

SAMPLE PAPER

2019 JEE ADVANCED

CHEMISTRY

SET-1

Roll No.

--	--	--	--	--	--	--

Section-1 (Maximum Marks : 12)

- (i) This section contains **TWO (02)** paragraphs. Based on each paragraph, there are **TWO (02)** questions.
- (ii) Each question has **FOUR** options. **ONLY ONE** of these four options corresponds to the correct answer.
- (iii) For each question, choose the option corresponding to the correct answer.
- (iv) Answer to each question will be evaluated according to the following marking scheme:
- (v) Full Marks : +3 If **ONLY** the correct option is chosen.
- (vi) Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered).
- (vii) Negative Marks : -1 In all other cases.

P with CH_3MgBr (excess) in $(\text{C}_2\text{H}_5)_2\text{O}$ followed by addition of H_2O gives Q. The compound Q on treatment with H_2SO_4 at 0°C gives R. The reaction of R with CH_3COCl in the presence of anhydrous AlCl_3 in CH_2Cl_2 followed by treatment with H_2O produces compound S. [Et in compound P is ethyl group].

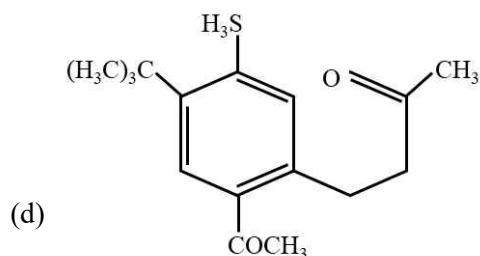
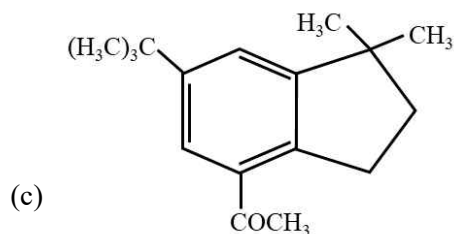
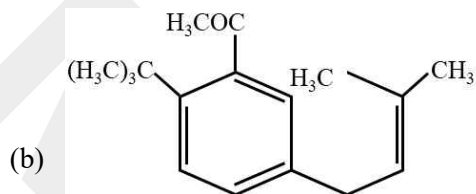
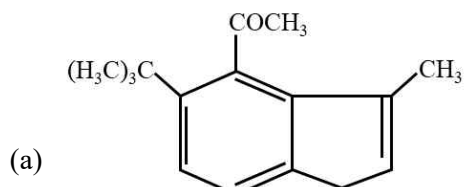
1. The reactions, Q to R and R to S, are
- Friedel-Crafts alkylation and Friedel-Crafts acylation
 - dehydration and Friedel-Crafts acylation
 - Friedel-Crafts alkylation, dehydration and Friedel-Crafts acylation
 - aromatic sulphonation and Friedel-Crafts acylation



MISOSTUDY.COM

The Best Online Coaching for IIT-JEE | NEET Medical | CBSE INQUIRY +91 8929 803 804

2. The products S is



The reactions of Cl_2 gas with cold dilute and hot concentrated NaOH in water give sodium salts of two (different) oxoacids of chlorine P and Q, respectively. The Cl_2 gas reacts with SO_2 gas, in presence of charcoal, to give a product R. R reacts with white phosphorus to give a compound S. On hydrolysis, S give an oxoacid of phosphorus, T.

3. R, S and T, respectively are

- (a) SO_2Cl_2 , PCl_5 and H_3PO_4
- (b) SO_2Cl_2 , PCl_3 and H_3PO_3
- (c) SOCl_2 , PCl_5 and H_3PO_2
- (d) SOCl_2 , PCl_5 and H_3PO_4

4. P and Q, respectively, are the sodium salts of

- (a) hypochlorous and chloric acids
- (b) hypochlorous and chlorous acids
- (c) chloric and perchloric acids
- (d) chloric and hypochlorous acid

Section-2 (Maximum Marks : 24)

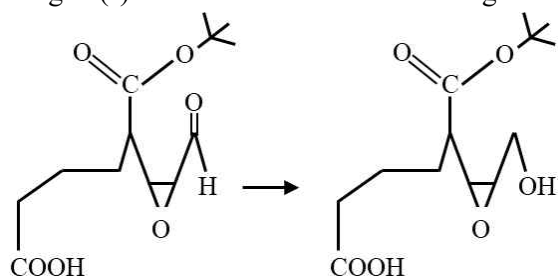
- (i) This section contains 8 question.
- (ii) Each question has 4 options (a), (b), (c), and (d). **ONLY ONE** of these four options is correct.
- (iii) For each question, darken the bubble corresponding to the correct option in the **OMR**.
- (iv) For each question, marks will be awarded in one of the following categories:
 Full Marks : +3 If, only the bubble corresponding to the correct option is darkened.
 Zero Marks : 0 If none of the bubbles is darkened.
 Negative Marks : -1 In all other cases.



