

# Unit 4 - Week 3

## Course outline

### How to access the portal?

### Week 1

### Week 2

### Week 3

● Drude Model: Electrical Conductivity

● Drude Model: Thermal Conductivity

● Drude Model: Successes and Limitations

● Drude Model: Source of Shortcomings

○ **Quiz : Assignment 3**

○ Physics of Materials : Week 3 Feedback Form

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## VIDEO DOWNLOAD

## Text Transcripts

# Assignment 3

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2019-08-21, 23:59 IST.**

**Note :** More than one answer may be right.

Partial marks awarded if only some of the correct answers are selected. No marks awarded if even one of the wrong answers is selected

1) Resistance of a conductor

1 point

- Decreases with increase in its cross sectional area
- Decreases with increase in its length
- Is a constant independent of its length
- Increases with increase in its length

**No, the answer is incorrect.**  
Score: 0

**Accepted Answers:**  
*Decreases with increase in its cross sectional area*  
*Increases with increase in its length*

2) Conductivity of a metallic conductor

1 point

- Increases with alloying
- Increases presence of grain boundaries
- Decreases with presence of porosity
- Decreases with the presence of precipitates

**No, the answer is incorrect.**  
Score: 0

**Accepted Answers:**  
*Decreases with presence of porosity*  
*Decreases with the presence of precipitates*

3) When voltage applied across a conductor is gradually increased

1 point

- The current gradually increases
- The resistance gradually increases
- The power consumed increases
- The electric field decreases

**No, the answer is incorrect.**  
Score: 0

**Accepted Answers:**  
*The current gradually increases*  
*The power consumed increases*

4) In an infinitely long metal wire, if two free electrons are 1 m apart and the wire is subject to an electric field  $\epsilon$

1 point

- Both the electrons will initially accelerate
- It is possible that the electrons can meet
- The electron that is behind will accelerate more slowly
- The two electrons will prevent each other from moving

**No, the answer is incorrect.**  
Score: 0

**Accepted Answers:**  
*Both the electrons will initially accelerate*  
*It is possible that the electrons can meet*

5) In a metallic conductor, at room temperature, in the presence of an applied field,

1 point

- The average velocity of electrons is zero
- The instantaneous velocity of all electrons is zero
- The average velocity of electrons is not zero
- The average speed of electrons is not zero

**No, the answer is incorrect.**  
Score: 0

**Accepted Answers:**  
*The average velocity of electrons is not zero*  
*The average speed of electrons is not zero*

6) Heat Transfer in a metal occurs through

1 point

- Conduction
- Convection
- Radiation
- Forced convection

**No, the answer is incorrect.**  
Score: 0

**Accepted Answers:**  
*Conduction*

7) Thermal conduction in Diamond occurs

1 point

- Only through free electrons
- Only through lattice vibrations
- Using both free electrons as well as lattice vibrations
- Neither through free electrons nor through lattice vibrations

**No, the answer is incorrect.**  
Score: 0

**Accepted Answers:**  
*Only through lattice vibrations*

8) If a sample is 10 cm long and is placed left to right, and is heated at a point 7 cm away from the left end

1 point

- Heat will flow from the right end to the left end
- Heat will flow from the left end to the right end
- Heat will flow towards the centre
- Heat will flow towards the ends

**No, the answer is incorrect.**  
Score: 0

**Accepted Answers:**  
*Heat will flow towards the ends*

9) Copper bottom is added to stainless steel cooking utensils because

1 point

- Food cooks at a lower temperature over copper
- Heat transfer through copper is faster than that through stainless steel
- It improves the efficiency of the cooking
- It makes the vessel flat

**No, the answer is incorrect.**  
Score: 0

**Accepted Answers:**  
*Heat transfer through copper is faster than that through stainless steel*  
*It improves the efficiency of the cooking*

10) Metals with high thermal conductivity, when heated and left in air

1 point

- Will cool faster
- Will hold heat longer
- Will decrease in electrical resistance with time while still cooling
- Will increase in electrical resistance with time while still cooling

**No, the answer is incorrect.**  
Score: 0

**Accepted Answers:**  
*Will cool faster*  
*Will decrease in electrical resistance with time while still cooling*