Roll No.....

B.Tech
2019
4th Sem.

B.Tech Food Technology
Semester IV Examination, 2019
Paper Title: Transfer Processes in Food
Paper Code: BFTC – 403

Time: 3 Hours **Max Marks 70**

It is compulsory to answer all the questions of Section-A
Answer any four question in Section-B

Section-A (5X6=30)

Q1. Explain (2X3=6M)

(a) Mechanism of conduction

(b) Overall heat transfer coefficient

Q2. Define and explain the physical significance of Reynold's Number. (6M)

Q3. Explain the difference between 'Heat transfer' and 'Thermodynamics'. (6M)

Q4. Describe the role of mass transfer operations in the industrial processes. (6M)

Q5. Discuss the analogy between heat, mass and momentum transfer operations. (6M)

Section B (4X10=40)

Q1. Derive the Hagen-Poiseuille equation for shell momentum balance inside a circular conduit or pipe. (10M)

Q2. A mixture of noble gases [He, Ar, Kr & Xe] is at a total pressure of 100kPa and a temperature of 200K. If the mixture has equal kmole fractions of each of the gases, determine:

(a) The composition of the mixture in terms of mass fraction

(b) Total molar concentration

(c) The mass density

(Mol. Wt. in kg/mole: He=4; Ar=40; Kr=83.8 & Xe=131.3) (10M)

Q3. Derive the heat transfer equation for combined conduction and convection. (10M)

Q4. A cold storage room is constructed of an inner layer of 12.7 mm of pine, a middle layer of 101.6 mm of cork board, and an outer layer of 76.2 mm of concrete. The wall surface temperature is 255.4 K inside the cold room and 297.1 K at the outer surface of the concrete. Conductivities: for pine = 0.151; for cork board = 0.0433; and for concrete = 0.762 W/m.K. Calculate the heat loss in W for 1 m^2 and the temperature at the interface between the wood and cork board. (10M)

Q5. Derive the expression for steady state equimolar counter diffusion in liquids. (10M)

Q6. Find the Fourier's heat conduction equation for multilayered wall having different conductivities and connected in series. (10M)

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