KERALA AGRICULTURAL UNIVERSITY
B.Tech. (Ag . Engg) 2018 Admission
I Semester Final Examination-January 2019

acs. 1103

Engineering Chemistry (2+1)

Marks:50
Time: 2 hours

I **Answer the following.** **(10x1=10)**

1 The chemical formula of bleaching powder is _____
2 Gobar gas mainly consists of _____
3 Give example each for cation exchange and anion exchange resins
4 How can you remove dissolved oxygen?
5 Why small amount of ethylene dibromide or ethyl bromide along with tetraethyl lead is used in internal combustion engines?
6 Why Mg rod is used in underground iron pipelines?
7 Iron gets rapidly corroded by dil. HNO_3 but aluminium is not attacked even by conc.HNO_3 why?
8 How viscosity index of oil is related to its temperature?
9 Give an example of a solid lubricant?
10 Give the general chemical structure of fatty acids? Differentiate between saturated and unsaturated fatty acids.

I **Write Short notes on ANY FIVE of the following** **(5x2=10)**

1 Match the following

i	Permanent hardness of water	a	Hydrated sodium aluminosilicate
ii	Temporary hardness of water	b	Semi permeable membrane
iii	Softening of water	c	Nitrates of Ca and Mg
iv	Reverse osmosis	d	Bicarbonates of Ca and Mg

2 How the absorbance of a solution is related to its concentration? What is the significance of molar absorption coefficient?
3 Give a schematic representation of Fischer Tropsch process
4 Calculate the weight and volume of air required for the combustion of 1 kg of carbon. Air contains 23% of oxygen by mass and 21% of oxygen by volume.
5 Explain the initiation reaction in free radical polymerization by taking an example.
6 Explain the fermentation method for the production of alcohols.
7 Give two examples each for
a natural
b artificial food colourants

Answer ANY FIVE of the following **(5x4=20)**

1 A polymer resin contains certain amount of $CaCO_3$ as filler. The TGA data for 0.75 g of the sample shows that, 15% by weight loss was observed below 300 °C due to the loss of volatiles and decomposition of polymer. The final weight of the sample as residue after 650 °C analysis was 65% due to liberation of CO_2. Calculate the amount of $CaCO_3$ present in the polymer sample in grams. [At.wt. of calcium = 40 $gmol^{-1}$].
2 Explain reverse osmosis process with a diagram.
3 Differentiate between chemical oxygen demand and biological oxygen demand

P.T.O

Explain flue gas analysis by Orsat apparatus

5 a Differentiate between crystalline and amorphous polymers by a schematic represen the behaviour of polymer chains.

b How can you determine the crystallinity?

6 a An oil sample under test has a Saybolt Universal Viscosity same as that of standard (low viscosity standard) and Pennsylvanian oil (high viscosity index standard) at 21 Saybolt Universal viscosities at 100°F are 61, 758 and420 s respectively. Calculate viscosity index of the sample oil.

b What is cloud and pour points of lubricating oil?

7 Describe with suitable examples the advantages of enzyme catalysts over the convention

IV **Answer ANY ONE of the following**

1 a What are complexometric titrations?

b Give the principle of EDTA titrations for the determination of Ca and Mg in water

c Is it necessary to maintain the pH of the solution nearly constant by adding a suitabl during EDTA titrations? If yes Why?

2 a Explain any method for the processing of

i Plastic ii Rubber

b Explain the chemical reaction for the synthesis of Nylon6.6

c Differentiate between short fibre and long fibre? Name the fibre using for making b proofs

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