

R5

# NEET 2024

## Chemistry

### Section – A (Compulsory)

51. Match List I with List II.

	List I (Process)		List II (Conditions)
A.	Isothermal process	I.	No heat exchange
B.	Isochoric process	II.	Carried out at constant temperature
C.	Isobaric process	III.	Carried out at constant volume
D.	Adiabatic process	IV.	Carried out at constant pressure

Choose the correct answer from the options given below:

- (1) A-IV, B-II, C-III, D-I
- (2) A-I, B-II, C-III, D-IV
- (3) A-II, B-III, C-IV, D-I
- (4) A-IV, B-III, C-II, D-I

52. Arrange the following elements in increasing order of first ionization enthalpy:

Li, Be, B, C, N

Choose the correct answer from the options give below:

- (1)  $Li < B < Be < C < N$
- (2)  $Li < Be < C < B < N$
- (3)  $Li < Be < N < B < C$
- (4)  $Li < Be < B < C < N$

53. Match List I with List II.

	List I (Molecule)		List II (Number and types of bond/s between two carbon atoms)
A.	ethane	I.	one $\sigma$ -bond and two $\pi$ -bonds
B.	ethene	II.	two $\pi$ -bonds
C.	carbon molecule, $C_2$	III.	one $\sigma$ -bond
D.	ethyne	IV.	one $\sigma$ -bond and one $\pi$ -bond

Choose the correct answer from the options given below:

- (1) A-IV, B-III, C-II, D-I
- (2) A-III, B-IV, C-II, D-I
- (3) A-III, B-IV, C-I, D-II
- (4) A-I, B-IV, C-II, D-III

54. The Henry's law constant ( $K_H$ ) values of three gases (A, B, C) in water are 145,  $2 \times 10^{-5}$  and 35 kbar, respectively. The solubility of these gases in water follow the order:

- (1)  $B > C > A$
- (2)  $A > C > B$
- (3)  $A > B > C$
- (4)  $B > A > C$

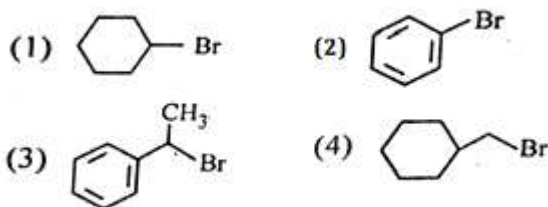
55. Arrange the following elements in increasing order of electronegativity:

N, O, F, C, Si

Choose the correct answer from the options given below:

- (1)  $\text{Si} < \text{C} < \text{O} < \text{N} < \text{F}$
- (2)  $\text{O} < \text{F} < \text{N} < \text{C} < \text{Si}$
- (3)  $\text{F} < \text{O} < \text{N} < \text{C} < \text{Si}$
- (4)  $\text{Si} < \text{C} < \text{N} < \text{O} < \text{F}$

56. The compound that will undergo  $\text{S}_{\text{N}}1$  reaction with the fastest rate is



57. In which of the following processes entropy increases?

- A. A liquid evaporates to vapour.
- B. Temperature of a crystalline solid lowered from 130 K to 0 K
- C.  $2 \text{NaHCO}_3(\text{s}) \rightarrow \text{Na}_2\text{CO}_3(\text{s}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$
- D.  $\text{Cl}_2(\text{g}) \rightarrow 2 \text{Cl}(\text{g})$

Choose the correct answer from the options given below:

- (1) A, B and D
- (2) A, C and D
- (3) C and D
- (4) A and C

58. Given below are two statements:

**Statement I:** Aniline does not undergo Friedel-Crafts alkylation reaction.

**Statement II:** Aniline cannot be prepared through Gabriel synthesis.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both Statement I and Statement II are false.
- (2) Statement I is correct but Statement II is false.
- (3) Statement I is incorrect but Statement II is true.
- (4) Both Statement I and Statement II are true.

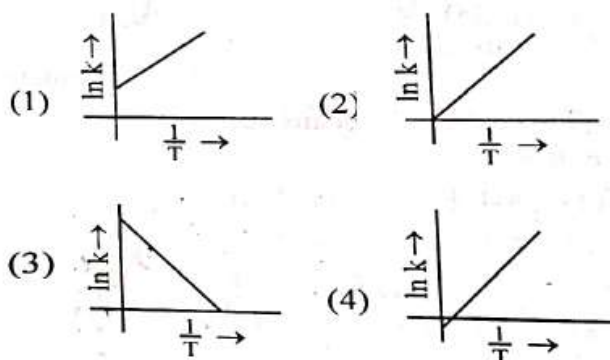
59. Match List I with List II.

