HB-003-2016028

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

April - 2023

Fundamentals of Chemical Engineering : BS-IC-603

Faculty Code : 003

Subject Code : 2016028

Time : $2\frac{1}{2}$ / Total Marks : **70**

Instructions :

    (1)   Question paper carries total 5 questions.

    (2)   All the questions are compulsory and each carries 14 marks.

    (3)   Draw labelled diagram wherever necessary and assume suitable data.

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

        (1)   _____ is defined as the substance that cannot be permanently deformed.

        (2)   If the flow does not vary with time, the flow is known as _____ flow.

        (3)   What is the range of Reynold's number for Turbulent flow ?

        (4)   Continuity equation is based on low of conservation of mass. (True/False)

  (b)   Answer in brief : (any 1 out of 2)   **2**

        (1)   Draw only diagram of Inclined manometer.

        (2)   Enlist classification of fluid mechanics.

  (c)   Answer in detail : (any 1 out of 2)   **3**

        (1)   Write a short note on Newton's law of viscosity.

        (2)   Write a brief note on time independent fluid.

  (d)   Write a note on : (any 1 out of 2)   **5**

        (1)   Explain : Principle, construction and working of Venturimeter.

        (2)   Write a detailed note on Notches and Weirs.

2 (a) Answer the following questions : 4
   (1) According to Fourier's Law, heat transfer is directly proportional to _____.
   (2) Give an example of convection mode of heat.
   (3) Overall thermal resistance in series can be given by formula as $R_{overall} =$
   (4) Give the unit of thermal conductivity.

   (b) Answer in brief : (any 1 out of 2) 2
   (1) Define : Latent heat with example.
   (2) Define :
      (a) Conduction
      (b) Radiation

   (c) Answer in detail : (any 1 out of 2) 3
   (1) Discuss : Mass and energy balance over evaporator.
   (2) Derive an equation for Fourier's law.

   (d) Write a note on : (any 1 out of 2) 5
   (1) Write a detailed note on LMTD with diagrams.
   (2) Derive an equation of striping column with its diagram.

3 (a) Answer the following questions : 4
   (1) ASHARE is stands for what ?
   (2) What is the refrigerant number of ammonia ?
   (3) To produce high refrigeration effect, the latent heat of vaporization should be _____.
   (4) The freezing temperature of refrigerant should be low. (True/False)

   (b) Answer in brief : (any 1 out of 2) 2
   (1) What is ton of refrigeration ?.
   (2) Define :
      (a) Efficiency of heat engine
      (b) Relative COP

   (c) Answer in detail : (any 1 out of 2) 3
   (1) Discuss : Characteristics of good refrigerants.
   (2) Explain : Function of condenser in brief.

   (d) Write a note on : (any 1 out of 2) 5
   (1) Discuss : Difference among heat engine, refrigerant and heat pump.
   (2) Write a detailed note on industrially important refrigerants.

4   (a)   Answer the following questions :   **4**
            (1)   Give the full form of D.C.S.
            (2)   Transportation lag means delay in _____.
            (3)   The difference between set point and measured variable is called _____.
            (4)   The outgoing signal from the control system is called output signal (True/False)

       (b)   Answer in brief : (any 1 out of 2)   **2**
            (1)   What is negative and positive feedback ?
            (2)   Define :
                  (a)   Amplication
                  (b)   Action

       (c)   Answer in detail : (any 1 out of 2)   **3**
            (1)   Write a brief note on capacitance.
            (2)   Explain : Transfer function in brief.

       (d)   Write a note on : (any 1 out of 2)   **5**
            (1)   Explain : Component of control system with block diagram.
            (2)   Discuss : Proportional controller with neat diagram.

5   (a)   Answer the following questions :   **4**
            (1)   Give full form of CSTR.
            (2)   Red colour indicates _____ in colour code for safety.
            (3)   The property of brightness of the surface of material and its ability to remit the light is called _____.
            (4)   Safety means to prevent any accident. (True/False)

       (b)   Answer in brief : (any 1 out of 2)   **2**
            (1)   Discuss : Principle of industrial safety.
            (2)   Define :   (a)   Hardness
                          (b)   Malleability

       (c)   Answer in detail : (any 1 out of 2)   **3**
            (1)   Discuss : Standard and specially designed equipments.
            (2)   Explain : Colour code for safety.

       (d)   Write a note on : (any 1 out of 2)   **5**
            (1)   Explain : Dangerous properties of chemicals in detail.
            (2)   Discuss : Various reactors and reaction vessels with neat diagrams.

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