Questions 14 to 16

The temperature on the two faces of a uniform solid wall are 5 °C and 17 °C. The wall is 0.2 metres thick, is made of homogeneous material, and has a surface area of 20 m^2. The rate of heat transfer by conduction through 1 m^2 of the wall is 34 W. The convective heat transfer coefficient is 10 $W\,m^{-2}\,°C^{-1}$ on the high-temperature side of the wall.

14 Select the option which is closest to the thermal conductivity of the material of the wall.

Options

A	0.57 $W\,m^{-1}\,°C^{-1}$	**B**	2.8 $W\,m^{-1}\,°C^{-1}$	**C**	6.8 $W\,m^{-1}\,°C^{-1}$
D	34 $W\,m^{-1}\,°C^{-1}$	**E**	82 $W\,m^{-1}\,°C^{-1}$	**F**	170 $W\,m^{-1}\,°C^{-1}$

15 Select the option which is closest to the air temperature on the high-temperature side of the wall.

Options

A	13.6 °C	**B**	16.8 °C	**C**	17.0 °C	**D**	17.2 °C
E	20.4 °C	**F**	23.8 °C	**G**	28.8 °C	**H**	30.6 °C

16 Select the option which is closest to the rate of heat transfer through the whole wall.

Options

A	1.7 W	**B**	2.8 W	**C**	20 W
D	170 W	**E**	680 W	**F**	8160 W

Question 17

A cylindrical copper pipe has an internal radius of 2.5 cm and an external radius of 3 cm. Its internal surface is at a constant temperature of 60 °C and its external surface is at a constant temperature of 40 °C. The thermal conductivity of copper is 380 $W\,m^{-1}\,°C^{-1}$. Which of the following options is nearest to the rate of heat transfer by conduction through the wall of a 1 metre length of the pipe?

Options

A	3 kW	**B**	4 kW	**C**	9 kW	**D**	14 kW
E	159 kW	**F**	262 kW	**G**	603 kW	**H**	757 kW

Question 18

The temperature of a radiating body is raised from 800 °C to 1000 °C. Which of the following options gives approximately the factor by which the heat transfer by radiation from the body is increased by the rise in temperature?

Options

A	1.00	**B**	1.19	**C**	1.25	**D**	1.98	**E**	2.44