	List I (Conversion)		List II (Number of Faraday required)
A.	1 mol of $\text{H}_2\text{O}$ to $\text{O}_2$	I.	3F
B.	1 mol of $\text{MnO}_4^-$ to $\text{Mn}^{2+}$	II.	2F
C.	1.5 mol of Ca from molten $\text{CaCl}_2$	III.	1F
D.	1 mol of FeO to $\text{Fe}_2\text{O}_3$	IV.	5F

Choose the correct answer from the options given below:

- (1) A-III, B-IV, C-I, D-II
- (2) A-II, B-III, C-I, D-IV
- (3) A-III, B-IV, C-II, D-I
- (4) A-II, B-IV, C-I, D-III

60. Which plot of  $\ln k$  vs  $\frac{1}{T}$  is consistent with Arrhenius equation?



Ans: (3)

61. Given below are two statements:

**Statement I:** The boiling point of three isomeric pentanes follows the order n-pentane > isopentane > neopentane

**Statement II:** When branching increases, the molecule attains a shape of sphere. This results in smaller surface area for contact, due to which the intermolecular forces between the spherical molecules are weak, thereby lowering the boiling point.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Both Statement I and Statement II are incorrect.
- (2) Statement I is correct but Statement II is incorrect.
- (3) Statement I is incorrect but Statement II is correct.
- (4) Both Statement I and Statement II are correct.

62. Match List I with List II.

	List I (Complexes)		List II (Type of isomerism)
A.	$[\text{Co}(\text{NH}_3)_5(\text{NO}_2)]\text{Cl}_2$	I.	Solvate isomerism
B.	$[\text{Co}(\text{NH}_3)_5(\text{SO}_4)]\text{Br}$	II.	Linkage isomerism
C.	$[\text{Co}(\text{NH}_3)_6]$ $[\text{Cr}(\text{CN})_6]$	III.	Ionization isomerism
D.	$[\text{Co}(\text{H}_2\text{O})_6]\text{Cl}_3$	IV.	Coordination isomerism

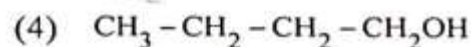
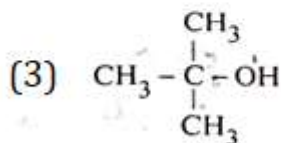
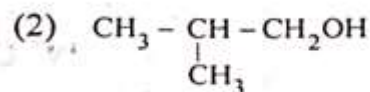
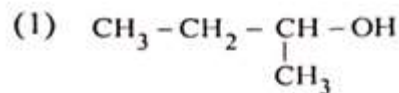
Choose the correct answer from the options given below:

- (1) A - I, B - III, C - IV, D - II
- (2) A - I, B - IV, C - III, D - II
- (3) A - II, B - IV, C - III, D - I
- (4) A - II, B - III, C - IV, D - I

63. 1 gram of sodium hydroxide was treated with 25 ml. of 0.75 M HCl solution, the mass of sodium hydroxide left unreacted is equal to

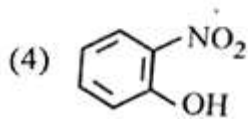
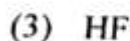
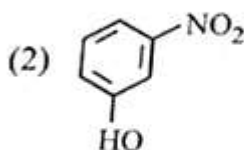
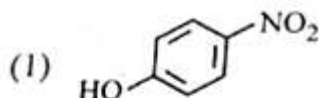
- (1) 250 mg
- (2) Zero mg
- (3) 200 mg
- (4) 750 mg

64. Which one of the following alcohols reacts instantaneously with Lucas reagent?



65. The  $E^\circ$  value for the  $Mn^{3+}/Mn^{2+}$  couple is more positive than that of  $Cr^{3+}/Cr^{2+}$  or  $Fe^{3+}/Fe^{2+}$  due to change of
- (1)  $d^5$  to  $d^2$  configuration
  - (2)  $d^4$  to  $d^5$  configuration
  - (3)  $d^3$  to  $d^5$  configuration
  - (4)  $d^5$  to  $d^4$  configuration

