

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/Backlog), Nov.-Dec. 2015

B. Tech in Chemical Engineering, Semester VII

Roll No.....

CHE724: FERTILIZER TECHNOLOGY

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. Granular fertilizers are solid materials of:
(a) particles of a predetermined size (b) random size particles
(c) variable size particles (d) None of these
- ii. Coated fertilizers are granular fertilizers which are coated with:
(a) a thick film of same material (b) a thin film of different material
(c) a variable thickness material (d) any kind of ultrathin material
- iii. Which of the following is true about slurry fertilizers:
(a) contain dissolved and undissolved plant nutrient materials
(b) require mechanical agitation to assure homogeneity
(c) choice a and b both are correct
(d) none of these
- iv. Which of the following is true about straight fertilizers: (a) possess a declarable content of only one of the primary nutrient (b) possess a declarable contents of more than one primary nutrients (c) possess both primary and secondary nutrients (d) possess primary, secondary and micro nutrients
- v. Which form of nitrogen is taken up by rice crop: (a) nitrate (b) ammonium
(c) elemental nitrogen (d) all of these
- vi. Which of the following is NOT true about the role of phosphorus compounds in plant nutrition: (a) important in energy transfer and storage reactions (b) are essential constituents of nucleic acids (c) flowering, fruiting and early plant development rely on phosphorus availability (d) phosphorus content in plant tissues is more than nitrogen and potassium
- vii. Which of the following is NOT true about the role of potassium in plants: (a) it becomes part of plant tissues (b) remains as an ion in cellular liquids (c) it does not become part of plant tissues (d) all of these
- viii. Fuming nitric acid contains how much concentration of HNO_3 : (a) 50% (b) 65%
(c) 98% (d) 86%
- ix. Calcium ammonium nitrate (CAN) is a: (a) mixed fertilizer (b) compound fertilizer (c) straight fertilizer (d) coated fertilizer
- x. Which fertilizer is also used as a de-icing agent at airports: (a) NH_4NO_3
(b) NH_2CONH_2 (c) CaCO_3 (d) NH_4Cl

Q.2	Short answer type questions (4 questions @ 2.5 marks)	10
i.	What do you understand by fertilizer grades?	
ii.	What is the purpose of adding soil conditioners in the fertilizers?	
iii.	What is ammonium fixation and how does it help plant growth?	
iv.	What are the atmospheric sources of Sulphur in the soils?	
Q.3A	Explain the role of nitrogen in plant nutrition.	05
Q.3B	Relate the nitrogen nutritional management of crops with the nitrogen cycle of the environment.	05
Q.4A	What is phosphorus fixation? Elaborate the soil pH dependence on the phosphorus fixation.	05
Q.4B	What is eutrophication and how it can be controlled?	05
Q.5A	How soil liming affects the soil fertility?	05
Q.5B	What are the appearance similarities and dissimilarities of the Nitrogen and Sulphur deficiencies in the plants?	05
Q.6A	Describe advantages of using compound fertilizers. Give some examples of commercial compound fertilizers.	05
Q.6B	Describe the production of hydrogen used for manufacture of ammonia.	05
OR		
Q.6B	Describe the required specifications of the storage and transport equipment used in ammonia production?	05
Q.7A	Describe various precautions need to be taken during production, storage and transportation of ammonium nitrate fertilizer.	05
Q.7B	Describe the advantages of using ammonium sulphate as a fertilizer.	05
OR		
Q.7B	Why biuret formation during urea production is not desirable? Make a chemical reaction showing biuret formation.	05
Q.8A	Make a detailed process flow diagram for nitric acid manufacturing and also mention relevant reactions.	10
Q.9A	Why urea is the most popular and widely used nitrogen fertilizer? Explain the nitrogen release mechanism of urea in soil.	10
Q.9B	Make a detailed process flow diagram for triple superphosphate production and write the necessary chemical reactions.	10
OR		
Q.9B	How potassium fertilizer is manufactured using mining method? Explain with the help of a schematic diagram. Also mention the chemical methods to produce potassium fertilizers.	10