B.E./B.TECH. Degree Examination, September 2020

Semester - VIII

CH16019 – PROCESS PLANT UTILITIES

(Regulation 2016)

Time: Three hours Maximum : 80 Marks

Answer **ALL** questions

PART A - (8 X 2 = 16 marks)##

1. Removal of organic pollutant is carried out in wastewater treatment at the stage of
   a) Primary b) secondary c) tertiary d) in-plant treatment
2. Straight-tube and bent –tube boilers are the classifications of
   a) Fire tube boiler b) water tube boiler c) forced circulation boilers d) multi-tube boilers.
3. Which of the following statement is wrong?
   a) The performance of the vapour compression refrigerator varies considerably with both vaporising and condensing temperatures.
   b) In vapour compression cycle, the useful part of the heat transfer is at the condenser.
   c) In ammonia-hydrogen (Electrolux) refrigerator, no compressor, pump or fan is required.
   d) The effect of under-cooling the liquid refrigerant is to decrease the coefficient of performance
4. Natural draft cooling towers are mainly used in the
   a) Steel industry b) Alumina industry c) Fertilizer industry d) Power stations
5. Differentiate between cation and anion exchange resins
6. How specific volume of wet steam can be calculated?
7. List the application of cryogenic temperature in chemical industry.
8. Sketch a psychrometric chart and show the following properties of air on it. i) DBT lines ii) WBT lines iii) Specific volume lines iv) Relative humidity lines

PART B - (4 X16 = 64 marks)**

09.	(a)	(i)	Elucidate briefly about primary and secondary plant utilities.		**(6)**
		(ii)	Describe the methods of purification of water required to be used in the manufacture of food products and pharmaceuticals.		**(10)**
			(OR)		
	(b)	(i)	Demonstrate the special treatments required for high pressure boiler feed water.		**(10)**
		(ii)	Adapt the methods used for water conservation in big chemical industries		**(6)**
10.	(a)	(i)	Sketch the basic flow diagram of a steam plant cycle showing by product generation of electric power and process steam.		**(10)**
		(ii)	List the factors that affect the efficiency of steam generation.		**(6)**
			(OR)		
	(b)	(i)	Discuss about steam handling and its effective distribution.		**(16)**
11.	(a)	(i)	Explain the vapor-compression refrigeration system and discuss the methodologies used to improve the C.O.P of the plant		**(16)**
			(OR)		
	(b)	(i)	Explicate the different types of condensers used in refrigeration system.		**(10)**
		(ii)	Explain briefly the important methods used for low temperature gas liquefaction.		**(6)**
12.	(a)	(i)	Describe the setup of a compressed air distribution system		**(6)**
		(ii)	Discuss briefly about the types of packing materials and mechanical seals used in compressor equipment's.		**(10)**
			(OR)		
	(b)	(i)	Write the working principle of cooling towers. Explain in detail the types of cooling towers with a neat sketch.		**(16)**