Department of Mathematics and Statistics (KFUPM)
Math-333 Semester-181 QUIZ VI

NAME: S.No. ID:
Maximum Marks: 8 Section:03 Time Allowed: 40 minutes

1 (204points) Use Laplace transform to solve the problem

$$\frac{\partial^2 u}{\partial x^2} = \frac{\partial^2 u}{\partial t^2},\ x > 0,\ t > 0,$$

subject to the boundary and initial conditions

$$u(0,t) = 1,\ \lim_{x\to\infty} \frac{\partial u}{\partial x} = 0,\ t > 0,$$

$$u(x,0) = e^x - x,\ \left.\frac{\partial u}{\partial t}\right|_{t=0} = 0,\ x > 0.$$

2 (04 points) Solve the problem using the Fourier **sine** transform

$$\frac{\partial^2 u}{\partial x^2} = \frac{\partial u}{\partial t},\ x > 0,\ t > 0,$$

$$u(0,t) = 2,\ t > 0, \qquad u(x,0) = 0, x > 0.$$