Reg. No. : | | | | | | | | | | |

Question Paper Code: 59920

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

Elective

Chemical Engineering

15UCH920 – PROCESS PLANT UTILITIES

(Use of Steam table and Psychrometry chart is permitted)

(Regulations 2015)

Duration: Three hours Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. Hardness of water is due to the presence of salts of ____ CO1- R

   (a) Potassium (b) Chlorine (c) Magnesium (d) Boron

2. Which of the following membrane is used in the osmosis process? CO1- R

   (a) Impermeable membrane (b) Semi-permeable membrane

   (c) Permeable membrane (d) Non-porous membrane

3. What is the critical pressure of steam? CO2- R

   (a) 221.2 bar (b) 220 bar (c) 120 bar (d) 300 bar

4. The properties of water are arranged in the steam tables as function of CO2- R

   (a) Pressure (b) Temperature

   (c) Pressure and temperature (d) None of the above

5. A gas-cycle refrigeration system is used in CO3- R

   (a) aircrafts (b) missiles

   (c) both of the mentioned (d) none of the mentioned

6. When volume flow rate of refrigerant is large, which compressor is used? CO3- R

   (a) reciprocating (b) centrifugal (c) rotary (d) all of the mentioned

7. For minimum work, the compression should be ____ CO3- R

   (a)adiabatic (b) isothermal (c) isochorme (d) isobar

8. In humidification the gas is _____ in the liquid for the mass transfer to take part. CO4- R

(a) Soluble (b) Insoluble (c) Partially soluble (d) Inert

9. Which fuel is used widely in steam power plants? CO5- R

(a) Oil (b) Gas (c) Coal (d) Petroleum

10. Which of the fuels give enormous amount of energy? CO5- R

(a) Gaseous (b) Solid (c) Liquid (d) Nuclear

PART – B (5x 2= 10 Marks)

11. Define soft water. CO1- U

12. State the sources of water. CO2- U

13. Write the basic refrigeration principles. CO3- U

14. What are the applications of compressed air? CO4- U

15. What do you mean fuel? CO5- U

PART C - (5 x 16 = 80 Marks)

16. (a) Explain the effects of impure boiler feed water. CO1 -U (20)

Or

(b) Explain about the hard water and soft water. CO1- U (20)

17. (a) Distinguish fire tube boiler and water tube boiler. CO2 -U (20)

Or

(b) Explain the construction and working of the Cochran Boilers. CO2 -U (20)

18. (a) Explain the different types of condensers used in refrigeration system. CO3- U (20)

Or

(b) Describe the working of Vapour compression refrigeration cycle. CO3- U (20)

19. (a) Discuss the principle and working of two stage reciprocating air Compressor with intercooler. CO4 -U (20)

Or

(b) Compare the performance of reciprocating and rotary compressors. CO4 -U (20)

20.	(a)	Discuss the various treatment methods of spent fuel waste disposal in chemical process industries.	CO5- U	(20)
		Or		
	(b)	Discuss briefly the solid waste management techniques in process industries.	CO5- U	(20)

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