BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BE **SEMESTER: VI/ADD**
BRANCH: CHEM/C & P **SESSION: SP/19**

SUBJECT: CL6003: INDUSTRIAL CHEMICAL PROCESS

TIME: 3 Hours **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a)	What is wall effect during hydrochloric acid manufacture from H_2 and Cl_2 gases?	[2]
Q.1(b)	What are the sources of raw materials for manufacturing of soda ash? Show all reactions involved in that process.	[4]
Q.1(c)	List the differences in working principles of diaphragm cell and membrane cell used in chlor-alkali industry. With a neat sketch explain the process of mercury cell.	[6]
Q.2(a)	What are the differences between DCDA and single contact processes?	[2]
Q.2(b)	Explain the manufacturing process of elemental sulfur from pyrite ores.	[4]
Q.2(c)	Describe different unit operations involved in DCDA process for sulfuric acid production with their operating conditions (T, P and composition) with a complete flow sheet.	[6]
Q.3(a)	What do you mean by 20-10-10 labeled fertilizer?	[2]
Q.3(b)	Explain the effect of temperature and pressure on key reaction of ammonia synthesis.	[4]
Q.3(c)	Explain the manufacturing process of urea from ammonia and carbon dioxide with the following notes: sources of raw materials, reactions and conditions, separation of products, process flow diagram.	[6]
Q.4(a)	What do you mean by rancidity and iodine value?	[2]
Q.4(b)	What are differences between soap and detergent? Explain the cleansing mechanism of detergent.	[4]
Q.4(c)	Discuss the method of production of glycerin from natural product.	[6]
Q.5(a)	Define adhesive? Cite example.	[2]
Q.5(b)	Explain the mechanism of adhesive bonding.	[4]
Q.5(c)	Name different chemicals used as color pigments for red, yellow, white, black, blue, green. Explain the manufacturing process of titanium dioxide by sulfate process.	[6]
Q.6(a)	Name different ceramics used in chemical plants.	[2]
Q.6(b)	Discuss the types of commercial glass used and write their properties.	[4]
Q.6(c)	Explain the manufacturing of glass by pot furnace process.	[6]
Q.7(a)	Define hazard and safety.	[2]
Q.7(b)	Write short note on Detonation and Deflagration (ii) Confined VCE and Unconfined VCE	[4]
Q.7(c)	What do you mean by HAZOP study? Explain the HAZOP study of a high temperature and high pressure reactor.	[6]

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