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Sardar Patel University
S.Y. B.Sc. Industrial Chemistry Vocational, Semester-IV
US04CICV01- Plant Utilities
6th April 2016

Time: 10:30 am to 01:30 pm

Total Marks: [70]

Q - 1 Answer the following MCQ'S:

[10]

- I. The exhausted zeolite is regenerated by percolating through a solution of:
(a) Sodium chloride (b) Zinc chloride
(c) Magnesium chloride (d) Calcium chloride
- II. Temporary hardness in water can be removed by
(a) Boiling (b) Filtration
(c) Sedimentation (d) None of these
- III. Blow-down operation causes removal of:
(a) Scales (b) Sodium carbonate
(c) Both (a) & (b) (d) Hot water only
- IV. The maximum temperature reached, when coal is completely burnt in the theoretical amount of air is called:
(a) Fusion temperature (b) Calorific intensity
(c) Ignition temperature (d) None of these
- V. Which of the following gas is used for the fire extinguishers?
(a) Nitrogen (b) Carbon dioxide
(c) Oxygen (d) Hydrogen
- VI. The pressure at the inlet of a refrigerant compressor is called:
(a) Discharge pressure (b) Suction pressure
(c) Critical pressure (d) Back pressure
- VII. The Freon group of refrigerants is:
(a) Inorganic refrigerants (b) Azeotrope refrigerants
(c) Halo-carbon refrigerants (d) Hydro-carbon refrigerants
- VIII. Which of the following refrigerants has the lowest freezing point?
(a) R-11 (b) R-12
(c) R-22 (d) Ammonia
- IX. Which of the following is not a water tube boiler?
(a) Simple vertical (b) Babcock
(c) Lancashire (d) Wilcox
- X. Which of the following is affects the selection of boiler?
(a) No. of tubes (b) Working pressure
(c) Initial cost (d) All of these

Q - 2 Answer the following: (Any Ten)

[20]

- I. What is scale formation?
- II. Why does hard water consumes lot of soap?
- III. Why is hot lime soda process better than the cold process?
- IV. Why should an ideal fuel have moderate ignition temperature?
- V. What is meant by ignition temperature?
- VI. Define critical temperature.
- VII. Define suction pressure.
- VIII. Enlist the various types of refrigerants.
- IX. Enlist name of any four inorganic refrigerants
- X. Define saturated steam.
- XI. Define internal combustion engine.
- XII. Give the function of safety valve in boiler.

Q - 3(a) With the help of suitable example explain effect of water on rocks and mineral. [06]
(b) Write note on sources of water [04]

OR

Q - 3 (a) with the help of labelled diagram explain hot lime soda process. [06]
(b) Write a note on Equivalent of calcium carbonate. [04]

Q - 4 with the help of diagram explain construction and working of bomb calorimeter. [10]

OR

Q - 4 Write the industrial applications of following gases. [10]
a. Oxygen b. Nitrogen c. Hydrogen d. Carbon dioxide

Q - 5 with the help of p-v diagram explain work done by reciprocating compressor with clearance volume [10]

OR

Q - 5 Write a note on R-12 and R-729. [10]

Q - 6 Differentiate between. [10]
a. Petrol engine and diesel engine.
b. Water tube boiler and fire tube boiler

OR

Q - 6 Write note on steam power plant. Explain in detail about working and efficiency of steam power plant working on carnot cycle. [10]

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(2)