|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TEST 1 | TEST 2 | TEST 3 | TEST 4 |
| ST1 (°C) | 50 | 55 | 60 | 65 |
| ST2 (°C) | 35.85 | 39.5 | 43.13 | 48.53 |
| ST3 (°C) | 45.17 | 49.53 | 54.95 | 60.25 |
| ST4 (°C) | 31.40 | 34.42 | 36.84 | 41.76 |
| ST5 (°C) | 43.55 | 47.91 | 52.89 | 57.88 |
| ST6 (°C) | 25.41 | 27.43 | 28.63 | 31.56 |
| ST7 (°C) | 42.19 | 45.66 | 50.19 | 54.99 |
| ST8 (°C) | 18.25 | 18.92 | 18.26 | 18.32 |
| ST9 (°C) | 39.76 | 43.13 | 46.88 | 51.94 |
| ST10 (°C) | 44.81 | 48.95 | 53.49 | 58.38 |
| ST11 (°C) | 39.41 | 42.44 | 46.21 | 50.69 |
| SC1 (l/min) | 3 | 3 | 3 | 3 |
| SC2 (l/min) | 0.74 | 0.72 | 0.67 | 0.23 |

# LAB SESSION 12

# Turbulent flow Heat exchanger

**Objective 1**

**For Crosscurrent Flow**

**Objective 2**

|  |  |  |
| --- | --- | --- |
|  | TEST 1  Crosscurrent Flow | TEST 2  Parallel Flow |
| ST1 (°C) | 65 | 65 |
| ST2 (°C) | 39.64 | 18.81 |
| ST3 (°C) | 59.89 | 59.29 |
| ST4 (°C) | 32.93 | 28.12 |
| ST5 (°C) | 55.94 | 54.13 |
| ST6 (°C) | 25.42 | 33.12 |
| ST7 (°C) | 51.92 | 50.44 |
| ST8 (°C) | 17.27 | 37.92 |
| ST9 (°C) | 47.84 | 48.18 |
| ST10 (°C) | 57.93 | 56.76 |
| ST11 (°C) | 47.72 | 47.76 |
| SC1 (l/min) | 3 | 3 |
| SC2 (l/min) | 1.18 | 1.15 |

**Objective 3**

**For Crosscurrent Flow**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TEST 1 | TEST 2 | TEST 3 | TEST 4 |
| ST1 (°C) | 50 | 50.31 | 53.19 | 54.07 |
| ST2 (°C) | 32.82 | 31.94 | 31.40 | 36.36 |
| ST3 (°C) | 46.38 | 47.09 | 48.06 | 48.93 |
| ST4 (°C) | 28.50 | 27.27 | 27.13 | 26.06 |
| ST5 (°C) | 43.61 | 43.34 | 43.87 | 43.84 |
| ST6 (°C) | 23.18 | 21.94 | 21.86 | 21.29 |
| ST7 (°C) | 41.89 | 41.15 | 41.79 | 40.58 |
| ST8 (°C) | 18.14 | 17.06 | 17.27 | 17.33 |
| ST9 (°C) | 39.20 | 38.12 | 37.49 | 36.38 |
| ST10 (°C) | 45.54 | 45.63 | 45.54 | 46.51 |
| ST11 (°C) | 38.89 | 37.79 | 37.15 | 36.3 |
| SC1 (l/min) | 3 | 2.5 | 2 | 1.5 |
| SC2 (l/min) | 1.15 | 1.15 | 1.15 | 1.15 |

# LAB SESSION 13 (Shell and Tube Heat exchanger)

**Objective 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TEST 1 | TEST 2 | TEST 3 | TEST 4 |
| ST16 | 45 | 50 | 55 | 60 |
| ST1 (°C) | 40 | 43 | 47 |  |
| ST2 (°C) | 30 | 32 | 35 |  |
| ST3 (°C) | 20 | 20 | 20 |  |
| ST4 (°C) | 22 | 23 | 26 |  |
| ST5 (°C) | 25 | 28 | 29 |  |
| ST6 (°C) | 26 | 29 | 32 |  |
| ST7 (°C) | 27 | 31 | 34 |  |
| SC1 (l/min) | 3.53 | 3.53 | 3.53 | 3 |
| SC2 (l/min) | 0.73 | 0.71 | 0.70 |  |

**Parallel Flow**

**Objective 2**

|  |  |  |
| --- | --- | --- |
|  | TEST 1  (Parallel) | TEST 2 (Crosscurrent Flow) |
| ST16 | 45 | 50 |
| ST1 (°C) | 40 | 46 |
| ST2 (°C) | 30 | 33 |
| ST3 (°C) | 20 | 30 |
| ST4 (°C) | 22 | 27 |
| ST5 (°C) | 25 | 24 |
| ST6 (°C) | 26 | 23 |
| ST7 (°C) | 27 | 20 |
| SC1 (l/min) | 3.53 | 3 |
| SC2 (l/min) | 0.70 | 0..69 |

