# Sardar Patel University

B. Sc. (Semester – IV) Examination

Date: 05 APRIL 2019  Friday                          Time: 10:00 am to 01:00 pm

Industrial Chemistry Vocational

COURSE NO: US04CICV01 (PLANT UTILITIES)

Notes: Figures to the right indicate full marks.                    Total marks: 70

Q.1 Answer the following Multiple Choice Questions. (All are compulsory)          (10)

1. Scale formation in boilers causes:
    (a) No loss of heat                (b) decrease in efficiency
    (c) Increase in efficiency         (d) Waste of heat

2. The exhausted permit (zeolite) is regenerated by percolating through it a solution of:
    (a) Calcium chloride            (b) potassium chloride
    (c) Magnesium chloride        (d) Sodium chloride

3. The maximum temperature achieved when coal is completely burnt in the theoretical amount of air is called:
    (a) Fusion temperature          (b) Calorific intensity
    (c) Ignition temperature         (d) Calorific temperature

4. Which of the following gas is used in making tungsten filaments for electric lamps?
    (a) $N_2$                      (b) Mixture of $N_2$ and $H_2$
    (c) $O_2$                      (d) $CO_2$

5. Which gas has the highest calorific value among given option?
    (a) Oxygen                 (b) Helium
    (c) Hydrogen               (d) Nitrogen

6. The work requirement for a reciprocating compressor is minimum when the compression process is:
    (a) Isentropic               (b) Isothermal
    (c) Adiabatic               (d) Geothermal

7. The pressure at the inlet of a refrigerant compressor is called_____.
    (a) Suction pressure           (b) Discharge pressure
    (c) Critical pressure           (d) Back pressure

8. Which of the following is not a horizontal boiler?
    (a) Cochran                (b) Babcock
    (c) Lancashire             (d) Locomotive

9. The thermal efficiency of Carnot engine is given by_____.
    (a) n = 1-Tc             (b) ri = 1-(Th/Tc)
    (c) n = 1- r             (d) n = 1-(Tc/Th)

10. The Engine which use petrol as a fuel is known as
    (a) Otto Engine            (b) Stream Engine
    (c) Diesel Engine         (d) Gas Engine

(P.T.O)

(1)

Q.2 Answer the following short questions. (Any TEN) (20)

1. Why is hot lime soda process better than the cold process?
2. Explain the role of coagulant in softening of water.
3. How does zeolite aid in softening of water.
4. Define the terms "Ignition temperature".
5. Briefly explain the concept of Critical temperature and Critical Pressure.
6. Give the industrial uses of Hydrogen gas.
7. Compare multi-stage compression and single stage compression.
8. What are the factors affecting volumetric efficiency of a reciprocating compressor.
9. What are the properties of an ideal refrigerant?
10. Compare external and internal combustion engine.
11. Define the term "Saturated steam".
12. What are the factors to be considered prior to selection of boiler?

Q.3
  A. Describe the Zeolite process for water softening. (05)
  B. Explain cold lime soda process and hot lime soda process. (05)
<div align="center">OR</div>
Q.3 Explain in detail various problems associated with the use of water in boiler. (10)

Q.4 Write a notes on "calculation of heat energy" and "characteristic of good fuel". (10)
<div align="center">OR</div>
Q.4 Explain construction and working of bomb calorimeter. (10)

Q.5 Explain work done by reciprocating compressor with clearance volume. (10)
<div align="center">OR</div>
Q.5 Write a note on simple vapour compression refrigeration system. (10)

Q.6 Explain in detail about working and efficiency of steam power plant in detail. (10)
<div align="center">OR</div>
Q.6 Write a detailed note on internal-combustion engine used in automobiles. (10)

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<div align="center">②</div>