

OCTOBER 2017 / IN - SEM (T2)
F. Y. B.TECH. (COMMON) (SEMESTER - I)
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) Draw neat labeled diagram of Bomb calorimeter and give construction, working with calculation to determine GCV and NCV. [6] [CO3]
- b) Define octane number. Explain octane number determination with example. Explain effect of chemical structure on octane number. Explain improvement of octane number. [6] [CO3]
- c) Calculate volume of air required for complete combustion of 1 m³ of gaseous fuel having CO = 15%, CH₄ = 36%, H₂ = 46%, N₂ = 3%. [4] [CO3]
- OR**
- Q.2) a) What is power alcohol? Give preparation reactions, 3 merits and 3 demerits of power alcohol. [6] [CO3]
- b) Explain manufacturing of hydrogen gas by steam reforming of (i) methane and (ii) coke [6] [CO3]
- c) Analysis of a fuel gave C=90%, H = 3%, O = 2.5%, S = 0.5%, H₂O = 0.2%, N= 0.6% and remaining ash. Calculate minimum weight of air required for complete combustion of 1 kg of fuel. [4] [CO3]
- OR**
- Q.3) a) Define glass transition temperature. Explain any five factors affecting on it. [6] [CO4]
- b) Compare bulk polymerization and solution polymerization techniques. (Give 4 points) [4] [CO4]
- c) What are thermosoftening polymers. Give preparation, two properties and two uses of Polyvinyl Chloride. [4] [CO4]
- OR**
- Q.4) a) Give six points of differences between thermosetting and thermosoftening polymer. [6] [CO4]
- b) What are biodegradable polymers? Give structure, two properties and two applications of PHBV. [4] [CO4]
- c) Distinguish between LDPE and HDPE. (Give 4 points) [4] [CO4]