Reg. No. :

Question Paper Code: 59713

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fifth Semester

Agriculture Engineering

15UAG504 - HEAT AND MASS TRANSFER FOR AGRICULTURAL ENGINEERS

(Regulation 2015)

Duration: One hours   Maximum: 30Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The heat of sun reaches to us according to   CO1- R
   (a) Conduction   (b) Convection   (c) Radiation   (d) None of the above

2. The critical thickness of insulation for a sphere is   CO1- R
   (a) k/h   (b) 2k/h   (c) h/k   (d) h/2k

3. The product of Reynolds number and Prandtl number is known as   CO2-R
   (a) Stanton number   (b) Biot number   (c) Peclet number (d) Grashoff number

4. The condition for Laminar Flow for Flow over Flat Plate in Forced   CO2- R
   Convection, if the Reynolds Number is
   (a) < 2300   (b) <5 X 10^5 (c) >2300   (d) <10^7

5. The radiation emitted by a black body is known as   CO3- R
   (a) Black radiation   (b) Full radiation (c) Both (a) & (b) (d) None of the above

6. Heat transfer by radiation mainly depends upon   CO3- R
   (a) Its temperature   (b) Nature of the body (c) Both (a) & (b) (d) None of the above

7. The concept of overall coefficient of heat transfer is used in heat transfer   CO4- R
   problems of
   (a) Conduction   (b) Convection   (c) Radiation   (d) Conduction and convection

8. The correction of LMTD is necessary in case of _____ Flow heat exchanger.   CO4- R
   (a) Parallel flow type   (b) Counter flow type
   (c) Cross flow type   (d) Regenerator type

9. Universal gas constant value is CO5- U

   (a) 8.314 J/kg K   (b) 8314 J/kg K   (c) 8314 KJ/kg K   (d) All of the above

10. Molecular weight of N_2 is CO5- U

   (a) 28   (b) 32   (c) 40   (d) 77

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. A wire of 7mm is covered with an insulating material (k=1 W / mK). The wire temperature and ambient temperature are 80°C and 15°C.if the inside convective heat transfer co efficient is 8.2 W/m2K,find the minimum thickness of insulation and also find the percentage of increase in the heat dissipation.   CO1- App   (8)

12. A large vertical plate 5 m height is maintained at 100^0C and exposed to air at 30^0C. Calculate the convective heat transfer coefficient and heat transfer.   CO2- App   (8)

13. Two black square plates of size 2 by 2m are placed parallel to each other at a distance of 0.5m. one plate is maintained at a temperature of 1000^0C and the other at 500^0C.find the heat exchange between plates.   CO3- App   (8)

14. In a counter flow double pipe heat exchanger, oil is cooled from 85^0C to 55^0C by water entering at 25^0C. the mass flow rate of oil is 9800kg/h and specific heat of oil is 2000J/kg K. the mass flow rate of water is 8000 kg/h and specific heat of water is 4180 J/kg K. determine the heat exchanger area and heat transfer rate for an overall heat transfer co-efficient of 280 W/m^{2}K.   CO4- App   (8)

15. Air at 10^0C with velocity of 3m/s flows over a flat plate . if the plate is 0.3m long, calculate the mass transfer co-efficient.   CO5- App   (8)