

A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE

(AUTONOMOUS) (Grant-in-Aid)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Bachelor of Science (Semester - 3) External Examination - 2025

US03MAICH01: CHEMICAL PLANT UTILITIES AND INSTRUMENTATION

Date: 06-10-2025 (MONDAY)

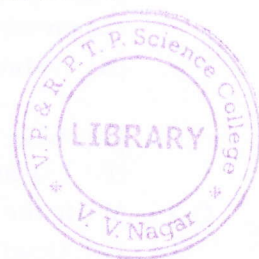
Time: 02:00 PM to 04:30 PM (2.5 HRS.)

Total marks: 50

Note: Figures to the right indicate marks of the question.

Q-1 Write the most appropriate answer from the following multiple-choice questions. [10]

- 1 Water used for steam generation should be _____
(a) Free from dissolved salts and suspended impurities (b) Consisting of dissolved salts and suspended impurities
(c) Rich in minerals for better conductivity (d) Saturated with gases for better heat transfer
- 2 Nitrogen is used in welding and metal cutting because it _____
(a) Acts as a reducing agent (b) Provides an inert atmosphere
(c) Increases flame temperature (d) Supplies oxygen for combustion
- 3 The Carnot refrigeration cycle gives the _____
(a) Minimum possible COP (b) Practical COP of real systems
(c) Maximum possible COP (d) Zero COP
- 4 The main components of a steam power plant are _____
(a) Boiler, generator, chimney, and fan (b) Turbine, compressor, evaporator, and pump
(c) Boiler, alternator, fuel tank, and chimney (d) Boiler, turbine, condenser, and pump
- 5 Which of the following is an example of halocarbon refrigerant?
(a) Chlorofluorocarbons (b) Water
(c) Dry Ice (d) Isobutane
- 6 Which of the following instruments is commonly used to measure atmospheric pressure?
(a) Manometers (b) Barometer
(c) Bourdon tube gauge (d) Thermometer
- 7 The Ultrasonic level detectors are more advantageous because they _____
(a) Are cheaper than all other methods (b) Need direct contact with liquid
(c) Provide continuous non-contact measurement (d) Work only at very high pressure
- 8 The diaphragm pressure gauge is operated based on the principle of _____
(a) Thermal expansion (b) Electromagnetic induction
(c) Hydrostatic pressure (d) Elastic deformation



- 9 The Differential pressure gauges are mainly used in
(a) Flow measurement across an orifice (b) Liquid level measurement
(c) Temperature measurement (d) Vibration measurement
- 10 In a float-operated level gauge, the principle of operation is based on
(a) Elastic deformation (b) Buoyancy of the float
(c) Hydrostatic pressure (d) Capillary action

Q-2 Write the answer of following long Questions.

[10]

[A]. Write a note on sources of water.

[B]. Discuss the construction and working of Bomb Calorimeter.

OR

[A]. With the help of labeled diagram explain zeolite process for softening of Hard water.

[B]. Write the industrial applications of Nitrogen, Hydrogen and Carbon dioxide gases.

Q-3 Write the answer of following long Questions.

[10]

[A]. Explain with the help of neat sketch work done by single stage, single acting reciprocating compressor.

[B]. Distinguish between petrol engine and diesel engine.

OR

[A]. Write the classification of Boiler.

[B]. Explain mechanism of simple vapour compression refrigeration system.

Q-4 Write the answer of following long Questions.

[10]

[A]. Describe Diaphragm pressure Gauge.

[B]. Explain Bourdon pressure gauge, With neat sketch labeled sketch.

OR

[A]. Write a detailed note on Barometer

[B]. Explain construction and working of Enlarged leg manometer and Inclined leg Manometer.

Q-5 Write the answer of following long Questions.

[10]

[A]. Describe Hook Gauge method for level measurement.

[B]. Explain the sight glass method with a neat sketch.

OR

[A]. Describe Bob and Tape method for level measurement.

[B]. Explain in detailed about pressure gauge method for indirect level measurement.