66. Intramolecular hydrogen bonding is present in



67. Match List I with List II.

	List I (Compound)		List II (Shape/ geometry)
A.	$NH_3$	I.	Trigonal Pyramidal
B.	$BrF_5$	II.	Square Planar
C.	$XeF_4$	III.	Octahedral
D.	$SF_6$	IV.	Square Pyramidal

Choose the correct answer from the options given below:

- (1) A-II, B-IV, C-III, D-I
- (2) A-III, B-IV, C-I, D-II
- (3) A-II, B-III, C-IV, D-I
- (4) A-I, B-IV, C-II, D-III

68. Among Group 16 elements, which one does NOT show -2 oxidation state?

- (1) Se
- (2) Te
- (3) Po
- (4) O

69. Given below are two statements:

**Statement I:** The boiling point of hydrides of Group 16 elements follow the order  $H_2O > H_2Te > H_2Se > H_2S$ .

**Statement II:** On the basis of molecular mass,  $H_2O$  is expected to have lower boiling point than the other members of the group but due to the presence of extensive H-bonding in  $H_2O$ , it has higher boiling point.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both Statement I and Statement II are false.
- (2) Statement I is true but Statement II is false.
- (3) Statement I is false but Statement II is true.
- (4) Both Statement I and Statement II are true.

70. 'Spin only' magnetic moment is same for which of the following ions?

- A.  $Ti^{3+}$
- B.  $Cr^{2+}$
- C.  $Mn^{2+}$
- D.  $Fe^{2+}$
- E.  $Sc^{3+}$

Choose the most appropriate answer from the options given below:

- (1) A and E only
- (2) B and C only
- (3) A and D only
- (4) B and D only

71. The reagents with which glucose does not react to give the corresponding tests/products are

- A. Tollen's reagent
- B. Schiff's reagent
- C. HCN
- D.  $\text{NH}_2\text{OH}$
- E.  $\text{NaHSO}_3$

Choose the correct options from the given below:

- (1) A and D                      (2) B and E
- (3) E and D                    (4) B and C

72. Given below are two statements:

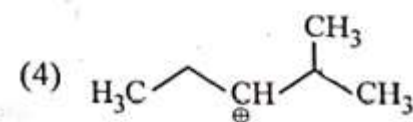
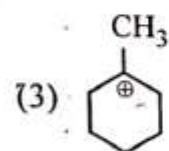
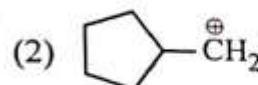
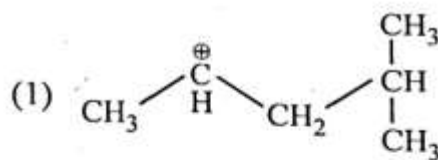
**Statement I:** Both  $[\text{Co}(\text{NH}_3)_6]^{3+}$  and  $[\text{CoF}_6]^{3-}$  complexes are octahedral but differ in their magnetic behaviour.

**Statement II:**  $[\text{Co}(\text{NH}_3)_6]^{3+}$  is diamagnetic whereas  $[\text{CoF}_6]^{3-}$  is paramagnetic.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Both Statement I and Statement II are false.
- (2) Statement I is true but Statement II is false.
- (3) Statement I is false but Statement II is true.
- (4) Both Statement I and statement II are true.

73. The most stable carbocation among the following is



Ans: (3)

74. Fehling's solution 'A' is

- (1) alkaline copper sulphate
- (2) alkaline solution, of sodium potassium tartrate (Rochelle's salt)
- (3) aqueous sodium citrate
- (4) aqueous copper sulphate

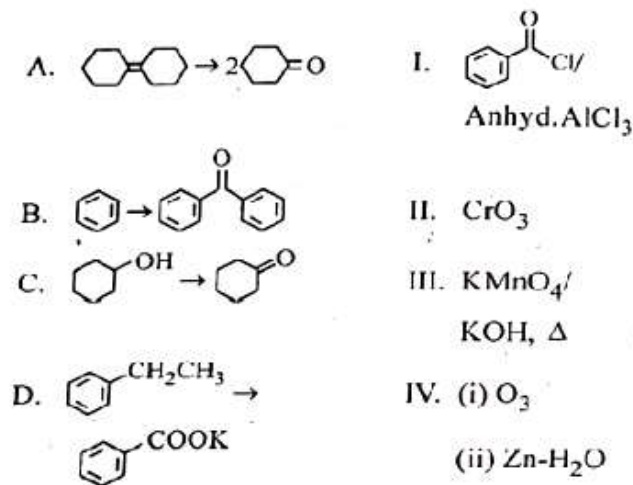
75. In which of the following equilibria,  $K_p$  and  $K_c$  are NOT equal?

