

# الإجابة النموذجية لامتحان مادة كيمياء المنظفات الصناعية

٤١٤ ك

(ورقة امتحانيه كامله)

الفرقة : الرابعه

التاريخ : الاربعاء ٢٢/٠١/٢٠١٧

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قسم : الكيمياء

كلية : العلوم



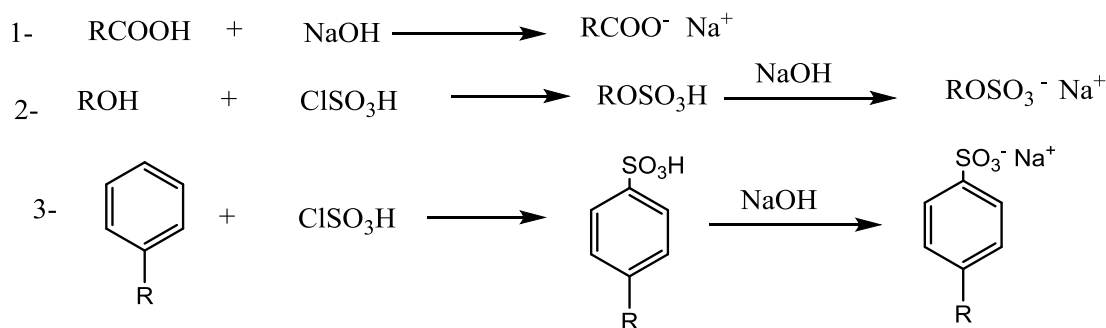
### Answer the following questions:

**[1] a) Define anionic surfactants and how can you prepare it by three different methods?**

**Answer:**

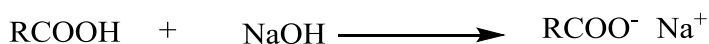
Anionic surfactants: The surface-active portion of the molecule bears a negative charge, for example,  $\text{RCOO}^- \text{Na}^+$  (soap),  $\text{RC}_6\text{H}_4\text{SO}_3^- \text{Na}^+$  (alkylbenzene sulfonate).

**preparation by three different methods:**



**b) Differentiate between Soaps and detergents?**

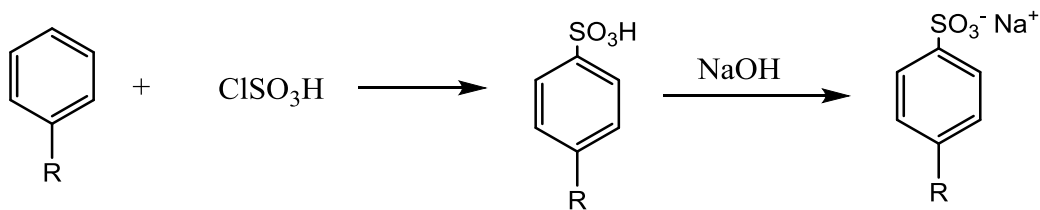
**Soaps**: are sodium or potassium salts of fatty acids



Soap don't work in hard water

Soap can be synthesized naturally and synthetic

**Detergent** : are metallic salts of benzene sulphonic acid



**Detergent** work in soft and hard water

**Detergent** can be synthesized industrially.

**[2] What is the mean of surfactants and write in details the types of surfactants?**

**Surfactants** are compounds that lower the surface tension (or interfacial tension) between two liquids or between a liquid and a solid. Surfactants may act as detergents, wetting agents, emulsifiers, foaming agents, and dispersants.

1. **Anionic.** The surface-active portion of the molecule bears a negative charge, for example,  $\text{RCOO}^- \text{Na}^+$  (soap),  $\text{RC}_6\text{H}_4\text{SO}_3^- \text{Na}^+$  (alkylbenzene sulfonate).

2. **Cationic.** The surface-active portion bears a positive charge, for example,  $\text{RNH}_3\text{Cl}^+$  (salt of a long-chain amine),  $\text{RN}^+(\text{CH}_3 \text{Cl}^-)$  (quaternary ammonium chloride).

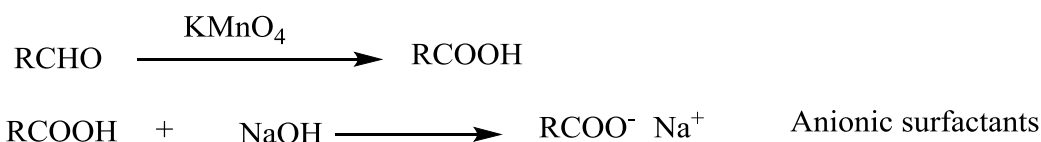
3. **Zwitterionic.** Both positive and negative charges may be present in the surface-active portion, for example,  $\text{RNH}_2\text{CH}_2\text{COO}^-$  (long-chain amino acid),  $\text{RN}^+(\text{CH}_3\text{CH}_2\text{CH}_2\text{SO}_3^-)$  (sulfobetaine).

