

NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA-136119  
THEORY EXAMINATION  
Question Paper

Month and Year of Exam: June, 2011

Programme: B.Tech. 2<sup>nd</sup> Semester

Subject: Chemistry-II

Session: 2010-11

Course No. CHT-106

(Common with BIT-102, CHE-102)

Max. Marks: 50 for 2010-11, 09-10, 05-06 & 04-05 Batches      Time allowed : 3 Hr  
60 for 2008-09, 07-08 & 06-07 Batches

- Note: (i) The question paper consists of eight questions spreading over two pages.  
(ii) Attempt any five questions. All the questions carry equal marks.  
(iii) **Write your section on the top right corner of first page of answer sheet.**

- Q1.(a) Discuss aerobic and anaerobic biodegradation of carbohydrates with chemical reactions involved.  
(b) How phospholipids differ from triglycerides? Give the name and structure of a phospholipid.  
(c) What are coenzymes? Give the names and an important application of any two coenzymes. (3,3,4)
- Q2.(a) Describe the conditions under which the temperature of ambient air increases with altitude rather than decreasing. What is its effect on air pollution?  
(b) Leakage of a poisonous gas led to Bhopal disaster. Which precautions were recommended for safe storage of this gas? Also give its polymerisation reaction.  
(c) What is photochemical smog? Give the mechanism of formation of PAN. (4,3,3)
- Q3. (a) What is meant by acid rain? List its four harmful effects.  
(b) Define COD. Describe the determination and significance of COD.  
(c) Why a modification is required in Winkler's method of D.O determination? How is it achieved? Give any two overall reactions involved in this modification. (3,3,4)
- Q4.(a) What is meant by activated sludge? Draw flow diagram of conventional activated sludge process. Suggest a modification in this process.  
(b) Describe one method used as attached film growth process in biological sewage treatment.  
(c) Discuss the steps involved in anaerobic digestion of sludge. (4,3,3)
- Q5.(a) What is indirect coal liquefaction? Explain a method used for this process.  
(b) Draw a labelled diagram of a gas producer with reactions occurring in various zones.  
(c) Give the significance of ash content in coal. (4,4,2)

- Q6.(a) Calculate the gross and net calorific value of coal sample having the composition: C=82%, H=9%, S=2%, N=3% and ash=4%. Latent heat of steam=587 Kcal/Kg.  
(b) Discuss the determination of sulphur content in coal with chemical reactions involved. Also give its significance.  
(c) Write a detailed note on extreme pressure lubrication. (3,4,3)

- Q7.(a) Why refining of lubricant oils is required? Explain solvent refining.  
(b) Give four conditions where greases are used as lubricants. Define drop point of a grease.  
(c) Write definition and significance of any TWO :  
i) Aniline point ii) Iodine value iii) Penetration point (3,3,4)

- Q8.(a) Give four biological functions of proteins.  
(b) Differentiate between oils and fats. Give the structural formula of a wax.  
(c) Give a list of gases with percentage contribution responsible for increase in the global temperature.  
(d) 1.8 g of an oil sample was saponified with 25 ml of N/2 alcoholic KOH solution. Unreacted KOH was titrated against N/2 HCl where 12 ml of the acid was consumed. A blank titration required 23.5 ml of the same acid. Calculate saponification value of the oil. (2,3,3,2)

OR

- (a) What is catalytic reforming? Describe the main reaction occurring during the process.  
(b) Name four important chemicals/materials commercially produced from benzene.  
(c) What are petrochemicals? Give their classification. (3,3,4)