

Marking scheme of solution.

- Q. 1 (A) Definition of scale & sludge : 1 mark each. (6)
 Causes, disadvantages & removal : $2\frac{1}{2}$ marks each.
- (B) Statement of Beer-Lambert's law - 1 mark. (3)
 Derivation of Beer-Lambert's law - 2 marks.
- (C) Definition of each - 1 mark. (3)

OR

- Q. 2. (A) Explain with reactions stating dissociation constant of phosphoric acid - 4 marks (6)
 Titration curve diagram showing two equivalence points - 2 marks
- (B) Merits of green synthesis of indigo dye - $1\frac{1}{2}$ marks, (3)
 Demerits of traditional synthesis of indigo dye - $1\frac{1}{2}$ marks.

(C) Given - $P = 0$

$$M = 14.5 \text{ ml}$$

∴ Only HCO_3^- Alkalinity present in water sample. (3)

Since, 1 ml of 1 N H_2SO_4 solⁿ \equiv 50 mg of CaCO_3 .

$$\therefore 14.5 \text{ ml of } 0.02 \text{ N } \text{H}_2\text{SO}_4 \text{ sol}^n \equiv 50 \times 0.02 \times 14.5 \text{ mg of } \text{CaCO}_3 \\ = 14.5 \text{ mg of } \text{CaCO}_3.$$

100 ml water sample contains = 14.5 mg of CaCO_3

∴ 1000 ml water sample contains : $\frac{14.5 \times 1000}{100}$ mg/lit

$$\text{HCO}_3^- \text{ Alkalinity} = \underline{\underline{145 \text{ ppm}}}$$

- (A) (a) LDPE - Preparation reaⁿ, Properties & uses - 3 marks (3+3) (6)
- (b) SBR - Preparation reaⁿ, prop. & uses - 3 marks

3 - (B) Definition of Biodiesel - 1 mark

Synthesis - 1 mark

Advantages - 1 mark

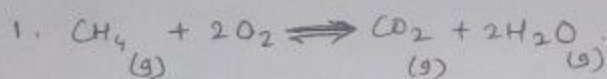
(C) Given - $\text{CH}_4 = 45\%$.

$\text{H}_2 = 30\%$.

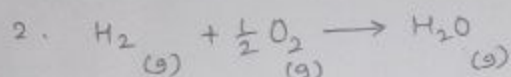
$\text{CO} = 20\%$.

$\text{N}_2 = 5\%$.

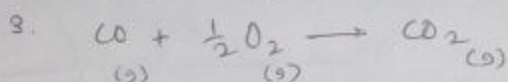
Possible combustion reactions.



1 Vol. 2 Vol.



1 Vol. $\frac{1}{2}$ Vol.



1 Vol. $\frac{1}{2}$ Vol.

Constituent of fuel	Volume (per m^3)	Volume of O_2 required,
CH_4	0.45	0.9
H_2	0.3	0.15
CO	0.2	0.1
N_2	0.05	—
	<hr/> 1.0 m^3	<hr/> 1.15 m^3 — (2)

\therefore Theoretical required volume of oxygen = 1.15 m^3 .

Theoretical required volume of air = $\frac{100}{21} \times 1.15$

= 5.476 m^3 — (1)

Imp. Questions Chemistry

By
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Unit - 6 Assign. No - 5

- (i) Define corrosion? Explain factor affecting rate corrosion.
- (ii) Define Atmospheric corrosion? Explain oxidation corrosion process for alkaline earth & alkali metals?
- (iii) State Pilling Bedworth Rule for oxide film formation. Explain mechanism for growth of oxide film formed on metal surface.
- (iv) Explain electrochemical corrosion with help of H_2 evolution & O_2 absorption mechanism.
- (v) Define cathodic protection? explain cathodic protection (Sacrificial corrosion) with help of suitable example.
- (vi) What is cathodic & anodic coating? which one will be preferred & why?
- (vii) Define electroplating? explain electroplating process with diagram & applications.
- (viii) Write short notes
 - (i) Powder coating process
 - (ii) Galvanizing process
 - (iii) Tinning process.

Imp. Questions

Principle of Green chemistry with example (any six)

Preparation of Adipic acid, PC & indigo dye.
 conventional & Green method with their merit & demerit.

Hyper chromic, hypsochromic, Bathochromic (Red)
 Hypochromic define ^(Blue) & explain example. *

Write difference betⁿ

- i) LDPE & HDPE polymer ✓
- ii) Thermoplastic & Thermosetting polymer

Write Note on

- i) Vulcanization of Rubber ✓
- ii) Kevlar
- iii) Conducting polymer

i) Explain principle, str, working of Boy's law & Bombs calorimeter ✓

Write Note

- ii) Proximate analysis.
- iii) power alcohol ✓
- iv) octane & Cetane number ✓
- v) Biodiesel & diesel ✓

viii) What is isotopes? explain isotopes of H₂ & ✓

ix) Explain preparation of H₂ for industrial use ✓

x) Explain methods for H₂ storage & explain difficulties in storage & transportation.

xi) Write Note on

- i) Saline Hydride
- ii) Sodium alanate
- iii) H₂ use as fuel ✓

When coating is ruptured iron is protected in galvanized sheet but not in tin coated. Explain why?

