Section 3: Chemistry

41. The number of electrons in an atom with atomic number 105 having (n + *l*) = 8 are:

(a) 30 (b) 17 (c) 15 (d) 18

42. The ratio $\frac{a}{b}$ (a and b being the van der Waal's constant of real gases) has the dimensions of

(a) atm mol^{-1} (b) L mol^{-1} (c) atm L mol^{-1} (d) atm L mol^{-2}

43. Resultant molarity of H^+ ion in a mixture of 100 mL of 0.1 M H_2SO_4 and 200 mL of 0.1 M H_3PO_3 is:

(a) 0.1 M (b) 0.2 M (c) 0.267 M (d) 0.133 M

44. The chemical reaction, $2O_3 \longrightarrow 3O_2$ proceeds as follows:

$O_3 \rightleftharpoons O_2 + O$ … (fast)

$O + O_3 \longrightarrow 2O_2$ … (slow)

The rate law expression should be:

(a) $r = K[O_3]^2$ (b) $r = K[O_3]^2 [O_2]^{-1}$ (c) $r = K [O_3] [O_2]$ (d) unpredictable

45. For the reaction in equilibrium,

$N_2O_4(g) \rightleftharpoons 2NO_2(g)$

the concentrations, of N_2O_4 and NO_2 at equilibrium are 4.8×10^{-2} and 1.2×10^{-2} mol L^{-1} respectively. The value of K_c for this reaction is:

(a) 3×10^{-3} mol L^{-1} (b) 3×10^{3} mol L^{-1} (c) 3.3×10^{2} mol L^{-1} (d) 3×10^{-1} mol L^{-1}

46. Which one of the following is tribasic acid?

(a) H_3PO_2 (b) H_3PO_3 (c) H_3PO_4 (d) $H_4P_2O_7$

47. In CsBr crystal structure edge length of unit cell is 4.3Å. The shortest interionic distance between Cs^+ and Br^- ions is

(a) 3.72 Å (b) 1.86 Å (c) 7.44 Å (d) 4.3 Å

48. Which is deliquescent?

(a) $MgCl_2$ (b) NaOH (c) $CaCl_2$ (d) All

49. For which change $\Delta H \neq \Delta U$?

(a) $H_{2(g)} + I_{2(g)} \longrightarrow 2HI_{(g)}$ (b) $CH_{4(g)} + 2O_2 \longrightarrow CO_{2(g)} + 2H_2O_{(g)}$

(c) $C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)}$ (d) $N_{2(g)} + 3H_{2(g)} \longrightarrow 2NH_{3(g)}$

50. Which one of the following is incorrect for spontaneous adsorption of gas on solid surface?

(a) ΔH decreases for system (b) ΔS (total) increases

(c) ΔS decreases for gas (d) ΔG increases for system

51. According to MO Theory,

(a) O_2^+ is paramagnetic and bond order greater than O_2

(b) O_2^+ is paramagnetic and bond order less than O_2

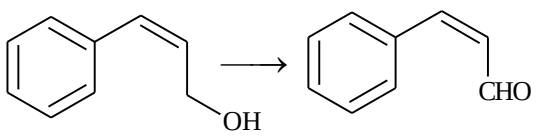
(c) O_2^+ is diamagnetic and bond order is less than O_2

(d) O_2^+ is diamagnetic and bond order is more than O_2

52. How many chiral compounds are possible on mono chlorination of 2-methyl butane?

(a) 2 (b) 4 (c) 6 (d) 8

53. Which of the following reagents can be used for the following conversions

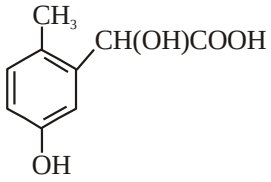


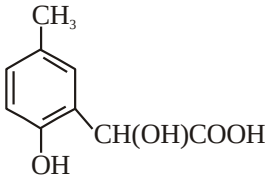
(a) CrO_3 / Pyridine (b) H_2/Pd-C (c) $LiAlH_4$ (d) $KMnO_4$ / OH^-

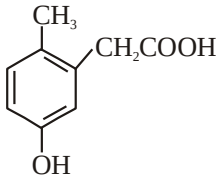
54. Which of the following is fully fluorinated polymer?

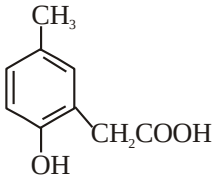
(a) Neoprene (b) Teflon (c) Thiokol (d) PVC

55. p-cresol reacts with chloroform in alkaline medium to give the compound A which adds hydrogen cyanide to form, the compound B. The latter on acidic hydrolysis gives chiral carboxylic acid. The structure of the carboxylic acid is

(a) 

(b) 

(c) 

(d) 

56. Which method of purification is represented by the following equation?

$$Ni + 4CO \xrightarrow{70^{o}C} Ni(CO)_4 \xrightarrow{180^{o}C} Ni + 4CO$$

(a) van Arkel (b) zone refining (c) mond process (d) cupellation

57. Which of the following has –O–O– linkage

(a) $H_2S_2O_6$ (b) $H_2S_2O_8$ (c) $H_2S_2O_3$ (d) $H_2S_4O_6$

58. 2-Methylbutane on reacting with bromine in the presence of sunlight gives mainly

(a) 1-bromo-2-methylbutane (b) 2-bromo-2-methylbutane

(c) 2-bromo-3-methylbutane (d) 1-bromo-3-methylbutane

59. Acid catalyzed hydration of alkenes except ethene leads to the formation of

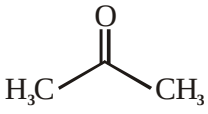
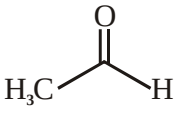
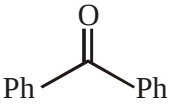
(a) primary alcohol (b) secondary or tertiary alcohol

(c) mixture of primary and secondary alcohols (d) mixture of secondary and tertiary alcohols

60. The material used in semiconductors

(a) Si (b) Sn (c) Ti (d) Cs

61. The order of reactivity of Phenyl Magnesium Bromide with the following compounds is

(i)  (ii)  (iii) 

(a)(ii) > (iii) > (i) (b) (i) > (iii) > (ii) (c) (ii) > (i) > (iii) (d) all react with same rate

62. Which one of the following types of drugs reduces fever ?

(a)Analgesic (b) Antipyretic (c) Antibiotic (d) Tranquiliser

63. Tertiary alkyl halides are practically inert to substitution by mechanism because of

(a)insolubility (b) instability (c) inductive effect (d) steric hindrance

64. Which of the following oxides is amphoteric in character?

(a)CaO (b) CO_2 (c) SiO_2 (d) SnO_2

65. Among the following acids which has the lowest pK_a value ?

(a)CH_3COOH (b) HCOOH

(c)$(CH_3)_2CH – COOH$ (d) CH_3CH_2COOH