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Question Paper Code: 51934

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

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. The activity of bleaching powder is measured in terms of

(a) hydrogen peroxide	(b) sulfur dioxide
(c) available chlorine	(d) ozone

2. Centrifugal pump is schematically represented in process industries by the symbol



3.	Oleum is the solution of	in sulfuri	c acid.						
	(a) <i>SO</i> ₂	(b) <i>H</i> ₂ <i>O</i>	(c) nitric acid	(d) <i>SO</i> ₃					
4.	is most widely used in wastewater treatment.								
	(a) sulfur	(b) ammonia	(c) alum	(d) soda ash					
5.	To prevent the quick sett manufacture.	ing of cement	is added as	retarder during the					
	(a) aluminium sulfate(c) calcium nitrite		(b) calcium sulfate (d) silica	dehydrate					
6.	An example for neutral refr	actory material is	brick.						
	(a) fire clay	(b) silica	(c) magnesia	(d) lime stone					
7.	Urea is manufactured using	the raw material							
	(a) ammonia and carbo(c) ammonia and carbo	n monoxide n dioxide	(b) nitrogen and hy (d) nitric acid, carb	drogen on and ammonia					
8.	Beneficiation of phosphate	rock is done to increa	ase the co	ontent.					
	(a) bone phosphate of la(c) nitrate	ime	(b) sulfate (d) potassium						
9.	. The nutrient necessary for fruit formation in plant is								
	(a) nitrogen	(b) potassium	(c) selenium	(d) phosphorus					
10.	0 is used as an explosive ingredient in coal mines.								
	(a) Ammonium sulfate(c) Urea		(b) Ammonium pho (d) Ammonium nitr	osphate rate					
		PART - B (5 x $2 = 1$	0 Marks)						
11.	List out any four important	role of chemical engi	ineers in process indu	ustries.					

- 12. How sodium hypochlorite bleaching agent is prepared? Write down the chemical reaction involved.
- 13. What are the two types of raw material necessary for the production of portland cement?

14. List out the important uses of ammonia.

15. What are pesticides? Name any 2 pesticide manufacturing industry in India.

PART - C (5 x 16 = 80 Marks)

16. (a) 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)

Or

- (b) Explain the safety measures to be followed in process industries during handling of toxic chemicals and fire hazards. (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) (i) Explain the reactions involved and energy requirements during the manufacture of hydrochloric acid. (8)
 - (ii) Discuss the production of sodium thiosulfate along with chemical reactions involved. List out the important uses of sodium thiosulfate.(8)
- 18. (a) Explain the chemical composition and specific uses of five different types of portland cement. (16)

Or

- (b) Discuss the manufacturing steps, chemical specifications and uses of the following special glasses: (i) Colored and coated glass and (ii) Safety glass. (16)
- 19. (a) (i) Enumerate the manufacture of nitric acid by ammonia oxidation process. (8)
 - (ii) Discuss the major engineering problems faced during the production of nitric acid and suggest ways to minimize them.

Or

- (b) With a neat flow chart and chemical reactions involved, explain the production of phosphoric acid by wet process. (16)
- 20. (a) Draw a flowchart illustrating superphosphate manufacturing process and discuss the steps involved during the large scale production. (16)

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(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)