# LAB SESSION 14 Plate Heat Exchanger

**Objective 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TEST 1 | TEST 2 | TEST 3 | TEST 4 |
| ST16 | 50 | 55 | 60 | 65 |
| ST1 (°C) | 18 | 18 | 20 | 20 |
| ST2 (°C) | 45 | 52 | 54 | 61 |
| ST3 (°C) | 31.6 | 35 | 40 | 42 |
| ST4 (°C) | 32 | 37 | 41 | 45 |
| SC1 (l/min) | 3 | 3 | 3 | 3 |
| SC2 (l/min) | 0.56 | 0.54 | 0.51 | 0.48 |

**Parallel Flow**

**Objective 2**

|  |  |  |
| --- | --- | --- |
|  | TEST 1 (Parallel flow) | TEST 2 (Cross current flow |
| ST16 | 65 | 65 |
| ST1 (°C) | 20 | 20 |
| ST2 (°C) | 61 | 61 |
| ST3 (°C) | 42 | 39.7 |
| ST4 (°C) | 45 | 40 |
| SC1 (l/min) | 3 | 3 |
| SC2 (l/min) | 0.48 | 0.50 |

# LAB SESSION 10

## Observations

Table 7.1: Specimen: 20mm diameter Brass Cylinder.

|  |  |  |  |
| --- | --- | --- | --- |
| Recorded Time | T1  Bath Temp. | T2  Air/ Water Temp. | T3  Geometric Centre Temp. |
| Seconds | ºC | ºC | ºC |
| 0 | 83.3 | 20.9 | 20.8 |
| 5 | 83.3 | 52.4 | 52.3 |
| 10 | 83.3 | 71.5 | 71.4 |
| 15 | 83.3 | 78.7 | 78.6 |
| 20 | 83.3 | 81.5 | 81.4 |
| 25 | 83.3 | 82.5 | 82.4 |
| 30 | 83.3 | 82.9 | 82.8 |
| 35 | 83.3 | 83.1 | 83.0 |
| 40 | 83.3 | 83.2 | 83.1 |

Table 7.2: Specimen: 20mm Stainless steel Cylinder

|  |  |  |  |
| --- | --- | --- | --- |
| Recorded Time | T1  Bath Temp. | T2  Air/ Water Temp. | T3  Geometric Centre Temp. |
| Seconds | ºC | ºC | ºC |
| 0 | 82.9 | 20.4 | 20.2 |
| 5 | 82.9 | 31.9 | 31.7 |
| 10 | 82.9 | 52.7 | 52.5 |
| 15 | 82.9 | 65.2 | 65.0 |
| 20 | 82.9 | 72.6 | 72.4 |
| 25 | 82.9 | 76.9 | 76.7 |
| 30 | 82.9 | 79.4 | 79.2 |
| 35 | 82.9 | 80.9 | 80.7 |
| 40 | 82.9 | 81.8 | 81.6 |

# LAB SESSION 11

## Objective: 01

### Observations

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | AR-1 (Ohm) | SC-1  (l/s) | ST-1  (°C) | ST-2  (°C) | ST-3  (°C) | ST-4  (°C) | ST-5  (°C) | ST-6  (°C) | ST-7  (°C) |
| 1 | 40 | 0 | 16 | 16.1 | 16.9 | 17 | 16.9 | 16.8 | 16.7 |
|  |  |  |  |  |  |  |  |  |  |
| 2 | 60 | 0 | 24 | 25.1 | 26.3 | 28 | 27 | 26.9 | 26.0 |
|  |  |  |  |  |  |  |  |  |  |
| 3 | 70 | 0 | 28 | 28.9 | 29.3 | 32.5 | 31.6 | 30.7 | 30 |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

##### Table 8.1: Temperatures in free convection

## Objective:02

### Observations

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | AR-1 (Ohm) | SC-1  (l/s) | ST-1  (°C) | ST-2  (°C) | ST-3  (°C) | ST-4  (°C) | ST-5  (°C) | ST-6  (°C) | ST-7  (°C) |
| 1 | 40 | 156 l/min | 10 | 10.5 | 11 | 11.3 | 10.9 | 10.7 | 10.6 |
|  |  |  |  |  |  |  |  |  |  |
| 2 | 60 | 156 l/min | 14 | 14.2 | 16.1 | 16.9 | 16.5 | 16 | 15.3 |
|  |  |  |  |  |  |  |  |  |  |
| 3 | 70 | 156 l/min | 16 | 16.4 | 17.9 | 18.3 | 18 | 17.5 | 17.1 |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

##### Table 8.2: Temperatures in forced convection

Note: after including experiments 10, 12, 13 you will have total 12 experiments. Hence format your report accordingly