MISOSTUDY.COM

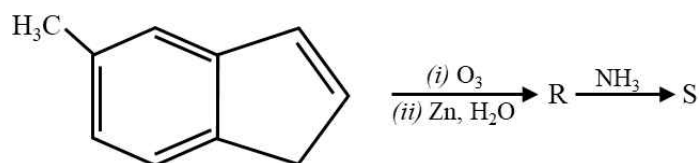
The Best Online Coaching for IIT-JEE | NEET Medical | CBSE INQUIRY +91 8929 803 804

5. Reagent(s) which can be used to bring about the following transformation is (are)



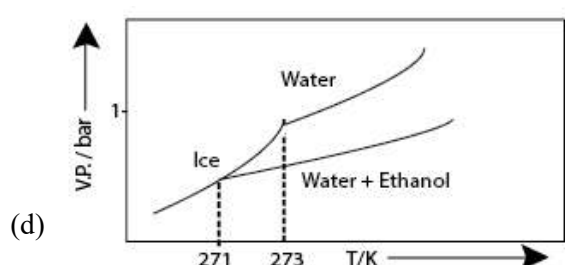
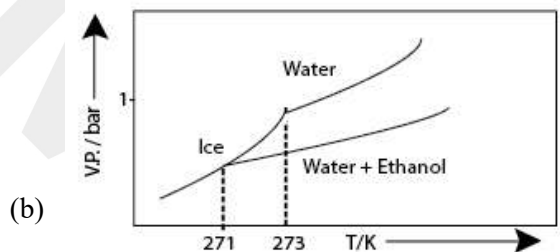
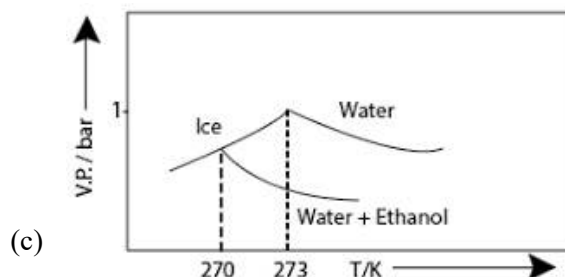
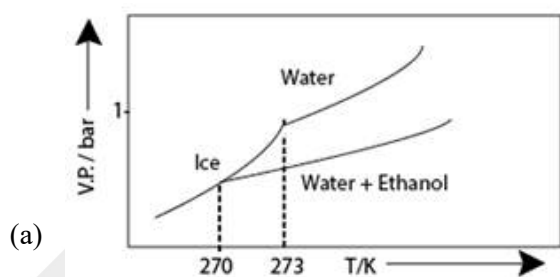
- (a) LiAlH_4 in $(\text{C}_2\text{H}_5)_2\text{O}$
 (b) BH_3 in THF
 (c) NaBH_4 in $\text{C}_2\text{H}_5\text{OH}$
 (d) Raney Ni/ H_2 in THF

6. In the following reactions, the product S is



- (a)
- (b)
- (c)
- (d)

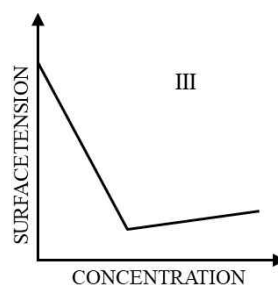
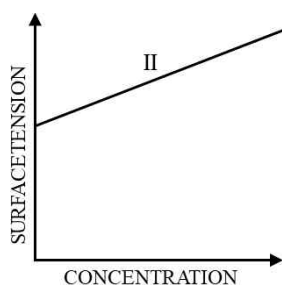
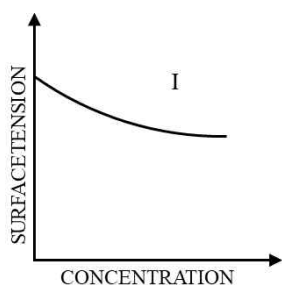
7. Pure water freezes at 273 K and 1 bar. The addition of 34.5 g of ethanol to 500 g of water changes the freezing point of the solution. Use the freezing point depression constant of water as 2 K kg mol^{-1} . The figures shown below represent plots of vapour pressure (V.P.) versus temperature (T) [Molecular weight of ethanol is 46 g mol^{-1}]. Among the following, the option representing change in the freezing point is



