

Reg.No.

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B.E / B.TECH. DEGREE EXAMINATIONS, MAY 2024

Eighth Semester

CH18020- PROCESS PLANT UTILITIES*(Chemical Engineering)**(Regulation 2018/ 2018A)***TIME:3 HOURS****MAX.MARKS: 100**

- CO 1 Apply the knowledge on the various process plant utilities
- CO 2 Discuss the concept of refrigeration, compressor and cooling towers.
- CO 3 Explain an efficient operation is imperative for economic and safe operation is essential for the survival of industries.
- CO 4 Provide an insight into the types of fuel used for power generation.
- CO 5 Identify the effective ways of waste disposal.

PART- A(10x2=20Marks)

(Answer all Questions)

	Marks	CO	RBT LEVEL
1 List the pre-requisites for members used in reverse osmosis.	2	1	2
2 Write the purpose of treating boiler water.	2	1	2
3 Illustrate important functions of Steam traps.	2	2	2
4 Differentiate forced and Induced draft.	2	2	2
5 Classify the refrigerants used in air-conditioning.	2	3	2
6 Define COP for the ideal simple refrigerator.	2	3	2
7 Differentiate between reciprocating compressors and vacuum pumps.	2	4	2
8 Justify the importance of Lubrication in Compressor.	2	4	2
9 Classify the Internal combustion engine based on application.	2	5	2
10 Brief Coke as fuel with its classification.	2	5	2

PART- B (5x 14=70Marks)

(Restrict to a maximum of TWO subdivisions)

	Marks	CO	RBT LEVEL
11(a) Write about pre-requisites of industrial water and explain the methods involved in water treatment.	(14)	1	3

(OR)

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|---|--------------|----------|----------|
| 11(b) Explain in detail the effects of impure boiler feed water and the procedure for treating impure boiler feed water. | (14) | 1 | 3 |
| 12(a) Sketch the basic flow diagram of a steam power plant cycle showing by product generation of electric power and process steam? | (14) | 2 | 3 |
| (OR) | | | |
| 12(b) Enumerate the operation of any two boiler used for steam production with its construction and diagrammatic representation. | (14) | 2 | 3 |
| 13(a) Explain the absorption refrigeration system with a neat sketch?
Explain in detail about different types of humidifiers. | (7+7) | 3 | 4 |
| (OR) | | | |
| 13(b) Mention the objectives of maintaining low temperatures using refrigeration in a chemical plant with at least two examples. | (14) | 3 | 4 |
| 14(a) Differentiate rotary compressor and reciprocating compressor with a neat sketch along with its performance characteristics. | (14) | 4 | 4 |
| (OR) | | | |
| 14(b) (i) Discuss briefly about spray chamber with a neat sketch.
(ii) Infer with a neat sketch of two industrial cooling towers with its advantages. | (7+7) | 4 | 4 |
| 15(a) Explain various components, construction and working of an internal combustion engine. | (14) | 5 | 4 |
| (OR) | | | |
| 15(b) Prioritize any two waste disposal methods used in chemical process industries. | (14) | 5 | 1 |

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

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|--|-------------|----------|-----------|
| 16 Summarise various Fuels used in chemical process industries along with their applications and Limitations. | (10) | 5 | 5 |
