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**BIME-026**

# DIPLOMA – VIEP – MECHANICAL ENGINEERING (DMEVI)

## Term-End Examination

00705

## December, 2014

## BIME-026 : HEAT TRANSFER

*Time : 2 hours* *Maximum Marks : 70*

***Note :*** *Attempt any **five** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

**1.** (a) How does the heat conduction differ from convection ?

(b) How does the thermal conductivity of liquids and gases vary with temperature ? 7+7

**2.** (a) Define and explain critical thickness of insulation.

(b) Define and explain thermal diffusivity. What is its dimension ? 7+7

**3.** (a) What is meant by thermal boundary layer ? Explain with suitable example.

(b) Define Grashof number and Rayleigh number. Explain their physical significance. 7+7

4. (a) What is the difference between fin effectiveness and fin efficiency ?

   (b) An aluminium alloy fin (k = 200 W/mK), 3·5 mm thick and 2·5 cm long protrudes from a wall. The base is at 420°C and the ambient air temperature is 30°C. The heat transfer coefficient may be taken as 11 $W/m^2K$. Find the heat loss and fin efficiency, if the heat loss from fin tip is negligible. 7+7

5. (a) State and explain Lambert Cosine Law.

   (b) Calculate the shape factor for cylindrical cavity as shown in Fig. 1 with respect to itself. 7+7

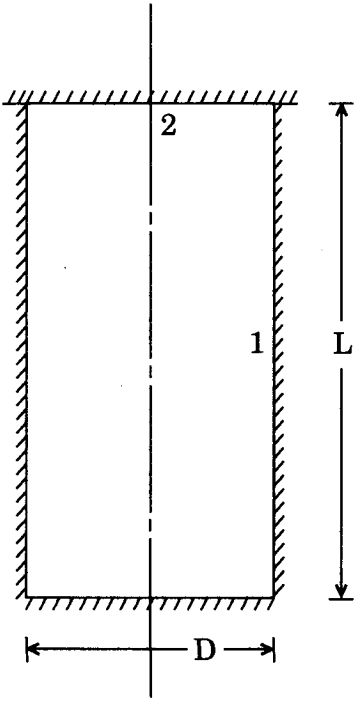


*Fig. 1*

6. (a) Discuss filmwise and dropwise condensation.

(b) Explain forced convection boiling. 7+7

7. Write short notes on any ***four*** of the following :

$4 \times 3\frac{1}{2} = 14$

(i) Newton's Law of Cooling

(ii) Shape Factor

(iii) Wein's Displacement Law

(iv) Kirchhoff's Law

(v) Total Emissivity