8. For the following cell $\text{Zn}(s) | \text{ZnSO}_4(aq) || \text{CuSO}_4(aq) | \text{Cu}(s)$ when the concentration of Zn^{2+} is 10 times the concentration of Cu^{2+} , the expression for ΔG (in J mol^{-1}) is [F is Faraday constant, R is gas constant, T is temperature, $E^\circ(\text{cell}) = 1.1 \text{ V}$]
- (a) $2.303 RT + 1.1 F$
 (b) $1.1 F$
 (c) $2.303 RT - 2.2 F$
 (d) $-2.2 F$

9. According to molecular orbital theory
- (a) C_2^{2-} is expected to be diamagnetic
 (b) O_2^{2+} is expected to have a longer bond length than O_2
 (c) N_2^+ and N_2^- have the same bond order
 (d) He_2^+ has the same energy as two isolated He atoms

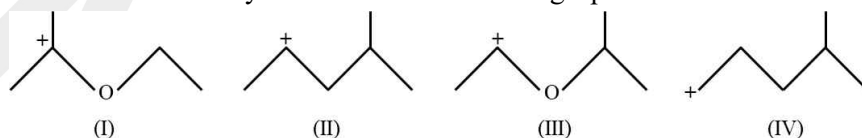
10. The qualitative sketches I, II and III given below show the variation of surface tension with molar concentration of three different aqueous solutions KCl, CH_3OH and $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$ at room temperature. The correct assignment of the sketches is



- (a) I : KCl II : CH_3OH III : $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$
 (b) I : $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$ II : CH_3OH III : KCl
 (c) I : KCl II : $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$ III : CH_3OH
 (d) I : CH_3OH II : KCl III : $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$

11. The K_{sp} of Ag_2CrO_4 is 1.1×10^{-12} at 298 K. The solubility (in mol/L) of Ag_2CrO_4 in 0.1 M $AgNO_3$ solution is
- 1.1×10^{-11}
 - 1.1×10^{-10}
 - 1.1×10^{-12}
 - 1.1×10^{-9}

12. The correct stability order for the following species is



- (II) > (IV) > (I) > (III)
- (I) > (II) > (III) > (IV)
- (II) > (I) > (IV) > (III)
- (I) > (III) > (II) > (IV)

Section-3 (Maximum Marks : 24)

- This section contains **SIX (06)** questions.
- Each question has **FOUR** options for correct answer(s). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct option(s).
- For each question, choose the correct option(s) to answer the question.
- Answer to each question will be evaluated according to the following marking scheme:**

Full Marks : +4 If only (all) the correct option(s) is (are) chosen.

Partial Marks : +3 If all the four options are correct but **ONLY** three options are chosen.

Partial Marks : +2 If three or more options are correct but **ONLY** two options are chosen, both of which are correct options.

Partial Marks : +1 If two or more options are correct but **ONLY** one option is chosen and it is a correct option.

Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered).

Negative Marks : -2 In all other cases.

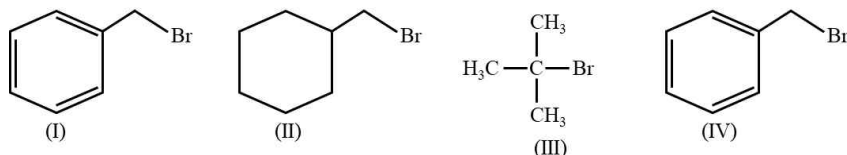
- For Example: If first, third and fourth are the **ONLY** three correct options for a question with second option being an incorrect option; selecting only all the three correct options will result in +4 marks. Selecting only two of the three correct options (e.g. the first and fourth options), without selecting any incorrect option (second option in this case), will result in +2 marks. Selecting only one of the three correct options (either first or third or fourth option), without selecting any incorrect option (second option in this case), will result in +1 marks. Selecting any incorrect option(s) (second option in this case), with or without selection of any correct option(s) will result in -2 marks.



