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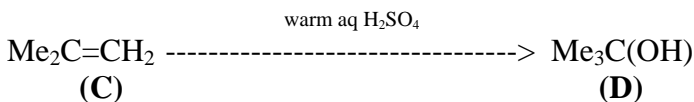
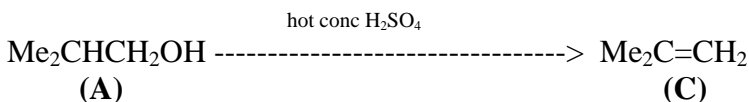
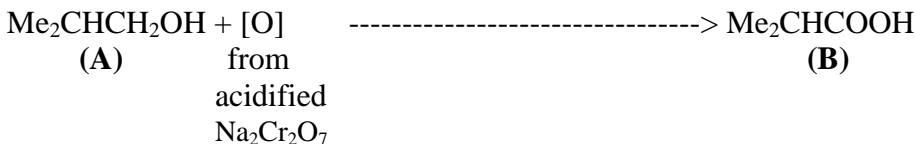
### SOLUTION TO CRACK PROBLEM 41

An alcohol A(C<sub>4</sub>H<sub>10</sub>O), on oxidation with acidic sodium dichromate, gives a carboxylic acid B (C<sub>4</sub>H<sub>8</sub>O<sub>2</sub>). Treatment of A with hot concentrated sulphuric acid brings about dehydration and gives compound C (C<sub>4</sub>H<sub>8</sub>). Treatment of C with warm aqueous sulphuric acid gives D(C<sub>4</sub>H<sub>10</sub>O), a new alcohol isomeric with compound A. Compound D is resistant to oxidation. Identify A, B, C and D. Give equations for all reactions.

#### Reasoning:

As A can be oxidized by acidic sodium dichromate solution to B which is a carboxylic acid, and D is an isomer of A which is resistant to oxidation, hence A is a primary alcohol and D is a tertiary alcohol (*A cannot be a secondary alcohol as secondary alcohols are oxidized to ketones*). Acid catalyzed dehydration of an alcohol results in elimination of the alcohol to form an alkene.

#### Reactions:



#### Answer:

A: Me<sub>2</sub>CHCH<sub>2</sub>OH : 2-methylpropan-1-ol

B: Me<sub>2</sub>CHCOOH : 2-methylpropan-1-oic acid

C: Me<sub>2</sub>C=CH<sub>2</sub> : 2-methylprop-1-ene (isobutylene)

D: Me<sub>3</sub>C(OH) : 2-methylpropan-2-ol