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Question Paper Code: 53094

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

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)

1. Concentration of NaOH solution produced by mercury electrolytic cell is about _____ percent.
(a) 10 (b) 25 (c) 50 (d) 98
2. Bleaching action of bleaching powder is due to its _____ properties.
(a) reducing (b) oxidising (c) disinfecting (d) none of these
3. Oxidation of SO₂ to SO₃ is favoured by
(a) low temperature and low pressure (b) low temperature and high pressure
(c) high temperature and low pressure (d) high temperature and high pressure
4. Most widely and commonly used coagulant for the removal of suspended impurities in water is
(a) bleaching powder (b) alum (c) slaked lime (d) copper sulphate
5. Which of the following is not a raw material used for the manufacture of ordinary glass?
(a) Iron oxide (b) Soda ash (c) Limestone (d) silica
6. Which oil is preferred for paint manufacture?
(a) Non-drying oil (b) Semi-drying oil
(c) Drying oil (d) 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. Draw standard symbols used to represent fixed bed column.
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) Describe the production of soda ash by Solvay Process including reactions involved in this process. (16)
17. (a) Discuss in detail with the aid of a neat flow diagram the production of Sulphuric acid by contact process. (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) Write a detailed note on Biofertilizers and its types. How it will work on plants? What are its limitations? (16)
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