SV-3

Total No. of Pages : 3

Seat No.	

F.E. (All Branches) (Semester-I&II) (Revised) Examination, April - 2018
ENGINEERING CHEMISTRY
Sub. Code : 59183

Day and Date : Saturday, 28-04-2018
Time :10.00 a.m. to 1.00 p.m.

Total Marks : 100

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

SECTION-I

Q1) a) A sample of water on analysis was found to contain the following sailts: **[8]**

Salt	Amount of salt in mg/lit.	Mol.Wt.
$Ca(HCO_3)_2$	34.1	162
$Mg(HCO_3)2$	44.0	146
$CaCl_2$	27.0	111
CaSO4	26.0	136
KCl	5.7	70.5

Calculate temporary, permanent and total hardness of sample in degree clark.

b) Solve any TWO of the following: **10M(Each 5M)**

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

ii) Explain Alkalinity of water in details.

iii) Give the properties and applications of urea formaldehyde resin.

P.T.O.

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

b) Solve any TWO of the following. **10M(Each 5M)**

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

ii) Define polymers. Explain condensation polymerization reactions with example.

iii) Give different synthesis methods of nano materials.

Q3) Solve any FOUR of the following. **16M(Each 4M)**

a) Write the advantages of Instrumental methods of analysis.

b) Give the important applications of composites.

c) Explain reverse osmosis method for purification of water.

d) State and explain of Beer's- Lambert's law.

e) What is conducting polymer? Explain its mechanism with suitable examples.

f) Write note on dissolved Oxygen of water.

SECTION-II

Q4) a) The following observations were made in Boy's gas calorimeter experiment: **[8]**

i) Volume of gas used = $0.086 m^3$ at STP

ii) Weight of water circulated = 44.1 Kg

iii) Temperature of inlet water = 27.4 °C

iv) Temperature of outlet water = 38.7 °C

v) Mass of condensate = 0.037 Kg

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 584 K cal/kg.)

b) Solve any TWO of the following. **10M(Each 5M)**

i) Explain the factors influencing on the rate of corrosion.

ii) Give composition, properties and uses of medium carbon steel.

iii) Explain various characteristics of good fuels.

Q5) a) Explain construction & working of bomb calorimeter with schematic diagram. **[6]**

b) Attempt any two questions. **10M(Each 5M)**

i) What is an alloy? Explain the purposes of alloying with suitable example.

ii) What are metallic coatings? Explain tinning process for the prevention of corrosion.

iii) Explain with suitable diagram cathodic protection to prevent corrosion.

Q6) Answer of the following four questions: **16M(Each 4M)**

a) Explain mechanism of oxidation corrosion with suitable diagram.

b) State composition, properties and uses of Alnico.

c) How liquid fuel is more advantages than solid fuel.

d) Give properties and uses of Nichrome.

e) Write note on metal spraying.

f) What are fuel cells? Explain the classification of fuel cells based on temperature.

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