# School of University Polytechnic
**Diploma in Mechanical Engineering**
**Mid Term Examination - May 2024**

**Duration : 90 Minutes**
**Max Marks : 50**

### Sem IV - N1DL405C - Concept of Heat Transfer

*General Instructions*
*Answer to the specific question asked*
*Draw neat, labelled diagrams wherever necessary*
*Approved data hand books are allowed subject to verification by the Invigilator*

**1)** Explain the fourier's law.     K2 (2)

**2)** Relate the thermal conductivity and temprature.     K1 (3)

**3)** Explain the composit wall.     K2 (4)

**4)** Explain the basic laws of heat transfer.     K2 (6)

**5)** Identify the factors affecting the overall heat transfer in a fin.     K3 (6)

**6)** The inner surface of furnace wall is at 2000 degree Celcious and outer surface at 500 degree Celcious. Calculate the heat lost per m2 area of the wall. If thermal conductivity of the brick is 0.5 W/m0C & the wall thickness is 200mm.     K3 (9)

**7)** State the long fin in extended surface heat transfer, and how does it work.     K4 (8)

**8)** Obtain the expression for thermal resistance offered by a spherical wall of uniform conductivity (k).     K4 (12)

**OR**

A wire 0.5 mm diameter is stretched along the axis of a cylinder 50 mm in diameter and 250 mm in length. The wire is maintained at a temprature of 750 k by passing a current through it, the cylinder is kept at 250 k and the gas in it has a thermal conductivity of 0.0251 W/mk. Calculate the rates at which the heat is dissipated both by conduction through the gas and by radiation, if the wire is perfectly black.     K4 (12)