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**Eka Oche Ogbaji\*** (ogbajieka@yahoo.com), Department of mathematics and statistics, federal university p.m.b1020 wukari., Wukari, Taraba , Nigeria, and **Emmanuel Innocent Agene** (emmanuel.innocent@yahoo.com), Department of mathematics and computer sc., Kwararafa university wukari, wukari, Taraba , Nigeria. *Flow rate of gas at variable optical depths.*

In this study of nonlinear differential equation of order two, model of flow rate of gas was formulated, were finite difference was used to study the behaviour of flow rate of gas at various optical depths were 0.3m radius of vertical plate was consider hypothetically. Pascal programming language was used to code the numerical method. Graph show the increase of flow rate at various increases of optical depths of gas. Finally, flow rate of gas increases as optical depth increase. (Received August 08, 2013)