Total No. of Questions – [4] Total No. of Printed Pages 2

G.R. No.	

Paper code - U127-105B(T2)

MARCH 2018 / IN - SEM (T2)

F. Y. B.TECH. (COMMON) (SEMESTER - II)

COURSE NAME : Engineering Chemistry

(2017 PATTERN)

Time : [1 Hour] [Max. Marks : 30]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1) **a)** i) Define GCV and NCV [6]

ii) A sample of coal contains: C= 92%, H = 6% and ash = 2%. The following data were obtained when above coal was tested in bomb calorimeter:
Weight of coal burnt = 0.9 gm
Weight of water taken = 546 gm
Water equivalent of bomb calorimeter = 2250 gm
Rise in temperature = 2.4 ^{0}C
Acid correction = 50 cal
Fuse wire correction = 15 cal
Calculate GCV and NCV assuming latent heat of condensation of steam as 587 cal/gm

b) Define cetane number. Explain cetane number determination with example. Explain effect of chemical structure on cetane number. Explain improvement of cetane number. [6]

c) Analysis of a fuel gave C=85%, H = 3%, O = 1.5%, S = 0.5%, H_2O = 0.2%, N= 0.6% and remaining ash. Calculate minimum weight of air required for complete combustion of 1 kg of fuel. [4]

OR

Q.2) **a)** Give 6 difficulties in storage and transportation of hydrogen [6]

b) Define power alcohol. Give 3 advantages and 3 disadvantages of power alcohol. [6]

c) Volumetric analysis of producer gas used as a fuel is as, H_2 = 20%, CO = 18%, N_2 =50%, CH_4 = 2%, CO_2 = 10%. If 25% excess air is used, find the volume of air actually supplied per m^3 of the gas. [4]

Q.3) **a)** Define crystallinity of polymers. Explain any five factors affecting on it. [6]

b) Give four points of differences between thermosetting and thermosoftening polymer. [4]

c) Define functionality of monomer. Explain bifunctional, trifunctional and tetrafunctional monomers with examples. [4]

OR

Q.4)	**a)**	Define liquid crystal polymers. Explain thermotropic and lyotropic liquid crystal polymers with example. Give two applications of liquid crystal polymers.	**[6]**
	b)	Define glass transition temperature. Discuss the effect of side groups, intermolecular forces and molecular weight on Tg of polymer.	**[4]**
	c)	Compare suspension polymerization and emulsion polymerization techniques	**[4]**