Total No. of Questions – [10] Total No. of Printed Pages: 03

G.R. No.	

Paper Code - Regular - U119-101 (ESE)
Backlog - U119-106 (BE-FS)

DECEMBER 2019 / ENDSEM

F. Y. B.TECH. (COmmon) (SEMESTER –I)

COURSE NAME: Engineering Chemistry

COURSE CODE: ES10184 B

(PATTERN 2018)

Time: [2 Hours] [Max.Marks: 50]

(*) Instructions to candidates:

1) **Attempt Q.1, Q.2, Q.3, Q.4OrQ.5, Q.6 Or Q.7,Q.8 Or Q.9 and Q.10**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed.**
4) **Use suitable data wherever required.**

Q.1) a) Give exchange reactions and regeneration reactions of following salts by using zeolite process [4]
(i)$CaCl_2$ (ii) $MgSO_4$

OR

b) Explain temporary hardness of water. [4]
50 ml of water sample requires 15 ml of 0.02 M EDTA during titration. Whereas 50 ml of boiled water sample requires 11 ml of same EDTA in the titration. Calculate total, temporary and permanent hardness of water sample

Q.2) a) Explain different types of electronic transitions with example that occur in organic molecules after absorbing UV – Visible radiation [4]

OR

b) Explain any 4 applications of IR spectroscopy [4]

Q.3) a) What is Pilling Bedworth ratio? Explain relation of PBR with nature of oxide film. Discuss 4 types of oxide films with suitable examples [6]

OR

b) Discuss any 6 factors affecting rate of corrosion [6]

Q.4) a) i)Draw neat labeled diagram of Bomb calorimeter [2+3]
ii)Following data were obtained in a Boy's gas calorimeter experiment:
Volume of gas used = 0.2 m^3 at STP
Weight of water heated = 30 kg
Temperature of inlet water = 20°C
Temperature of outlet water = 31 °C

Mass of steam condensed = 0.025 kg
(Consider latent heat of steam as 587 kcal/kg)
Find the GCV and NCV of the fuel.

b) **i)**Define GCV and NCV [2+3]

ii) Volumetric analysis of a gaseous fuel is as, H_2 = 40%, CO = 12%, N_2 =5 %, CH_4 =38 %and remaining CO_2 . If 10 % excess air is used, find the volume of air actually supplied per m^3 of the gas.

OR

Q.5) a) Explain manufacturing of hydrogen gas by steam reforming of hydrocarbon and steam reforming of coke [5]

b) i) What is Biodiesel? [1+4]
ii)Compare octane number and cetane number (Give 4 points of comparison)

Q.6) a) Define glass transition temperature. Give 3 factors affecting it. Give significance [5]

b) What are biodegradable polymers? Give structure, 2 properties and 2 applications of PHBV [5]

OR

Q.7) a) Define setting of cement. Explain reactions involved in setting of Portland cement. Explain role of Gypsum in setting of cement [5]

b) Give 5 points of differences between thermosetting and thermo softening polymers. [5]

Q.8) a) Give construction, working chemical reactions during discharging of lead acid battery. [5]

b) Give figure,construction,working,2advantages and 2 disadvantages of polymer electrolyte membrane fuel cell (PEMFC) [5]

OR

Q.9) a) Explain the conductometric titration with titration curve of [5]
(i)Strong acid- strong base.
(ii)Strong acid – weak base

b) Describe the construction with figure and working with reactions of Ni- Cd battery. Give 2 advantages [5]

Q.10) a) Which of the following is not a monomer [1]
(i)Ethylene
(ii)Ethanol
(iii) Glycol
(iv) Phenol

b) High density polyethylene has crystallinity [1]
(i) 40%
(ii) 90%
(iii)30%
(iv)100%

c) Kevlar is _____ type of liquid crystal polymer [1]
(i) Smectic
(ii)Thermotropic
(iii) Cholesteric
(iv) Lyotropic

d) In potentiometric titration of Fe^{+2} verses Ce^{+4}, _____ is used as indicator electrode [1]
(i) Glass electrode
(ii) Calomel electrode
(iii) Platinum electrode
(iv) Hydrogen electrode

e) Dry cell is an example of _____cell. [1]
(i) Primary
(ii)Secondary
(iii) Reserve
(iv)Electrolytic

f) Aq._____ solution is used in Ni-Cd battery. [1]
(i)NaCl
(ii)KOH
(iii)NH_4OH
(iv)$Ca(OH)_2$