4. **Nonionic.** The surface-active portion bears no apparent ionic charge, for example,  $\text{RCOOCH}_2\text{CHOHCH}_2\text{OH}$  (monoglyceride of long-chain fatty

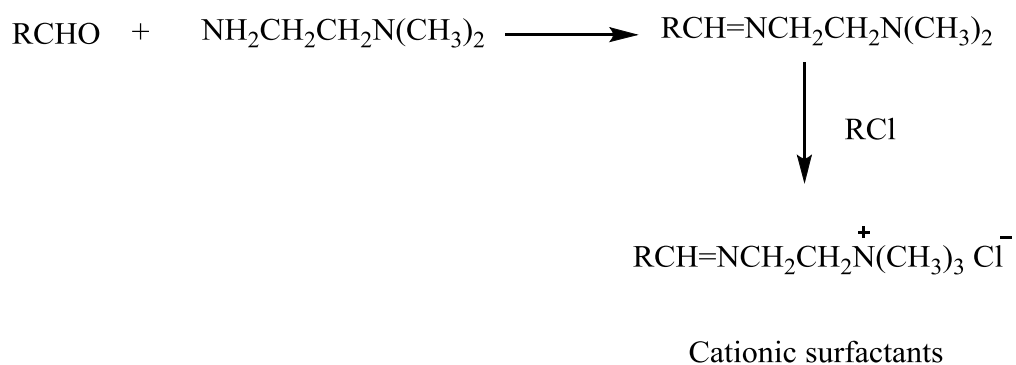
acid),  $\text{RC}_6\text{H}_4(\text{OC}_2\text{H}_4)_x\text{OH}$  (polyoxyethylenated alkylphenol),  $\text{R}(\text{OC}_2\text{H}_4)_x\text{OH}$  (polyoxyethylenated alcohol).

**[3] Starting by decanal, how can you prepare the following?**

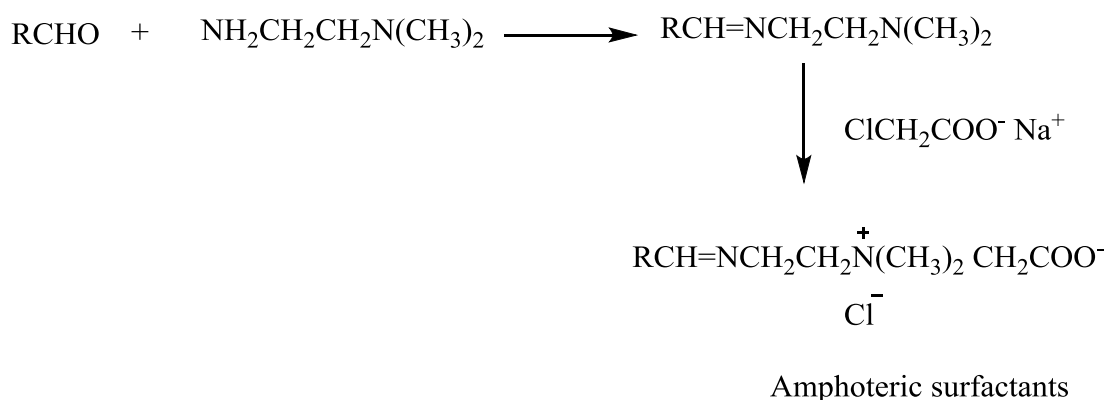
**a- Anionic surfactants**



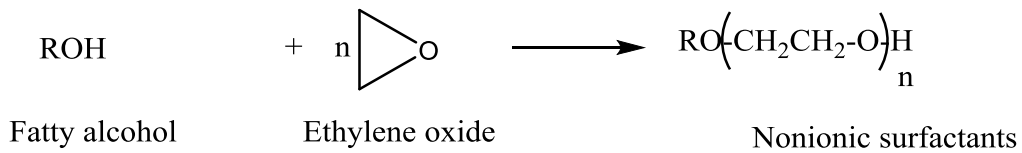
**b- Cationic surfactants**



**c- Amphoteric surfactants**

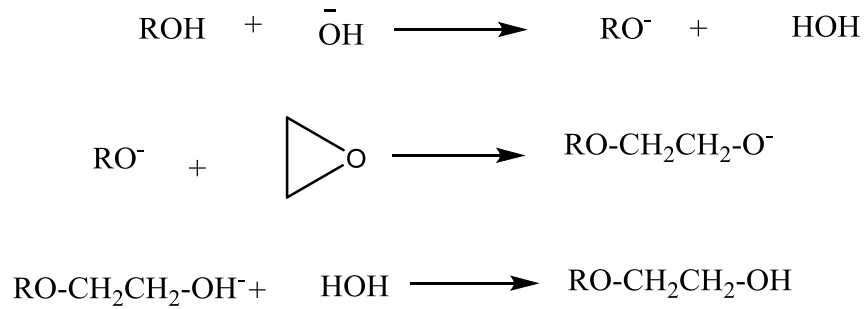


**[4] How can you synthesis nonionic surfactants and write the mechanism of it in base and acid medium?**

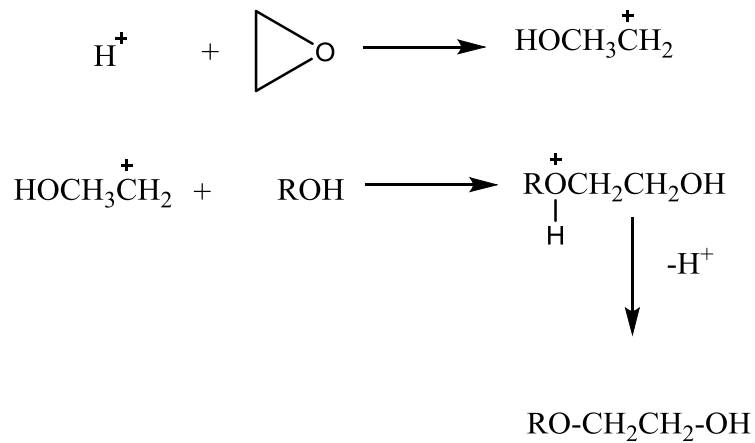


**Mechanism:**

**Base medium:**



**Acid medium:**



*With my best wishes*

*Dr. Ahmed Tantawy*