

TE - sem - VI (CBSE) chemical - Plant Engg
Plant Engineering
(3Hours)
Q. P. Code : 574500
20/12/16
[Total Marks: 80]

- N.B. (1) Question No. 1 is compulsory.
(2) Answer any three questions from the remaining questions.
(3) Assume suitable data wherever necessary.

- Q.1 a) Give classification of air compressors. 4
b) Explain fire triangle in brief. 4
c) Write short note on HAZOP. 4
d) Differentiate between humidification and dehumidification. 4
e) Discuss different types of vacuum systems in brief. 4
- Q.2 a) Explain in detail Lancashire boiler. 10
b) In a boiler test 1250 kg of coal are consumed in 24 hrs. The mass of water evaporated is 13000 kg and the mean effective pressure is 7 bar. The feed water temperature was 40 °C, the heating value of coal is 30000 kJ/kg. The enthalpy of 1 Kg of steam at 7 bar is 2570.7 kJ. Determine : i) Equivalent evaporation per Kg of Coal; 10
ii) Efficiency of the boiler.
- Q.3 a) Derive the expression of work for a single stage compressor neglecting the clearance. 10
b) Following data relate to a performance test of single acting 14 x 10 cm reciprocating compressor: 10
Suction pressure = 1 bar
Suction temperature = 20 °C
Discharge pressure = 6 bar
Discharge temperature = 180 °C
Speed of compressor = 1200 rpm
Shaft power = 6.25 kw
Mass of air delivered = 1.7 kg/min
Calculate the following:
1) The actual volumetric efficiency.
2) Indicated power
3) Isothermal efficiency
4) Mechanical efficiency
5) Overall isothermal efficiency.

[TURN OVER]

- Q.4 a) Discuss in detail about types of vents and flares. 10
- b) Discuss in detail about types of refrigerants and their importance. 10
- Q.5 a) Define the following 10
- a) Lost workdays.
 - b) TLV-TWA
 - c) Deflagration
 - d) BLEVE
 - e) Detonation
- b) Set up an analysis of variance table for the following per batch production data for three types of storage vessels, obtained from four different plants and state if the different types are significant. 10

Per plant production			
Plant no.	Types of storage vessels		
	A	B	C
1	200	300	300
2	250	200	280
3	350	250	225
4	300	200	250

Q.6 Write short notes (any four):

- a) Principle of refrigeration
- b) Distribution of steam in chemical plant
- c) Steam jet ejector.
- d) Process air and instrument air
- e) The basic principle of ANOVA
- f) Discuss concept of relief system

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