MISOSTUDY.COM

The Best Online Coaching for IIT-JEE | NEET Medical | CBSE INQUIRY +91 8929 803 804

13. For the following compounds, the correct statement(s) with respect to nucleophilic substitution reactions is (are).



- (a) I and II follow S_N2 mechanism
 (b) compound IV undergoes inversion of configuration
 (c) the order of reactivity for I, III and IV is : IV > I > III
 (d) I and III follow S_N1 mechanism

14. The CORRECT statement(s) for cubic closed packed (*ccp*) three-dimensional structure is (are)

- (a) The number of neighbours of an atom present in the topmost layer is 12
 (b) The efficiency of the atom packing is 74%
 (c) The number of octahedral and tetrahedral voids per atom are 1 and 2 respectively
 (d) The unit cell edge length is $2\sqrt{2}$ times the radius of the atom

15. The rate constant of a reaction is given by $k = 2.1 \times 10^{10} \exp(-2700/RT)$

It mean that

- (a) $\log k$ vs. $1/T$ will be a straight line with slope = $-\frac{2700}{2.303R}$
 (b) $\log k$ vs. $1/T$ will be straight line with intercept on $\log k$ axis = 2.1×10^{10}
 (c) The number of effective collisions are $2.1 \times 10^{10} \text{ cm}^{-3} \text{ sec}^{-1}$
 (d) Half life of the reaction increases with increase of temperature

16. The correct statement(s) about Cr^{2+} and Mn^{3+} is (are) [Atomic numbers of Cr = 24 and Mn = 25]

- (a) Cr^{2+} is a reducing agent
 (b) Mn^{3+} is an oxidizing agent
 (c) Both Cr^{2+} and Mn^{3+} exhibit d^4 electronic configuration
 (d) When Cr^{2+} is used as a reducing agent, the chromium ion attains d^5 configuration

17. The pair(s) of coordination complexes/ions exhibiting the same kind of isomerism is(are)

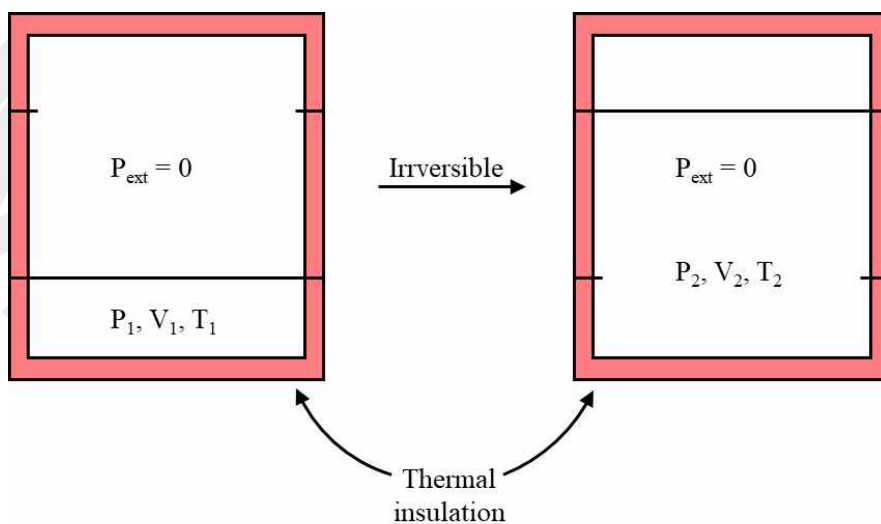
- (a) $[\text{Cr}(\text{NH}_3)_5\text{Cl}] \text{Cl}_2$ and $[\text{Cr}(\text{NH}_3)_4\text{Cl}_2] \text{Cl}$
 (b) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ and $[\text{Pt}(\text{NH}_3)_2(\text{H}_2\text{O}) \text{Cl}]^-$
 (c) $[\text{CoBr}_2\text{Cl}_2]^{2-}$ and $[\text{PtBr}_2\text{Cl}_2]^{2-}$
 (d) $[\text{Pt}(\text{NH}_3)_3(\text{NO}_3)] \text{Cl}$ and $[\text{Pt}(\text{NH}_3)_3\text{Cl}] \text{Br}$



MISOSTUDY.COM

The Best Online Coaching for IIT-JEE | NEET Medical | CBSE INQUIRY +91 8929 803 804

18. An ideal gas in a thermally insulated vessel at internal pressure = P_1 , volume = V_1 and absolute temperature = T_1 expands irreversibly against zero external pressure, as shown in the diagram. The final internal pressure, volume and absolute temperature of gas are P_2 , V_2 and T_2 respectively. For this expansion,



- (a) $q = 0$
- (b) $T_2 = T_1$
- (c) $P_2V_2 = P_1V_1$
- (d) $P_2V_2^\gamma = P_1V_1^\gamma$



MISOSTUDY.COM

The Best Online Coaching for IIT-JEE | NEET Medical | CBSE INQUIRY +91 8929 803 804