

- N.B. (1) Question No. 1 is compulsory.
 (2) Attempt any three from remaining five questions.
 (3) All questions carries equal marks.
 (4) Atomic weight :—

H = 1,	Cl = 35.5,
C = 12,	Ba = 137.3,
N = 14,	Mg = 24,
O = 16,	Na = 23,
S = 32,	Ca = 40

1. Answer any five from the following :—

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- Why silver, gold and platinum do not undergo oxidation corrosion ?
- Define Octane number and Cetane number. Give their significance.
- Give the composition, properties and uses of German silver.
- Give classification of composite material.
- What is Green chemistry ? List the 12 principles of Green chemistry.
- State the characteristics of a good paints.
- A coal sample was subjected to ultimate analysis, 0.6 gm of coal on combustion in a Bomb calorimeter, produces 0.05 gm BaSO₄. Calculate the percentage of 'S' in coal sample.

2. (a) What are metallic coatings ? Distinguish between Galvanizing and Tinning.

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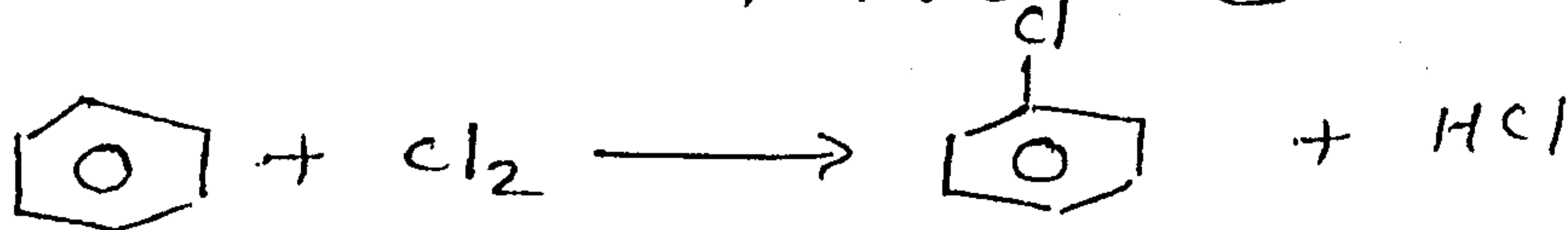
(b) Explain refining of petroleum with suitable diagram.

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(c) Calculate % atom economy for following reactions :—

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W.R.T. Chlorobenzene



3. (a) A coal sample has the following composition by weights : C = 82%, H = 3%, O = 8%, S = 2%, N = 2% and Ash = 3%. Calculate the minimum amount of air required both by weight and volume for complete combustion of 2 kg of coal. (mol-wt. of air = 28.949 gm).

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(b) Explain traditional and greener route of production of Indigo dye. By this reactions which principle of green chemistry is shown ?

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(c) How is the rate of corrosion influenced by :—

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(i) pH of medium

(ii) Relative area of cathode and anode parts ?

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4. (a) Write a note on Compacting and Sintering. 6
 (b) Explain wet corrosion in acidic medium with schematic diagram and mechanism. 5
 (c) Explain Laminar composite with suitable ~~diagram~~ example. 4

 5. (a) What is bio-diesel ? Explain the method to obtain bio-diesel from vegetable oil. 6
 Give advantages of bio-diesel as a fuel.
 (b) Distinguish between Brass and Bronze. 5
 (c) State the chemical factors influencing adhesive action. 4

 6. (a) What is cathodic protection ? Describe impressed current method of corrosion control. 5
 (b) A gaseous fuel has the following composition by volume : 5
 $H_2 = 10\%$, $CH_4 = 30\%$, $C_3H_8 = 20\%$, $CO = 20\%$, $CO_2 = 15\%$, $N_2 = 5\%$.
 Calculate the volume of air required for complete combustion of $1m^3$ of this gas.
 (c) Explain the effect of following elements on alloying :— 5
 - (i) Nickel
 - (ii) Chromium
 - (iii) Cobalt
 - (iv) Molybdenum
 - (v) Tungsten.
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