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RZ-003-1016028 Seat No. _____

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

March - 2019

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 & carry 14 marks each.

(3) Draw labeled diagram wherever necessary.

(4) Assume suitable data.

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

(1) Viscosity is defined as _____

(2) Gases are incompressible fluid. True/False?

(3) du/dy is also known as _____

(4) Give equation of Reynold's number.

(B) Answer in brief : (Any **One** out of Two) **2**

(1) What is critical velocity?

(2) Give statement of Newton's law of viscosity.

(C) Answer in detail : (Any **One** out of Two) **3**

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

(2) Discuss continuity equation with diagram.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Explain differential manometer with diagram.

(2) Discuss Venturimeter with neat diagram.

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

(1) L.M.T.D. is stands for what?

(2) Reflux ratio is amount of condensate sent back to the tower to amount of _____ recovered.

(3) McCabe Thiele method is used to count numbers of plates required for fractionating column. True/False?

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

(B) Answer in brief : (Any **One** out of Two) **2**

(1) Give statement of Fourier's law.

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

(C) Answer in detail : (Any **One** out of Two) **3**

(1) Discuss limitations of McCabe-Thiele method.

(2) Explain mass and energy balance over crystallizer.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Derive q line equation for continuous fractionating column.

(2) Explain heat flow through cylinder with diagram.

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

(1) Latent heat of vaporization should be _____ to produce high refrigerating effect.

(2) Good refrigerant should have _____ boiling point.

(3) Give full form of C.O.P.

(4) Ammonia cannot be used as refrigerant. True/False?

(B) Answer in brief : (Any **One** out of Two) **2**

(1) Explain Tone of refrigeration with example.

(2) How refrigerant number of CO_2 is calculated?

(C) Answer in detail : (Any **One** out of Two) **3**

(1) Discuss any two chemical properties of refrigerant.

(2) Explain use of receiver in refrigeration process.

(D) Write a note on : (Any **One** out of Two) **5**

(1) What is air-conditioning? Discuss importance of refrigeration in detail.

(2) Discuss classification of refrigerants in detail.

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

(1) What is measured variable?

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

(3) What is deviation or error?

(4) Lag means delay in response. True/False?

(B) Answer in brief : (Any **One** out of Two) **2**

(1) Define : (a) Signal (b) Out put

(2) Write uses of controller.

(C) Answer in detail : (Any **One** out of Two) **3**

(1) Discuss transfer function in brief.

(2) Explain Resistance with diagram in brief.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Explain difference between open loop and closed loop control system.

(2) Discuss components of control system.

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

(1) What is safety?

(2) Give full form of L.E.L.

(3) What is weldability of material?

(4) Process research include lab work and _____

(B) Answer in brief : (Any **One** out of Two) **2**

(1) Write a brief note on pilot plant.

(2) Explain `Compressibility' as dangerous property of chemical.

(C) Answer in detail : (Any **One** out of Two) **3**

(1) Discuss colour codes for safety.

(2) Explain fluidized bed and slurry phase reactors in brief.

(D) Write a note on : (Any **One** out of Two) **5**

(1) Discuss engineering controls of chemical plant hazards.

(2) Explain time schedule used in chemical industries.
