SC-3

Seat No.	

Total No. of Pages : 3

F.E. (All Branches) (Part - I) (Semester - I&II) (Revised) Examination, December - 2019

ENGINEERING CHEMISTRY

Sub. Code : 59183

Day and Date : Monday, 2 - 12 - 2019 **Total Marks : 100**

Time : 2.30 p.m. to 5.30 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Assume suitable data wherever necessary.**
3) **Draw neat diagram wherever necessary.**
4) **Figures to the right indicate full marks.**

SECTION - I

Q1) a) A water sample on analysis was found to contain following impurities in ppm. **[8]**

Impurities	Mass of impurities in ppm.	Mol.Wt.
$Ca(HCO_3)_2$	12ppm	162
$Mg(HCO_3)_2$	15.8 ppm	146
$CaCl_2$	60 ppm	111
$MgSO_4$	23 ppm	120

Calculate carbonate, non carbonate and total hardness of a sample water in mg/lit.

b) Solve any Two questions: **[10]**

i) Explain ion exchange process for softening of water.

ii) State properties and applications of glass reinforced plastic.

iii) What are advantages and disadvantages of instrumental methods of chemical analysis?

P.T.O.

Q2) a) Explain construction and working of glass electrode. **[6]**

b) Solve any TWO of the following: **[10]**

i) Give preparation, properties and applications of urea formaldehyde resin.

ii) Enlist different impurities in natural water and suggest methods for minimizing it.

iii) Give applications of nano materials in chemistry.

Q3) Solve any FOUR of the following: **[16]**

a) State advantages and applications of gas chromatography.

b) What is alkalinity of water? Explain in detail.

c) State and derive an equation for Lambert-law.

d) What are bio-degradable plastics?

e) Distinguish between thermo softening and thermosetting plastics.

f) Write note on total dissolved solids in water.

SECTION - II

Q4) a) Following observations were recorded in a Bomb calorimeter experiment **[8]**

i)	Weight of coal sample taken	0.750 gm
ii)	Weight of water taken in calorimeter	2.745 kg
iii)	Water equivalent of calorimeter	540 gm
iv)	Rise in temp.	2.35 °C
v)	Fuse wire correction	12 cal
vi)	Cooling correction	0.03°C
vii)	Correction due to H_2SO_4 and HNO_3	65 cal

Calculate the gross and net calorific value of the fuel if the fuel contains 5.2 % Hydrogen.

b) Solve any TWO of the following: **[10]**

i) What are the characteristics of a good fuel?

ii) Explain Hydrogen avolution mechanism of electrochemical corrosion

iii) Define and explain

1) Gross calorific value 2) Net calorific value

Q5) a) Explain the process of galvanizing for the prevention of corrosion **[6]**

b) Solve any TWO of the following. **[10]**

i) State composition, properties and applications of Brass.

ii) What are the advantages and disadvantages of liquid fuels

iii) Explain purposes of alloying with suitable examples.

Q6) Solve any FOUR of the following: **[16]**

a) Explain construction and working of Boy's calorimeter with neat diagram.

b) What are the advantages and applications of fuel cells?

c) Write a note on electroplating.

d) State goals of Green chemistry.

e) Give composition, properties and applications of Duralumin.

f) What are the factors affecting rate of corrosion?

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