BBH-003-1016028 Seat No. _____

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

July - 2021

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 10 questions.

(2) All the questions have general option & carry 14 marks each.

(3) Answer any 5 questions out of total 10 questions.

(4) Draw labeled diagram wherever necessary & Assume suitable data.

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

(1) The branch of engineering that deals with behavior of fluid under motion is called

(2) If the flow varies with time, the flow is known as _____ flow.

(3) Reynold's number is dimensionless.True/False?

(4) Technically fluid includes _____ & gas.

(B) Answer in brief. **2**

(1) Define:

a) Rotational flow

b) laminar flow

(C) Answer in detail. **3**

(1) Explain in brief: Head loss due to sudden enlargement

(D) Write a note on. **5**

(1) Explain principle, construction and working of Venturimeter with diagram.

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

(1) The range of Reynold's number for turbulent flow is _____.

(2) What is viscosity of fluid?

(3) Continuity equation is based on law of conservation of _____.

(4) What is compressible flow?

(B) Answer in brief. **2**

(1) Draw only diagrams of various orifice plates.

(C) Answer in detail. **3**

(1) Write a short note on notches & weirs.

(D) Write a note on. **5**

(1) Derive Bernoulli's equation with suitable diagram.

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

(1) According to Fourier's Law, heat transfer is directly proportional to _____.

(2) What is the unit of thermal conductivity?

(3) Conduction mainly takes place through _____. (Solid/liquid)

(4) Lo/D is known as _____ ratio.

(B) Answer in brief. **2**

(1) Discuss fouling factor with an example.

(C) Answer in detail. **3**

(1) Explain mass and energy balance over distillation column.

(D) Write a note on. **5**

(1) What is heat transfer? Explain various modes of heat transfer in detail.

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

(1) Convective heat transfer with the help of external agency like fans, agitators etc. is known as _____ convection. (Natural/Forced)

(2) Which law is used to explain convective heat transfer phenomena?

(3) As reflux ratio increases, number of theoretical plates required in distillation column _____.

(4) Glass wool is an example of _____.

(B) Answer in brief. **2**

(1) Explain types of convection in brief.

(C) Atiswer in detail. **3**

(1) Discuss mass and energy balance over Swenson Walker crystallizer.

(D) Write a note on. **5**

(1) Explain heat flow through cylinder with diagram.

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

(1) Brine can be used as refrigerant. True/False?

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

(3) Air is an example of _____ refrigerant.

(4) The science and an art of producing & maintaining temperature below that of surrounding atmospheric temperature is called _____.

(B) Answer in brief. **2**

(1) Explain in brief: Tonne of refrigeration

(C) Answer in detail. **3**

(1) Discuss characteristics of good refrigerants.

(D) Write a note on. **5**

(1) Discuss physical properties of refrigerants in detail.

6 (A) Answer the following questions. **4**

(1) Efficiency of heat engine is denoted by _____ symbol.

(2) Toxicity of refrigerant should be _____ (High/Low).

(3) What is refrigerant number of ammonia ?

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

(B) Answer in brief. **2**

(1) Define:

a) Efficiency of heat engine

b) Relative COP

(C) Answer in detail. **3**

(1) Write a brief note on air conditioning.

(D) Write a note on. **5**

(1) Explain classification of refrigerants in detail.

7 (A) Answer the following questions. **4**

(1) Transportation lag means delay in _____.

(2) FCE stands for what?

(3) The difference between set point and measured variable is know as _____.

(4) The outgoing signal from the control system is called _____.

(B) Answer in brief. **2**

(1) Define: a) Offset b) Input signal

(C) Answer in detail. **3**

(1) Explain ON-OFF control with example.

(D) Write a note on. **5**

(1) Explain components of feedback control system with diagram.

8 (A) Answer the following questions. **4**

(1) What is steady state process?

(2) The device which is used to for increasing strength of signal is known as _____.

(3) The information conveyed from one point to another in a control system is called _____.

(4) Define:-Tele -metering

(B) Answer in brief. **2**

(1) Define:

a) Control variable

b) Transducer

(C) Answer in detail. **3**

(1) Explain capacitance with diagram.

(D) Write a note on. **5**

(1) Differentiate between open loop and close loop control system. (Minimum 5 points)

9 (A) Answer the following questions. **4**

(1) The property of a material to resist indentation is called _____.

(2) The property of a material due to which it gets fractured beyond the elastic limit is called _____.

(3) Give full form of UEL.

(4) Safety means to prevent any accident. True/False?

(B) Answer in brief. **2**

(1) Enlist various factors to be considered for safety.

(C) Answer in detail. **3**

(1) Explain difference between standard and special designed equipments.

(D) Write a note on. **5**

(1) Explain colour code for safety in det-aii.

10 (A) Answer the following questions. **4**

(1) Give full form of CSTR.

(2) Process research include lab work and

(3) Red colour indicates fire hazards. True/False?

(4) Write full form of TLV.

(B) Answer in brief. **2**

(1) Define: a) Lost time injury b) Severity rate

(C) Answer in detail. **3**

(1) Discuss dangerous properties of chemicals in brief.

(D) Write a note on. **5**

(1) Explain time schedule in chemical industries in detail.