- 7) Write Note on
- powder coating process
 - Electroless plating process.

Numerical

1) 100 ml of water required 24 ml of 0.05M EDTA during titration. Where 100ml boiled water require 16.5 ml of same EDTA. Calculate total & temp & permanent hardness of water.

b) A water sample is not alkaline to phenolphthalein indicator. However 100ml of same sample on titration with 0.01N H_2SO_4 required 17.5 ml of acid to methyl orange end point. Identify type of alkalinity & determine its extent.

c) A zeolite bed exhausted by softening 6000 lit of water required 15 lit of 12% NaCl solⁿ of regeneration. Calculate the hardness of H_2O

1) Calculate carbon, Hydrogen & sulphur percentage in the coal sample.

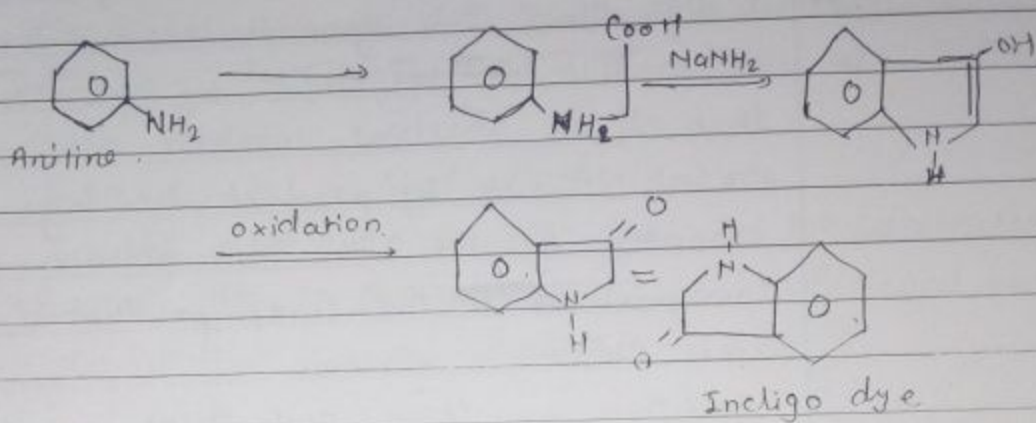
i) 0.2 gm sample burning in combustion chamber was found increases wt of carb U-tube by 0.09 gm & KOH-U tube by ~~0.51~~ 0.51 gm
0.51 gm

ii) 0.75 gm sample in bomb. solⁿ of bottom



III synthesis of Indigo dye :-

Traditional Route :

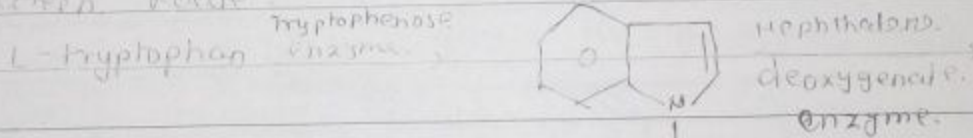


Starting material non renewable

Starting material poisonous

more number of steps

b) Green Route :-



Renewable starting material

Ecofriendly process

No waste matter

less steps in synthesis

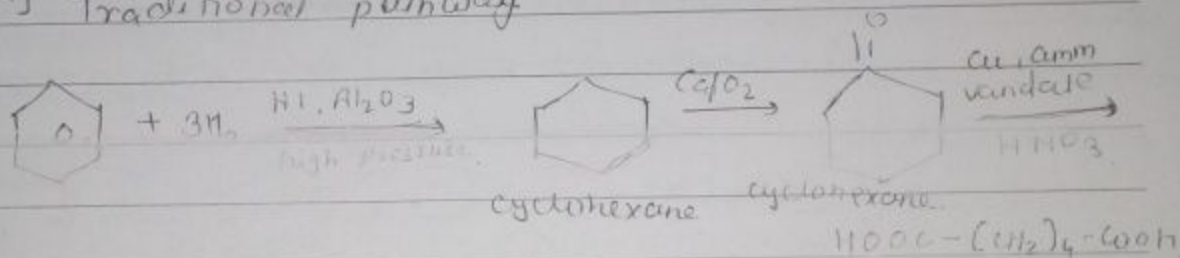
to use

Another example is some antibiotics have more side effects on human body and safer antibiotics with negligible side effects are 'green' to use.

Synthesis of Adipic Acid;

Adipic acid is required for the manufacture of nylon 66. It is prepared by traditional and green pathways i.e. alternative method.

a) Traditional pathway



b) Green pathway