- (1)  $\text{H}_{2(g)} + \text{I}_{2(g)} \rightleftharpoons 2 \text{HI}_{(g)}$
- (2)  $\text{CO}_{(g)} + \text{H}_2\text{O}_{(g)} \rightleftharpoons \text{CO}_{2(g)} + \text{H}_2(g)$
- (3)  $2 \text{BrCl}_{(g)} \rightleftharpoons \text{Br}_{2(g)} + \text{Cl}_{2(g)}$
- (4)  $\text{PCl}_{5(g)} \rightleftharpoons \text{PCl}_{3(g)} + \text{Cl}_{2(g)}$

76.

Match List I with List II.

List I (Reaction)

List II (Reagents/  
Condition)

Choose the correct answer from the options given below

- (1) A-III, B-I, C-II, D-IV  
 (2) A-IV, B-I, C-II, D-III  
 (3) A-I, B-IV, C-II, D-III  
 (4) A-IV, B-I, C-III, D-II
77. A compound with a molecular formula of C<sub>6</sub>H<sub>14</sub> has two tertiary carbons. Its IUPAC name is:
- (1) 2-methylpentane  
 (2) 2,3-dimethylbutane  
 (3) 2,2-dimethylbutane  
 (4) n-hexane
78. Activation energy of any chemical reaction can be calculated if one knows the value of
- (1) probability of collision.  
 (2) orientation of reactant molecules during collision.  
 (3) rate constant at two different temperatures.  
 (4) rate constant at standard temperature.

79. On heating, some solid substances change from solid to vapour state without passing through liquid state. The technique used for purification of such solid substances based on above principle is known as

- (1) Sublimation  
 (2) Distillation  
 (3) Chromatography  
 (4) Crystallization

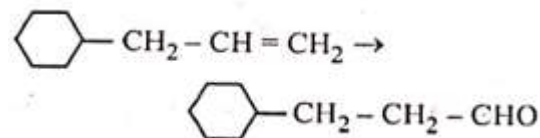
80. The energy of an electron in the ground state ( $n = 1$ ) for He<sup>+</sup> ion is  $-x$  J, then that for an electrons in  $n = 2$  state for Be<sup>3+</sup> ion in J is:

- (1)  $-\frac{x}{9}$                       (2)  $-4x$   
 (3)  $-\frac{4}{9}x$                     (4)  $-x$

81. Which reaction is NOT a redox reaction?

- (1)  $2 \text{KClO}_3 + \text{I}_2 \rightarrow 2 \text{KIO}_3 + \text{Cl}_2$   
 (2)  $\text{H}_2 + \text{Cl}_2 \rightarrow 2 \text{HCl}$   
 (3)  $\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2 \text{NaCl}$   
 (4)  $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$

82. Identify the correct reagents that would bring about the following transformation.



- (1) (i) BH<sub>3</sub>; (ii) H<sub>2</sub>O<sub>2</sub>/ $\bar{\text{O}}\text{H}$ ; (iii) PCC  
 (2) (i) BH<sub>3</sub>; (ii) H<sub>2</sub>O<sub>2</sub>/ $\bar{\text{O}}\text{H}$ ; (iii) alk. KMnO<sub>4</sub>; (iv) H<sub>3</sub>O<sup>+</sup>  
 (3) (i) H<sub>2</sub>O/H<sup>+</sup>; (ii) PCC  
 (4) H<sub>2</sub>O/H<sup>+</sup>; (ii) CrO<sub>3</sub>

83. Match List I with List II.

	List I Quantum Number		List II Information provided
A.	$m_l$	I.	shape of orbital
B.	$m_s$	II.	size of orbital
C.	$l$	III.	orientation of orbital
D.	$n$	IV.	orientation of spin of electron

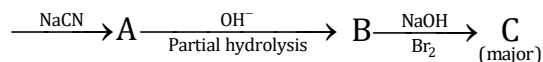
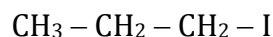
Choose the correct answer from the options given below:

