

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

NAME: _____ S.No. _____ ID: _____
Maximum Marks: 8 Section:04 Time Allowed: 40 minutes
1 (04points) Use Laplace transform to solve the problem

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

subject to the boundary and initial conditions

$$u(0, t) = \sin(\pi t), \quad \lim_{x \rightarrow \infty} u(x, t) = 0, \quad t > 0,$$

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

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

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0, \quad 0 < x < \pi, \quad y > 0,$$

$$u(0, y) = 0, \quad u(\pi, y) = e^{-y}, \quad y > 0,$$

$$\left. \frac{\partial u}{\partial y} \right|_{y=0} = 0, \quad 0 < x < \pi.$$