy-3-methylpropanenitrile

6. Which of the following compound will give positive iodoform test?



a) (I) and (II) b) (III) and (IV) c) (III) only d) (IV) only

7. The bond that determine the secondary structure of a protein is

a) ionic bond b) covalent bond

c) hydrogen bond d) coordinate bond

8. Diazotisation of aniline with aqueous $NaNO_2$ and dil HCl, an excess of HCl is used primarily due to:

a) generate stoichiometric amount of HNO_2

b) neutralize the base liberated from the reaction

c) suppress the concentration of free aniline

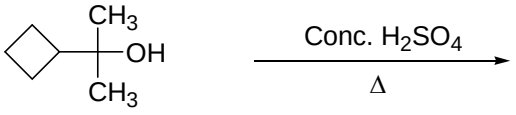
d) activate the β-naphthol for coupling reaction

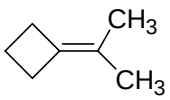
9. An organic molecule necessarily shows optical activity, if it

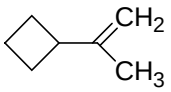
a) contain asymmetric carbon atoms b) is superimposable on its mirror image

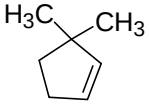
c) is non-superimposable on its mirror image d) is non-planar

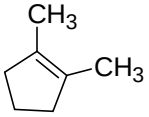
10. Predict the major product of the following reaction:



a) 

b) 

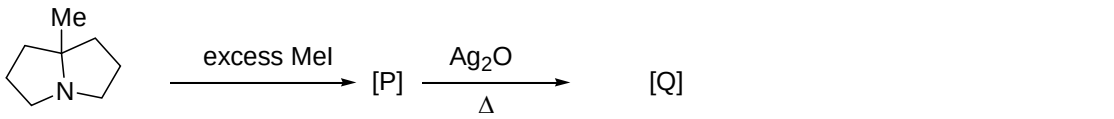
c) 

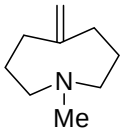
d) 

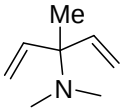
11. Formaldehyde react with ammonia to produce urotropine, which contain……..no. of nitrogen atom per molecule.

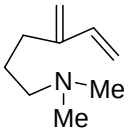
a) 3 b) 5 c) 4 d) 2

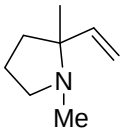
12. Identify the final product [Q] in this reaction sequence.



a) 

b) 

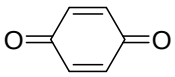
c) 

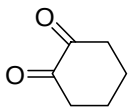
d) 

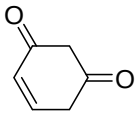
13. A condensation polymer among the following is

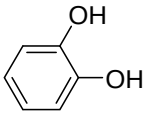
a) dacron b) PVC c) teflon d) polystyrene

14. Which of the following molecule does not exhibit tautomerism

a) 

b) 

c) 

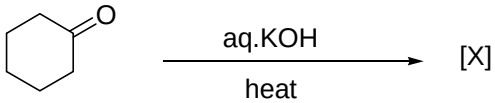
d) 

15. Reaction of acetylchloride with sodium propanoate will produce

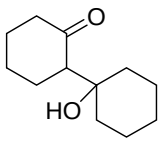
a) acetic anhydride b) propanoic anhydride

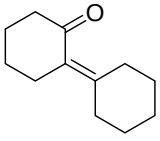
c) ethylpropanoate d) ethanoic propanoic anhydride

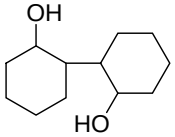
16. In the reaction:

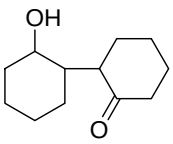


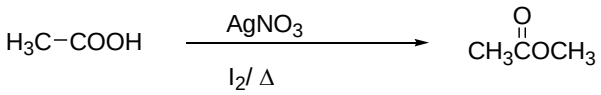
[X] is

a) 

b) 

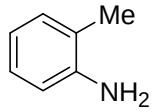
c) 

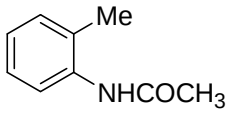
d) 

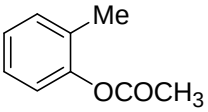
17. The reaction  is called as

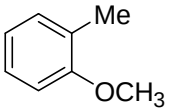
a) Hunsdiecker reaction
b) Hell Volhard Zelinsky reaction
c) Simonini reaction
d) Finkelstein reaction

18. Which one of the following is most reactive towards electrophilic reagent?

a) 

b) 

c) 

d) 

19. An organic compound reacts with aqueous nitrous acid at low temperature to produce an oily product. The compound is

a) $(CH_3CH_2)_3N$
b) $(CH_3CH_2)_2NH$
c) $C_6H_5CH_2NH_2$
d) $C_6H_5CH_2CH_2NH_2$

20. p-Amino benzenesulphonic acid when treated with excess bromine water give-

a) 2,6-dibromo-4-amino benzenesulphonic acid
b) 2,4,6-tribromo aniline
c) 2,4-dibromo aniline
d) 2,6-dibromo aniline

