2.5: HEATING AND INSULATING BUILDINGS

WAYS TO REDUCE RATE OF ENERGY TRANSFERS AT HOME

• Home heating system transfers energy to your home
• Your home transfers energy to the surroundings outside your home
METHODS OF REDUCING HEAT LOST TO SURROUNDINGS

1. Loft insulation
2. Cavity wall insulation
3. Aluminium foil between radiator panel and the wall
4. Double-glazed windows
5. Thicker bricks with lower thermal conductivity on external walls
Loft insulation

- Loft insulation is crucial for energy efficiency and comfort in homes.

Cavity wall insulation

- Cavity of an outer wall is the space between the two layers of brick that form the wall.
- Insulation is pumped into the cavity to improve energy efficiency.

- Insulation helps to retain heat and reduce energy loss.
- Up to 25% of home heat is lost through non-insulated lofts.
Aluminium foil between radiator panel and wall
- Reflects radiation away from wall
- Reduces rate of energy transfer by radiation from radiator to wall

Double glazed windows
- Two glass panes with dry air or vacuum inside
Thicker bricks with lower thermal conductivity on external walls

SOLAR PANELS

- Solar panels absorb infrared radiation from the sun
- Generate electricity or heat water directly
DUVETS

- Filling material traps air
- Duvet reduces rate at which energy is transferred from your body
- **Tog rating** = depends on thickness and thermal conductivity of material
- Better insulator = higher tog rating

QUESTIONS

1. a) Explain why cavity wall insulation is better than air in the cavity between the walls of a house
   b) Explain why fixing aluminium foil to the wall behind a radiator reduces energy transfer through a wall

2. Some double-glazed windows have a plastic frame and a vacuum between the panes.
   a) Explain why a plastic frame is better than a metal frame
   b) State why a vacuum between the panes is better than air

3. Two manufacturers advertise double-glazed windows of the same size with dry air between the panes at the same price, but with a different gap width between the glass planes. Explain which one you would choose.

4. A manufacturer of loft insulation claimed that each roll of loft insulation would save £10 per year on fuel bills. A householder bought six rolls of the loft insulation at £15 per roll and paid £90 to have the insulation fitted in her loft.
   a) Calculate how much it cost to buy and install the loft insulation
   b) Assuming the £10 per year savings is accurate, how many years until the householder ‘breaks even’ on the cost of the insulation?