(REVISED COURSE) **QP Code :11873**

(2 Hours) [Total Marks : 60

N.B. : (1) Question No.1 is **Compulsory**.
   (2) Attempt any **three** Questions from remaining **five** questions.
   (3) **All** questions carry **equal** marks.
   (4) **Figures** to the **right** indicate **full** marks.
   (4) **Atomic Weights** : H = 1, C = 12, N = 14, O = 16, S = 32, Cl = 35.5, Ba = 137.3.

1. Answer any **five** of the following :—
   (a) Distinguish between Galvanizing and tinning. 15
   (b) Give composition, properties and uses of Duralumin.
   (c) What is 'cracking' of heavy oil? Mention any four advantages of catalytic cracking over thermal cracking.
   (d) Explain 'Design for Energy Efficiency' principle in Green Chemistry.
   (e) What are composite materials? Mention any four characteristic properties of composite materials.
   (f) Gold and platinum do not get corroded in atmospheric oxygen. Explain.
   (g) A sample of coal has the following composition by mass : C = 75%, H = 7%, O = 8 %, S = 4 %, N = 2% and Ash = 4 %. Calculate Gross Calorific value of the fuel using Dulong's formula.

2. (a) What is Electrochemical corrosion ? With a suitable diagram and electrode reactions, explain electrochemical mechanism of rusting of iron in neutral, aqueous medium. 6
   (b) What is meant by 'Knocking' in internal combustion engine ? Define Octane number and Cetane number. Name any two anti-knock agents. 5
   (c) Calculate percentage atom economy for the following reaction with respect to allyl chloride. 4
   $$CH_3 - CH = CH_2 + Cl_2 \rightarrow Cl - CH_2 - CH = CH_2 + HCl$$
   allyl chloride
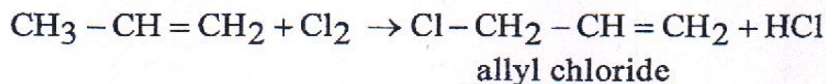
3. (a) A gaseous fuel has the following composition by volume :
   H_2 = 40%, CH_4 = 30%, CO = 10%, C_3H_8 = 12%, N_2 = 3%, O_2 = 2% and CO_2 = 3% . Calculate volume and weight of air required for complete combustion of $1m^3$ of fuel. (Mol. wt. of air = 28.949) 6

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