

SEAT No. _____

No. of printed pages: 02

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SARDAR PATEL UNIVERSITY
B. Sc. Examination (Third semester)
Friday, 1st January-2021
10.00 am to 12.00 pm
US03EICH02- Industrial Chemistry-I

Total Marks: 70

Q-1 Choose the most appropriate option for each of the following. [10]

- (i) _____ is the ratio of the moles of a particular product produced to the moles of another product produced in a set of reactions.
(a) Conductivity (b) Reactivity (c) Selectivity (d) Nonselectivity
- (ii) The material and _____ calculations are basic tools for process design work.
(a) Phase balance (b) mass balance
(c) energy balance (d) Chemical balance
- (iii) A simplex pump is the one having only _____ cylinder.
(a) four (b) two (c) three (d) one
- (iv) Volute converts the _____ energy of the liquid imparted by the impeller to pressure energy.
(a) mechanical (b) kinetic (c) potential (d) translational
- (v) The spur gear pump contains _____ gear wheels in casing.
(a) one (b) four (c) two (d) six
- (vi) Mercury-in-glass thermometer cannot be used below _____ °F.
(a) 27 (b) 38 (c) 50 (d) 72
- (vii) _____ glass is used in optical pyrometers.
(a) yellow-filter (b) red-filter (c) green-filter (d) brown-filter
- (viii) Calculation of hardness of water using EDTA is a _____ type of reaction.
(a) Complexometric (b) Neutralization (c) Redox (d) Precipitation
- (ix) Hardness due to 162 mg/lit $\text{Ca}(\text{HCO}_3)_2$ is equal to _____.
(a) 50 ppm (b) 100 ppm (c) 150 ppm (d) 200 ppm
- (x) Dissolved Oxygen in water is responsible for _____.
(a) Corrosion (b) Priming (c) Scale Formation (d) foaming

Q-2 Choose correct option given in the bracket and fill in the blanks. [08]

- (i) The _____ of a substance is the mass per unit volume of the substance.
(temperature / density)
- (ii) The basis for material balance calculations is the _____.
(law of conservation of mass / law of energy conservation)
- (iii) The heat transfer equipment which consists of two concentric pipes is called as _____ heat exchanger. (double pipe / finned tube)
- (iv) The shortest centre-to-centre distance between the adjacent tubes is known as the _____. (tube pitch / square pitch)

[PTO]

- (v) A pressure spring of bronze is used in the pressure range up to about ____ psi.
(600 / 400)
- (vi) The temperature range covered by the industrial bimetallic thermometer is _____.
(-35 to 700 °F / -40 to 800 °F)
- (vii) Blow down is process of _____.
(Precipitation of impurities / Replacing the impure water)
- (viii) Carry over of steam mainly due to _____.
(Priming & Foaming / Caustic embrittlement)

Q-3 Attempt any ten questions of following.

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- (i) What is general balance equation?
- (ii) Explain by-passing streams.
- (iii) Define the following terms: (a) Selectivity (b) Open system
- (iv) Give the types of reciprocating pumps.
- (v) Give the factors which influence the choice of pump for particular operation.
- (vi) Define the following terms: (a) condenser (b) heater
- (vii) Give the mechanical properties which must be considered in the selection of a thermal well.
- (viii) Give the methods of selecting lead wires.
- (ix) Give the application of radiation pyrometers.
- (x) Give the sources of water.
- (xi) What are the common impurities present in natural water?
- (xii) Give the methods of boiler water treatment

Q-4 Attempt any four questions of following.

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- (i) Explain batch, continuous and semibatch chemical processes.
- (ii) Write a note on Recycle operation and its importance.
- (iii) Explain the various losses occurring during the operation of a centrifugal pump.
- (iv) Write in brief on plate type heat exchanger.
- (v) Give the brief account on bimetallic thermometer.
- (vi) Give the brief account on industrial thermocouples.
- (vii) Discuss the prevention of scale formation in boilers.
- (viii) Write note on: Determination of hardness

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