

Q. No.3**20**

Consider a large plate of thickness $t = 3$ cm with an internal heat generation of 1200 kW/m^3 and a constant thermal conductivity of 1.1 W/mK . The faces of the plate are maintained at 150° C and 300° C . Assume that the dimensions in the directions perpendicular to the thickness are so large that the temperature gradients due to conduction are significant in the direction of thickness only

- Write the one dimensional governing equation for the above phenomena
- Obtain the discretized equation for each node
- Arrange the equations in the matrix form and solve it to find the steady state temperature at five equally spaced nodes using TDMA

Q.No.4

- a) What is a SIMPLER algorithm used for? Explain the steps involved in the algorithm. How is it different from SIMPLE? **10**
- b) Discuss the $k - \epsilon$ and $k - \omega$ models used in turbulence modeling **10**

Q.No.5 Write brief notes**20**

- a) Explain the concept of Peclet no.
- b) What is QUICK? Give the distribution of flux ϕ at the face values of a control volume.
- c) What are the differences between FDM and FVM.
- d) Application of CFD in automobile engineering.
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