PB-003-1016028 Seat No. _____

B. Sc. (Sem. VI) (CBCS) Examination

March / April - 2020

BS-IC-603 : Fundamentals of Chemical Engineering

Faculty Code : 003
Subject Code : 1016028

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) Question paper carries total 5 questions.
(2) All the questions are compulsory and carry 14 marks each.
(3) Draw labeled diagram wherever necessary.
(4) Assume suitable data.

1 (a) Answer the following questions : **4**

(1) The symbol to denote viscosity is _____.

(2) Liquid is incompressible fluid. True / False?

(3) Weirs are used for measurement of liquid flow having _____ size. (Large / Small)

(4) Write equation of Reynold's number.

(b) Answer in brief : (Any one out of two) **2**

(1) What is minor energy loss?

(2) Draw only diagram of differential manometer.

(c) Answer in detail : (Any one out of two) **3**

(1) Write a short note on rotational and uniform flow.

(2) Explain continuity equation with diagram.

(d) Write a note on : (Any one out of two) **5**

(1) Describe simple manometer with diagram.

(2) Discuss orifice meter and its equation with neat diagram.

2 (a) Answer the following questions : **4**

(1) Define : Heat transfer.

(2) Reflux ratio is denoted by _____ symbol.

(3) In distillation column, vapor rich section means _____ section.

(4) Free convection is also called as _____ convection.

(b) Answer in brief : (Any one out of two) **2**

(1) What is fouling factor? Give one example.

(2) Draw only diagram of compound resistance in parallel.

(c) Answer in detail : (Any one out of two) **3**

(1) Discuss various modes of heat transfer.

(2) Explain mass and energy balance over evaporator.

(d) Write a note on. (Any one out of two) **5**

(1) Derive an equation for bottom operating line using McCabe Thiele method.

(2) Give statement of Fourier's law and derive its equation with neat figure.

3 (a) Answer the following questions : **4**

(1) Refrigeration can be used in crystallization process. True/False?

(2) Good refrigerant should have _____ boiling point.

(3) CO_2 is useful inorganic refrigerant. True/False?

(4) Compressor utilizes high temperature and high _____.

(b) Answer in brief : (Any one out of two) **2**

(1) Elaborate the word 'Tone of refrigeration' with example.

(2) Calculate refrigerant code of ammonia.

(c) Answer in detail : (Any one out of two) **3**

(1) Discuss any two physical properties of refrigerant.

(2) Explain use of condenser in refrigeration process.

(d) Write a note on. (Any one out of two) **5**

(1) Write a detailed note on industrial refrigerant.

(2) Explain classification of refrigerants in detail.

4 (a) Answer the following questions : **4**

(1) What is amplifier?

(2) Write full form of F.C.E.

(3) What is Lag?

(4) Define : Input.

(b) Answer in brief : (Any one out of two) **2**

(1) Define :

(a) Gain

(b) Transducer

(2) Give various uses of controller.

(c) Answer in detail : (Any one out of two) **3**

(1) Discuss on-off control in brief.

(2) Explain capacitance with diagram in brief.

(d) Write a note on : (Any one out of two) **5**

(1) Explain control valve with neat diagram.

(2) Discuss difference between open loop and closed loop control system.

5 (a) Answer the following questions : **4**

(1) Health hazard is caused due to _____ chemicals.

(2) Give full form of NIHL.

(3) What is castability of material?

(4) Give full form of CSTR.

(b) Answer in brief : (Any one out of two) **2**

(1) Write a brief note on semi commercial plant.

(2) Explain 'Oxidisability' as dangerous properties of chemical in brief.

(c) Answer in detail : (Any one out of two) **3**

(1) Draw only diagrams of various vessels and reactors.

(2) Discuss colour codes for safety.

(d) Write a note on : (Any one out of two) **5**

(1) Explain time schedule used in chemical industries.

(2) Give an account of major considering factor for safety.