21. The equivalent mass of an element is 4. Its chloride has a vapour density 59.25. The valency of the element will be.

a) 4 b) 3 c) 2 d) 1

22. Which pair of the following substances is said to be isomorphous?

a) Epsom salt and white vitriol
b) white vitriol and blue vitriol

c) Epsom salt and Glauber's salt d) Glauber's salt and blue vitriol

23. Magnetic quantum number is a number related to:

a) spin b) shape c) size d) orientation

24. Which one of the following is the man made radioactive disintegration series?

a) Uranium series b) Thorium series

c) Neptunium series d) Actinium series

25. The maximum number of molecules is present in:

a) 01.0 gm of H_2 gas b) 10 gm of O_2 gas

c) 15 L of H_2 gas at STP d) 10 L of N_2 gas at STP

26. A gas can be liquefied:

a) below its critical temperature b) above its critical temperature

c) at its critical temperature d) at any temperature

27. If 4 gms of oxygen diffuse through a very narrow hole, how much hydrogen would have diffused under same condition?

a) 16 gm b) 1 gm c) 0.25 gm d) 64 gm

28. Solubility product of $BaSO_4$ is 1.5×10^{-9}. The precipitation in a 0.01 M solution of Ba^{2+} ions will start on adding H_2SO_4 of concentration:

a) 10^{-6} M b) 10^{-8} M c) 10^{-9} M d) 10^{-7} M

29. At high pressure van der Waals equation can be written as

a) $\left(P + \frac{a}{v} \right)\left(v - b \right) = RT$ b) $P\left(v - b \right) = RT$

c) $\left(P + \frac{a}{v} \right) v = RT$ d) $PV = RT$

30. 18 gm of glucose and 6 gm of urea are dissolved in 1 litre aqueous solution at 25 ^{0} C. The osmotic pressure of the solution will be:

a) 3.826 atm b) 9.42 atm c) 4.926 atm d) 2.92 atm

31. Critical micelle concentration (CMC) is:

a) concentration at which micelle formation starts

b) concentration of micelles at room temperature

c) concentration of electrolyte added to destroy the micelle

d) concentration at which micelles are destroyed

32. 2 Moles of an ideal gas at 27 ^{0}C is expanded reversibly from 2 litre to 20 litre. Find the entropy change (R = 2 cal/ mol K)

a) 0 b) 4 c) 9.2 d) 92.1

33. Enthalpy changes for two reactions are given by equations.

$2\,Cr\,(g) + 3/2\,O_2\,(g) \longrightarrow Cr_2O_3\,(s)$ $\quad \Delta H = -1130$ kJ

$C\,(s) + 1/2\,O_2\,(g) \longrightarrow CO_2\,(g)$ $\quad \Delta H = -110$ kJ

What is the enthalpy change in kJ for the following reaction?

$C\,(s) + Cr_2O_3\,(s) \longrightarrow 2Cr\,(s) + 3\,CO(g)$

a) - 800 kJ b) + 800 kJ c) + 1020 kJ d) + 1460 kJ

34. Consider the exothermic reaction $X \rightarrow Y$ with the activation energies E_b and E_f for backward and forward reactions respectively. Which statement is correct?

a) $E_b < E_f$ b) $E_b = E_f$

c) no definite relation between E_b and E_f d) $E_b > E_f$

35. $NaOH + Cl_2 \longrightarrow NaCl + NaClO_3 + H_2O$

The equivalent mass of Cl_2 in the above reaction is

a) M/2 b) M/5 c) 2M/3 d) 3M/5

36. On heating a liquid, its viscosity

a) decreases
b) increases
c) remains same
d) first increases and then decreases

37. During the change of O_2 to O_2^- ion, the electron adds on which one of the following orbital?

a) π^* orbital b) σ^* orbital c) π orbital d) σ^* orbital

38. If 0.8 mole of $BaCl_2$ is mixed with 0.4 mole of Na_3PO_4, the maximum number of mole of $Ba_3(PO_4)_2$ that can be formed.

a) 1.2 b) 0.45 c) 0.20 d) 0.40

39. The pair of compound having same shape.

a) SF_4 and XeF_4 b) CO_2 and XeF_2 c) BCl_3 and BrF_3 d) IF_5 and PCl_5

40. The dissociation equilibrium of a gas AB_2 can be represented as, $2AB_2\,(g) \rightleftharpoons 2AB\,(g) + B_2\,(g)$

The degree of dissociation is "x" and is small compared to 1. The expression relating the degree of dissociation x with equilibrium constant K_p and total pressure P is:

a) $2K_p/P$ b) K_p/P c) $(2K_p/P)^{1/2}$ d) $(2K_p/P)^{1/3}$

41. In the modern periodic table one of the following does not have appropriate position:

a) inert gases
b) inner-transition elements
c) transition elements
d) inert gases