- (1) A-III, B-IV, C-I, D-II  
 (2) A-III, B-IV, C-II, D-I  
 (3) A-II, B-I, C-IV, D-III  
 (4) A-I, B-III, C-II, D-IV
84. For the reaction  $2A \rightleftharpoons B + C$ ,  $K_c = 4 \times 10^{-3}$ . At a given time, the composition of reaction mixture is:  $[A] = [B] = [C] = 2 \times 10^{-3}M$ . Then, which of the following is correct?
- (1) Reaction has a tendency to go in forward direction.  
 (2) Reaction has a tendency to go in backward direction.  
 (3) Reaction has gone to completion in forward direction.  
 (4) Reaction is at equilibrium.
85. The highest number of helium atoms is in
- (1) 4 u of helium  
 (2) 4 g of helium  
 (3) 2.271098 L of helium at STP  
 (4) 4 mol of helium

### Section – B (Attempt Any 10)

86. The pair of lanthanoid ions which are diamagnetic is
- (1)  $Ce^{3+}$  and  $Eu^{2+}$   
 (2)  $Gd^{3+}$  and  $Eu^{3+}$   
 (3)  $Pm^{3+}$  and  $Sm^{3+}$   
 (4)  $Ce^{4+}$  and  $Yb^{2+}$
87. The products A and B obtained in the following reactions, respectively, are
- $$3ROH + PCl_3 \rightarrow 3RCl + A$$
- $$ROH + PCl_5 \rightarrow RCl + HCl + B$$
- (1)  $POCl_3$  and  $H_3PO_4$   
 (2)  $H_3PO_4$  and  $POCl_3$   
 (3)  $H_3PO_3$  and  $POCl_3$   
 (4)  $POCl_3$  and  $H_3PO_3$
88. Given below are two statements:
- Statement I:**  $[Co(NH_3)_6]^{3+}$  is a homoleptic complex whereas  $[Co(NH_3)_4Cl_2]^+$  is a heteroleptic complex.
- Statement II:** Complex  $[Co(NH_3)_6]^{3+}$  has only one kind of ligands but  $[Co(NH_3)_4Cl_2]^+$  more than one kind of ligands.
- In the light of the above statements, choose the correct answer from the options given below:
- (1) Both Statement I and Statement II are false.  
 (2) Statement I is true but Statement II is false.  
 (3) Statement I is false but Statement II is true.  
 (4) Both Statement I and Statement II are true.

89. Identify the major product C formed in the following reaction sequence :



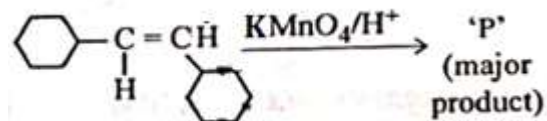
- (1) butylamine  
 (2) butanamide  
 (3)  $\alpha$ -bromobutanoic acid  
 (4) propylamine
90. The work done during reversible isothermal expansion of one mole of hydrogen gas at  $25^\circ\text{C}$  from pressure of 20 atmosphere to 10 atmosphere is:  
 (Given  $R = 2.0 \text{ cal K}^{-1} \text{ mol}^{-1}$ )

- (1) - 413.14 calories  
 (2) 413.14 calories  
 (3) 100 calories  
 (4) 0 calorie

91. Identify the correct answer.

- (1)  $\text{BF}_3$  has non-zero dipole moment.  
 (2) Dipole moment of  $\text{NF}_3$  is greater than that of  $\text{NH}_3$ .  
 (3) Three canonical forms can be drawn for  $\text{CO}_3^{2-}$  ion.  
 (4) Three resonance structures can be drawn for ozone.

92. For the given reaction:



'P' is

- (1)
- (2)
- (3)
- (4)

93. During the preparation of Mohr's salt solution (Ferrous ammonium sulphate), which of the following acid is added to prevent hydrolysis of  $\text{Fe}^{2+}$  ion?

- (1) concentrated sulphuric acid  
 (2) dilute nitric acid  
 (3) dilute sulphuric acid  
 (4) dilute hydrochloric acid

94. Given below are certain cations. Using inorganic qualitative analysis, arrange them in increasing group number from 0 to VI.

