(a) Discuss, with the aid of *hem freedom sketches*, the methods by which heat is transferred through a building.

(b) A flat roof consists of 150mm thick concrete slab finished with 20mm asphalt on 70mm lightweight concrete screed. The soffit of the slab is plastered 15mm thick. Calculate the u-value of the roof using the following information:

Asphalt	resistivity	=	1.20 m °C/W
Lightweight concrete	resistivity	=	1.96 m° C/W
Concrete Slab	resistivity	=	0.69 m °C/W
Plaster	resistivity	=	2.17 m °C/W
	Internal surface resistance	=	0.104 m² °C/W
	External surface resistance	=	0.403 m² °C/W

(c) What thickness of lightweight concrete would be needed in order to achieve a u-value of 1.05?

B)

COMPONENT	RESTIVITY	THICKNESS	CONDUCTIVITY	RESISTANCE
ASHALT	1.20	.020		.024
LW CONCRETE	1.96	.070		.1374
CONCRETE SLAB	.69	.150		.1035
PLASTER	2.17	.015		.03255
INT SURFACE				.104
EXT SURFACE				.403
			TOTAL RESISTANCE	.80445

U VALUE = 1/TR 1/.80445 = 1.243085

c) u-value needs to be 1.05, 1/1.05 = TOTAL RESISTANCE .952380

DIFFERENCE IN RESISTANCE BETWEEN PART B + PART C = .147930

THEREFORE .147930 IS RESISTANCE OF LIGHT WEIGHT CONCRETE

TO FIND THICKNESS:

THICKNESS x RESTIVITY = RESISTANCE

THICKNESS x 1.96 = .147930

$$\text{THICKNESS} = \frac{.147930}{1.96} = .07535 \text{ (METRES)}$$

x 1000 TO FIND MILLIMETRES

75MM