42. The ratio of the difference between 2^{nd} and 3^{rd} Bohr′s orbit energy to that between 3^{rd} and 4^{th} orbit energy is:

a) 0.35 b) 0.185 c) 5.4 d) 2.85

43. Basic strength of trihalides of nitrogen increases in the order:

a) $NCl_3 < NBr_3 < NI_3 < NF_3$
b) $NF_3 < NCl_3 < NBr_3 < NI_3$
c) $NF_3 < NBr_3 < NCl_3 < NI_3$
d) $NF_3 < NI_3 < NCl_3 < NBr_3$

44. H_2SO_4 has a very corrosive action on skin because

a) it acts as dehydrating agent
b) it reacts with proteins
c) it acts as oxidizing agent
d) it acts as dehydrating agent and absorption of water is highly exothermic

45. Calcium cyanamide on treatment with steam under pressure gives ammonia and

a) $CaCO_3$ b) $Ca(OH)_2$ c) CaO d) $CaHCO_3$

46. When excess of $SnCl_2$ is added to a solution of $HgCl_2$, a white precipitate turning black is obtained. The black colour is due of the formation of:

a) Hg_2Cl_2 b) $SnCl_4$ c) Sn d) Hg

47. Lead dissolves most readily in:

a) CH_3COOH b) HNO_3 c) H_2SO_4 d) HCl

48. Electrolytic reduction process is used for the extraction of:

a) noble metals
b) highly electronegative elements
c) highly electropositive elements
d) transition metals

49. Standard electrode potentials are:
$Fe^{2+} \mid Fe = -0.44$ V and $Fe^{3+} \mid Fe^{2+} = +0.77$ V. Fe^{2+} and Fe^{3+} blocks are kept together , then

a) Fe^{3+} increases
b) Fe^{2+}/ Fe^{3+} remains unchanged
c) Fe^{3+} decreases
d) Fe^{2+} decreases

50. When ZnS and PbS minerals are present together, NaCN is added of separate them in froth floatation process because

a) PbS forms soluble complex, $Na_2Pb(CN)_4$
b) ZnS forms soluble complex, $Na_2Zn(CN)_4$
c) $Pb(CN)_2$ is precipitated while there is no effect on ZnS
d) both (b) and (c)

51. Both HNO_3 and HF are strong acids. But when HNO_3 dissolve in HF, it behaves as:

a) an acid b) a zwitter ion c) amphiprotic solvent d) a base

52. A commercial sample of H_2O_2 is labeled as "15 volume" its percentage strength is nearly:

a) 9 % b) 4.5 % c) 10 % d) 45%

53. Which one of the following is used for reviving the exhaust permutit?

a) dil. HCl solution
b) 15 % $FeCl_3$ solution
c) 10 % $MgCl_2$ solution
d) 10 % NaCl solution

54. The bond present in borazole are:

a) $9\alpha, 9\pi$ b) $6\alpha, 6\pi$ c) $9\alpha, 6\pi$ d) $12\alpha, 3\pi$

55. Which one of the following ions in aqueous solution is the best conductor of electricity?

a) Cs^+ b) Na^+ c) Mg^{2+} d) Li^+

56. A chemical reaction is carried out at 280 K and 300K. The rate constants were found of be k_1 and k_2 respectively. Then

a) $k_1 = 4k_2$ b) $k_2 = 2k_1$ c) $k_2 = 4k_1$ d) $k_2 = 0.5k_1$

57. Nucleophilic substitution in aryl halides is favoured by-

a) electron donating group
b) electron withdrawing group
c) both electron donating and withdrawing groups
d) none of these

58. The inhibitors:

a) retard the rate of a chemical reaction
b) do not allow the reaction of proceed
c) stop a chemical reaction immediately
d) are reducing agents

59. Red phosphorous is less reactive than yellow phosphorous because

a) its colour is red
b) it is hard
c) it is tetra atomic

d) it is highly polymerized

60. Weight of iodine required to oxidize 500 mL of 2 N $Na_2S_2O_3$ solution is

a) 6.35 gm b) 63.5 gm c) 31.75 gm d) 127 gm

Answer Key:

1 (d), 2 (c), 3 (c), 4 (a), 5 (a), 6 (d), 7 (c), 8 (c), 9 (c), 10 (d), 11 (c), 12 (a), 13 (a), 14 (a), 15 (d), 16 (b), 17 (c), 18 (a), 19 (b), 20 (b), 21 (b), 22 (a), 23 (d), 24 (c), 25 (c), 26 (a), 27 (a), 28 (a), 29 (b), 30 (c), 31 (a), 32 (c), 33 (*), 34 (d), 35 (d), 36 (a), 37 (a), 38 (c), 39 (b), 40 (d), 41 (b), 42 (d), 43 (b), 44 (d), 45 (a), 46 (d), 47 (a), 48 (c), 49 (c), 50 (b), 51 (d), 52 (b), 53 (d), 54 (*), 55 (a), 56 (c), 57 (b), 58 (a), 59 (d), 60 (d).