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B. Tech. I Year, I Semester, I Mid Term Examination, 2014-15

AHC-101: Engineering Chemistry

Time: 01 ½ Hours Total Marks: 20

Section-A

Note: Attempt All Questions. [1X05=05 marks]

I. What is activation energy ? How the rate constant of a reaction is related to its activation energy ?

II. Arrange the following molecule/ ions in order of their increasing bond length : O_2 , O_2^+, O_2^-, O_2^{2-}.

III. Mention any two applications of photovoltaic cells.

IV. H_2O is a liquid but H_2S is a gas. Why ?

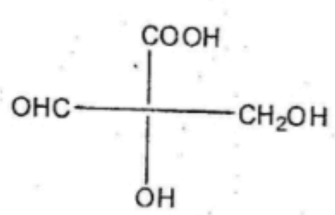
V. Which conformation of n-butane is most stable and why ?

Section-B

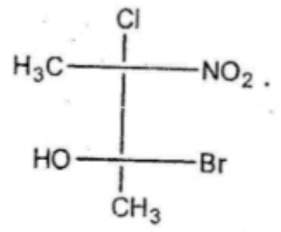
Note: Attempt Any Three Questions. [2X03=06 marks]

I . A first order reaction is 20 % completed in 40 minutes. How long will it take for the reaction to go to 80 % completion.

II. Assign *(R)*- or *(S)*- configuration to the following molecules- (by giving proper numbering.)



(I)



(II)

III. Explain conductors and semi-conductors on the basis of Band Theory.

IV. Write a short note on bio-materials.

Section-C

Note: Attempt Any Three Questions. [3X 03=09 marks]

I. Derive an integrated rate equation for a second order reaction when both reactants are same. Deduce an expression for it's half life period also.

II . Draw the molecular orbital diagram of N_2 ; find out the bond order and assign magnetic behaviour to it also.

III. Discuss the structure of carbocation and explain the stability order of primary, secondary and tertiary aliphatic carbocations.

IV. What are smart materials ? Mention some applications of piezoelectric effects.