

II B.Tech I Semester Supplementary Examinations, November 2006
FURNACE TECHNOLOGY AND PYROMETRY
(Metallurgy & Material Technology)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain the Fourier's law of thermal conductivity.
(b) Derive an expression for conduction through a homogeneous plane wall. [8+8]
2. Explain the following:
(a) Reynolds number
(b) Nusselt number
(c) log mean temperature difference.
(d) importance of heat transfer in furnace technology. [4x4=16]
3. (a) Explain the concept of black body.
(b) Derive an expression for heat exchange by radiation between large parallel plates of different emissivity. [7+9]
4. (a) Derive the relation for the rate of heat transfer due to combined effect of conduction and convection between two fluids separated by a cylindrical wall.
(b) Compare radiation with conduction and convection. [8+8]
5. (a) Discuss the salient features of reverberatory furnace and vertical shaft furnace.
(b) What are the possible sources of heat losses in furnaces? Explain. [9+7]
6. (a) Explain the principle and working of 'direct arc' and 'indirect arc' electrical furnaces.
(b) Explain the advantages of using electric energy as a source of heat in Metallurgical furnaces. [10+6]
7. (a) What is a Thermo-couple? Explain its working principle.
(b) Discuss various methods of cold Junction correction in case of thermo electric pyrometers.
(c) Explain Peltier and Thomson effects. [5+6+5]
8. (a) Explain the principle and working of a total radiation pyrometer.
(b) What are the various newer methods of measuring temperature that are available? Explain them. [8+8]
