Seat No.	

SE -3

Total No. of Pages : 2

F.Y. Engineering (Semester - I & II) (All Branches) Examination, November - 2018

ENGINEERING CHEMISTRY

Sub. Code : 59183

Day and Date : Friday, 30 - 11 - 2018 **Total Marks : 100**

Time : 02.30 p.m. to 05.30 p.m.

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

SECTION - I

Q1) a) A sample of water on analysis was found to contain the following impurities.

Salt	Amountin mg/lit	Mol. Wt.
$Ca(HCO_3)_2$	8.1	162
$Mg(HCO_3)_2$	14.6	146
$CaCl_2$	11.4	111
$CaSO_4$	13.6	136
KCl	5.7	74.5

Calculate temporary, permanent and total hardness of sample. **[8]**

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

i) What is pH? Explain construction of glass electrode with schematic diagram.

ii) Explain Alkalinity of water.

iii) Give the properties and applications of Bakelite.

Q2) a) Explain the construction and working of gas liquid chromatography with suitable diagram. **[6]**

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

i) What is scale and sludge formation? Explain the mechanism of scale formation.

ii) What is conducting polymer? Explain their applications.

iii) What are the applications of nanomaterials?

P.T.O.

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

a) Write the advantages of Instrumental methods of analysis.
b) What is composite material? Give the applications of composites.
c) Explain reverse osmosis method for removal of hardness of water.
d) State and derive an equation for Beer's- Lambert's law. Give it's limitations.
e) Write note on biodegradable plastics.
f) Write note on acidity of water.

SECTION - II

Q4) a) The following observations were Made in Boy's gas calorimeter experiment, [8]

i) Volume of gas used = $0.06m^3$ at NTP
ii) Weight of circulated water = 37.1kg
iii) Temperature of incoming water = 28.1 °C
iv) Temperature of outgoing water = 42°C
v) Mass of condensate = 0.035kg

Calculate the gross and net calorific values of gas sample in KJ/m^3. (Take heat liberated in condensing water vapors cooling the condensate is 587 Kcal/kg.)

b) Attempt any two questions [10]

i) What are the purposes of alloying with suitable examples?
ii) What are metallic coatings? Explain galvanization process for the prevention of corrosion.
iii) Explain construction & working of Bomb calorimeter for determination Calorific Value of fuel.

Q5) a) Explain with suitable diagram cathodic protection to prevent corrosion. [6]

b) Solve any two of the following [10]

i) Explain the factors related to metallic materials or metals influencing on the rate of corrosion.
ii) Give properties and uses of low carbon steel.
iii) Explain various properties of good fuels.

Q6) Answer of the following four questions. [16]

a) What are Fuel Cells? Explain the classification of Fuel cells based on temperature.
b) What are the natures of a product obtained in dry corrosion?
c) State composition, properties and uses of Alnico.
d) Explain advantages and disadvantages of solid fuels.
e) Give properties and uses of Nichrome.
f) Write note on hydrogen evolution mechanism in wet corrosion.

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