



# Applied Chemistry 1

MAY 18

First Year Engineering (Semester 1)

**Total marks: 80**

**Total time: 3 Hours**

## INSTRUCTIONS

(1) Question 1 is compulsory.

(2) Attempt any **three** from the remaining questions.

(3) Draw neat diagrams wherever necessary.

**1(a)** Discuss the drawback of natural rubber. (3 marks)

**1(b)** Explain the disinfection of water by addition of bleaching powder (3 marks)

**1(c)** What are the limitations of Phase rule? (3 marks)

**1(d)** Discuss fullerenes. Give its applications. (3 marks)

**1(e)** Write a note on Greases. (3 marks)

**1(f)** A 10ml of sample of water was refluxed with 20ml potassium dichromate solution and after refluxing the excess unreacted dichromate required 26.2ml of 0.1M FAS solution. A blank 10 ml of distilled water on refluxing with 20ml of dichromate solution required 36ml of 0.1M FAS solution. Calculate the COD of waste water. (3 marks)

**1(g)** Discuss the role of polymer in medicine and surgery. (3 marks)

**2(a)** Calculate the amount of lime (85% pure) and soda (95% pure) required to soften one million litre of water which contains  $\text{CaCO}_3 = 12.5\text{ppm}$ ,  $\text{MgCO}_3 = 8.4\text{ppm}$ ,  $\text{CaCl}_2 = 22.2\text{ppm}$ ,  $\text{MgCl}_2 = 9.5\text{ppm}$ ,  $\text{CO}_2 = 33\text{ppm}$ ,  $\text{HCl} = 7.3\text{ppm}$ , organic matter = 16.8ppm. (6 marks)

**2(b)i** Give the preparations, properties and uses of Kevlar. (3 marks)

**2(b)ii** Define Cloud point and Pour point of a lubricant. (2 marks)



- 2(b)iii** Write a note on decay of concrete. (4 marks)
- 3(a)** Define Moulding. List the different techniques of moulding. Explain injection moulding with the help of neat diagram. (6 marks)
- 3(b)i** Explain the term 'phase' with appropriate examples. (3 marks)
- 3(b)ii** Discuss the role of gypsum during the manufacturing of Portland cement.
- 3(c)** Calculate the total hardness in ppm in given water sample:  
1.50ml of standard hard water, containing 1 mg pure  $\text{CaCO}_3$  per ml consumed  
20ml EDT solution. 2.50ml of water sample consumed 30ml EDTA solution using EBT indicator. (3 marks)
- 4(a)** Explain the zeolite method for softening of water giving suitable diagram and reactions. What are the limitations of this method? (6 marks)
- 4(b)i** 6gms of oil was saponified with 50ml of 0.5N alcoholic KOH solution. After refluxing for 2 hours the mixture was titrated with 25ml 0.5N HCl. Find the saponification value of oil. (3 marks)
- 4(b)ii** Distinguish between the wet and dry process for manufacturing of Portland cement. (3 marks)
- 4(c)** Discuss the following additives in compound of plastics  
**i)** Fillers  
**ii)** Plasticizers (3 marks)
- 5(a)** Write a note on (any two):- (6 marks)  
**i)** Glass transition temperature  
**ii)** Buna-S c) Vulcanization (3 marks)
- 5(b)i** Distinguish between BOD and COD (3 marks)
- 5(b)ii** Define Oiliness. What is its significance? (2 marks)
- 5(c)** Discuss the application of Phase rule to the one component system based on:  
Diagram, triple point (4 marks)
- 6(a)** Define lubricants and lubrication. Mention the various mechanisms involved in lubrication of machine. Discuss boundary lubrication. (6 marks)
- 6(b)i** What is reduced or condensed phase rule (3 marks)
- 6(b)ii** Discuss Reverse Osmosis (2 marks)
- 6(c)** What are carbon nanotubes. What are its types? Discuss the laser method for its production. (4 marks)