

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (2011 Onwards) (Sem.-1,2)

ENGINEERING CHEMISTRY

Subject Code : BTCH-101

Paper ID : [A1106]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write briefly :

- (a) What do you understand by spectroscopy?
- (b) What do you understand by natural linewidth of a spectral line?
- (c) What are the advantages of gaseous fuels?
- (d) What is waterline corrosion?
- (e) What are third generation petrochemicals?
- (f) Explain nanochemistry.
- (g) Give two examples of photochemical reactions having high quantum yield.
- (h) λ_{\max} for two isomers (cis- and trans-) of stilbene ($\text{C}_6\text{H}_5\text{CH}=\text{CHC}_6\text{H}_5$) are 274 and 294 nm. Which isomer will have λ_{\max} of 294 nm? Explain.
- (i) What is the usefulness of TMS as an internal standard?
- (j) What are composite materials? Name two natural composites. (2×10=20)

SECTION-B

2. a) Discuss the factors responsible for intensity of spectral lines. (4)
b) Discuss the principle of NMR spectroscopy. (4)
3. a) For the photochemical formation of ethylene from di-n-propylketone using a radiation of wavelength 313 nm the quantum yield is 0.21. Calculate the number of moles of ethylene formed when the sample is irradiated with 50 watt of this radiation assuming that all the radiation is absorbed by the sample. (4)
b) Define Beer-Lambert law. Derive the equation. (4)
4. a) Discuss the cation and anion exchange resins, and their usefulness for water softening. (4)
b) Explain the break point chlorination. (4)
5. a) What are ultrasounds? How ultrasound waves can help the chemical reaction? (4)
b) Write any six principles of Green Chemistry. (4)

SECTION-C

6. a) Explain differential aeration corrosion. (4)
b) Explain cathodic protection for corrosion control. (4)
7. a) What do you understand by tacticity? How it can affect the properties of polymers? (4)
b) Describe the effect of molecular weight on the properties of polymers. (4)
8. a) Describe two dimensional assemblies. (4)
b) What are nanoscale materials? How these are useful? (4)
9. a) Explain natural gas treatment processes. (4)
b) Describe the composition of crude oil. (4)