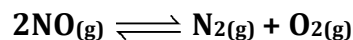
- A.  $\text{Al}^{3+}$                       B.  $\text{Cu}^{2+}$   
 C.  $\text{Ba}^{2+}$                       D.  $\text{Co}^{2+}$   
 E.  $\text{Mg}^{2+}$

Choose the correct answer from the options given below:

- (1) B, C, A, D, E  
 (2) E, C, D, B, A  
 (3) E, A, B, C, D  
 (4) B, A, D, C, E



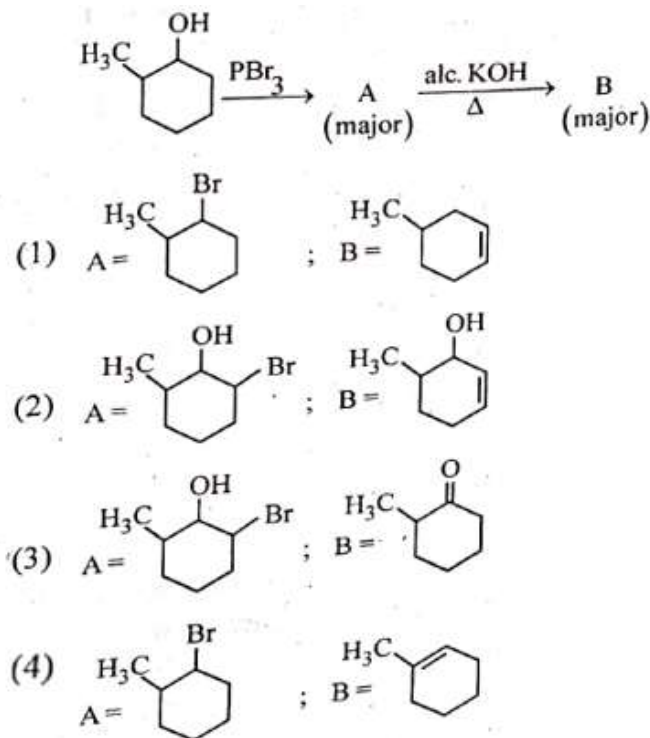
95. Consider the following reaction in a sealed vessel at equilibrium with concentrations of  $N_2 = 3.0 \times 10^{-3} \text{ M}$ ,  $O_2 = 4.2 \times 10^{-3} \text{ M}$  and  $NO = 2.8 \times 10^{-3} \text{ M}$



If  $0.1 \text{ mol L}^{-1}$  of  $NO(g)$  is taken in a closed vessel what will be degree of dissociation ( $\alpha$ ) of  $NO(g)$  at equilibrium?

- (1) 0.0889                      (2) 0.8889  
(3) 0.717                        (4) 0.00889
96. Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is:  
(Given: Molar mass of Cu:  $63 \text{ g mol}^{-1}$   $1F = 96487 \text{ C}$ )
- (1) 0.315 g                      (2) 31.5 g  
(3) 0.0315 g                    (4) 3.15 g
97. The plot of osmotic pressure ( $\Pi$ ) vs concentration ( $\text{mol L}^{-1}$ ) for a solution gives a straight line with slope  $25.73 \text{ L bar mol}^{-1}$ . The temperature at which the osmotic pressure measurement is done is: (Use  $R = 0.083 \text{ L bar mol}^{-1} \text{ K}^{-1}$ )
- (1)  $310^\circ\text{C}$                       (2)  $25.73^\circ\text{C}$   
(3)  $12.05^\circ\text{C}$                     (4)  $37^\circ\text{C}$

98. Major products A and B formed in the following reaction sequence, are



99. The rate of a reaction quadruples when temperature changes from  $27^\circ\text{C}$  to  $57^\circ\text{C}$ . Calculate the energy of activation.  
Given  $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$ ,  $\log 4 = 0.6021$
- (1)  $380.4 \text{ kJ/mol}$               (2)  $3.80 \text{ kJ/mol}$   
(3)  $3804 \text{ kJ/mol}$              (4)  $38.04 \text{ kJ/mol}$
100. A compound X contains 32% of A, 20% of B and remaining percentage of C. Then, the empirical formula of X is:  
(Given atomic masses of A = 64; B = 40; C = 32 u)
- (1)  $ABC_3$                         (2)  $AB_2C_2$   
(3)  $ABC_4$                         (4)  $A_2BC_2$