Week 2 Assessment

The due date for submitting this assignment has passed. Due on 2018-02-21, 23:59 IST.

Submitted assignment

1) When the operating temperature of a semiconductor exceeds the manufacturer's specification, which of the following happens? 1 point

- Performance reduces
- Working life reduces
- Reliability reduces
- All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

2) Which of these is the correct order in which the different heat transmission modes dissipate heat from a heat sink 1 point

- Conduction > Radiation > Convection
- Radiation > Conduction > Convection
- Convection > Conduction > Radiation
- Conduction = Convection = Radiation

No, the answer is incorrect.
Score: 0

Accepted Answers:
Convection > Conduction > Radiation

3) Which of these physical phenomena is the working principle behind the "Convection" heat transmission? 1 point

- Different materials at two different temperatures in physical contact transferring excitation of molecules from higher temperature body to lower temperature
- Hotter body heats molecules of colder body, causing decrease in density. These molecules are then displaced due to buoyancy creating a flow between hotter and colder molecules
- Increased density of the hotter body due to molecular excitation, causes a physical contact with cooler body and no flow of molecules
- No physical contact and no flow of molecules between hotter body and cooler body is the defining feature of convection

No, the answer is incorrect.
Score: 0

Accepted Answers:
Hotter body heats molecules of colder body, causing decrease in density. These molecules are then displaced due to buoyancy creating a flow between hotter and colder molecules.

4) For the calculation of heat transfer, the “Thermal Resistance” of many components needs to be factored. What is the unit of this?

- Kilo / Watt
- Kelvin / Watt
- Deg C / Watt
- Either 2 or 3

No, the answer is incorrect.
Score: 0
Accepted Answers:
Either 2 or 3

5) Which of these thermal resistances between individual components DOES NOT affect the total thermal resistance?

- Junction to case
- Case to heat sink
- Heat sink to ambient
- Junction to ambient

No, the answer is incorrect.
Score: 0
Accepted Answers:
Junction to ambient

6) Which of these thermal resistances can be changed by good engineering and design, thereby being the most important to keep the total thermal resistance to a minimum?

- Junction to case
- Case to heat sink
- Heat sink to ambient
- Junction to ambient

No, the answer is incorrect.
Score: 0
Accepted Answers:
Heat sink to ambient

7) Why is it that for the same material, the manufacturing method affects the thermal conductivity? (E.g., forged components have better thermal conductivity than gravity moulded)

- Because of the presence of microscopic voids which hinders conduction
- Because of material density being different
- Because of differences in crystalline structure
- This statement itself is not true

No, the answer is incorrect.
Score: 0
Accepted Answers:
Because of the presence of microscopic voids which hinders conduction

8) What should be the thermal resistance $R_{th}$ (surface to ambient) for a sealed IP65 enclosure with internal ambient 50°C given that?

All the heat generating components are mounted directly on the internal walls: There is perfect, even conduction in all faces. The prismatic enclosure dimensions are 20mm x 70 mm x 120 mm. Ambient temperature is 70°C. Total Wattage is 80W

$$R_{th} = \frac{4 \ (80W \ / \ 20 \ deg \ C)}{20 \ deg \ C \ / \ W}$$
9) If total volume of the enclosure is same as that of an enclosure of 20mm x 70 mm x 120 mm and it is made into a cube, What should be the Rth to keep the temperatures same?

- Rth should be the same
- Rth should increase
- Rth should decrease

No, the answer is incorrect.
Score: 0
Accepted Answers: Rth should be the same

10) If total volume of the enclosure is same as that of an enclosure of 20mm x 70 mm x 120 mm and it is made into a cube, to maintain the same Rth

- Make slots in the box to let air in
- Improve the surface properties
- Use reflective paint

No, the answer is incorrect.
Score: 0
Accepted Answers: Improve the surface properties