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Question Paper Code: 53904

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Third Semester

Chemical Engineering

15UCH304 - CHEMICAL PROCESS INDUSTRIES - I

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- The activity of bleaching powder is measured in terms of
 - hydrogen peroxide
 - sulfur dioxide
 - available chlorine
 - ozone
- Bleaching action of bleaching powder is due to its _____ properties.
 - reducing
 - oxidising
 - disinfecting
 - none of these
- Oxidation of SO_2 to SO_3 is favoured by
 - low temperature and low pressure
 - low temperature and high pressure
 - high temperature and low pressure
 - high temperature and high pressure
- _____ is most widely used in wastewater treatment.
 - sulfur
 - ammonia
 - alum
 - soda ash
- Which of the following is not a raw material used for the manufacture of ordinary glass?
 - Iron oxide
 - Soda ash
 - Limestone
 - silica
- Which oil is preferred for paint manufacture?
 - Non-drying oil
 - Semi-drying oil
 - Drying oil
 - Saturated oil

7. Phosphate rock is a raw material for the manufacture of
- (a) phosphoric acid (b) phosphorous
(c) superphosphates (d) all the above
8. Process used for the commercial production of nitric acid by the catalytic oxidation of ammonia
- (a) Solvay (b) Ostwald's
(c) Haber's (d) none of these
9. Action of phosphoric acid on rock phosphate produces
- (a) superphosphate (b) nitrophosphate
(c) triple super phosphate (d) diammonium phosphate
10. Ammonium sulphate fertiliser is
- (a) the highest concentration nitrogenous fertiliser
(b) the best fertiliser for paddy
(c) a basic fertiliser
(d) a neutral fertiliser

PART - B (5 x 2 = 10 Marks)

11. List out any four important role of chemical engineers in process industries.
12. How is sodium thio-sulphate produced? Write the chemical reaction scheme.
13. Differentiate dry process and wet process of Portland cement production.
14. "Urea plant should not operated with high temperature and high pressure without excess ammonia". Why?
15. "A fertilizer bag labeled as 10-10-10". What kind of information obtained by this label?

PART - C (5 x 16 = 80 Marks)

16. (a) Explain the manufacture of caustic soda by electrolysis using mercury cell and membrane cell process. (16)

Or

- (b) With a neat flow chart, explain the processing steps and chemical reactions involved in the manufacture of soda ash by solvay process. Mention the important uses of soda ash. (16)
17. (a) Describe the industrial scale production of elemental sulfur by the process involving oxidation–reduction of H_2S with a reference flow sheet. (16)

Or

- (b) With a neat sketch describe elemental sulphur mining by Frasch process. (16)
18. (a) Write short note on Soda lime glass, Potash-lime glass, Lead glass, Silica glass, Borosilicate glass and Alumino-silicate glass. (16)

Or

- (b) Describe the production of Portland cement with a neat flow sheet and its major engineering problems. (16)
19. (a) With a neat flow diagram, explain the unit process and unit operation involved in the phosphoric acid manufacturing process by sulphuric acid leaching process. (16)

Or

- (b) Explain the production of Ammonia by catalytic reaction of nitrogen and hydrogen with a neat flow diagram. (16)
20. (a) Give a detailed account of superphosphate and triple superphosphate manufacturing process with a neat flow diagram. (16)

Or

- (b) (i) What are Bio-fertilizers? Explain the different types of bio-fertilizer. (8)
- (ii) What are trace elements and micronutrients for plant growth? Give examples. (8)

