

# Unit 5 - Week 3

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## Assignment 3

The due date for submitting this assignment has passed. **Due on 2020-02-19, 23:59 IST.**  
 As per our records you have not submitted this assignment.

1) Hall coefficient of an n-type semiconductor is 1 point

- (a)  $R_H = \frac{1}{ne}$
  - (b)  $R_H = -\frac{1}{ne}$
  - (c)  $R_H = \frac{V_H}{ne}$
  - (d)  $R_H = V_H ne$
- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect. Score: 0  
 Accepted Answers: (b)

2) Which quantity cannot be calculated by measuring Hall coefficient? 1 point

- (a) Mobility of charge carriers
  - (b) Energy band gap of the semiconductor
  - (c) Type of semiconductor
  - (d) Concentration of charge carriers
- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect. Score: 0  
 Accepted Answers: (b)

3) A semiconductor crystal 12 mm long, 5 mm wide and 1 mm thick. A magnetic flux density of 0.5 Wb/m<sup>2</sup> applied perpendicular to largest faces. When a current of 20 ma flows lengthwise through the specimen, the Hall voltage measured along its wide direction is found to be 37μV. Find the Hall coefficient of the conductor. 1 point

- (a)  $3.7 \times 10^{-3} m^3/coulomb$
  - (b)  $3.7 \times 10^{-6} m^3/coulomb$
  - (c)  $1.12 \times 10^{-9} m^3/coulomb$
  - (d)  $2.57 \times 10^{-19} m^3/coulomb$
- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect. Score: 0  
 Accepted Answers: (b)

4) A slab of copper having length 5 cm, width 2 cm and thick 0.5 cm. The slab is placed in a magnetic field, B = 1.5 T. The magnetic field is perpendicular to the largest faces and a current of 50 A flows lengthwise of the specimen. The free electron concentration in copper is 8.5×10<sup>28</sup> electrons/m<sup>3</sup>. What is the magnitude of Hall voltage across the width of the slab? 1 point

- (a) 1.1 μV
  - (b) 3.7 μV
  - (c) 4.9 μV
  - (d) 7.5 μV
- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect. Score: 0  
 Accepted Answers: (a)

5) A current of 10 mA flows through an n-type Ge strip of 1mm thick and 2 mm wide placed in a magnetic field B. If the Hall voltage produced inside the strip be 1.5 mV, what is the value of B? [Given: Hall coefficient,  $R_H = 10^{-2} m^3/coulomb$ ] 1 point

- (a) 0.1 T
  - (b) 0.15 T
  - (c) 0.015 T
  - (d) 2.5 T
- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect. Score: 0  
 Accepted Answers: (c)

6) For the small value of applied magnetic field, B the magneto-resistivity varies as 1 point

- (a) B
  - (b) B<sup>2</sup>
  - (c)  $\frac{1}{B^2}$
  - (d)  $\frac{1}{B}$
- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect. Score: 0  
 Accepted Answers: (b)

7) A change with magnetic field in the electrical resistance measured along the current direction, a phenomenon referred as 1 point

- (a) Magneto-resistance
  - (b) Hall Effect
  - (c) Stark Effect
  - (d) Kerr Effect
- (a)  
 (b)  
 (c)  
 (d)

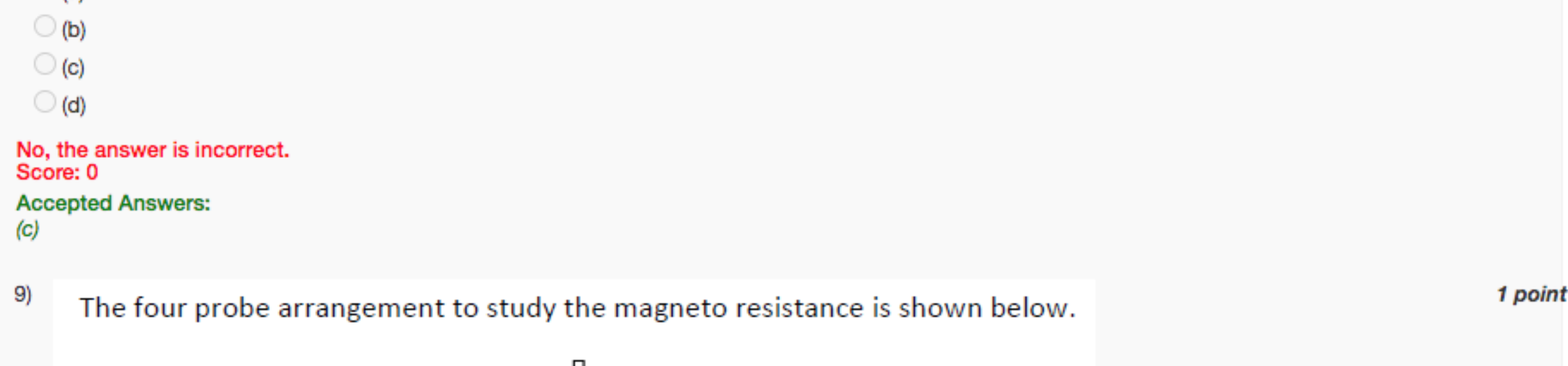
No, the answer is incorrect. Score: 0  
 Accepted Answers: (a)

8) If R<sub>B</sub> is the resistance of a sample in presence of magnetic field B and R<sub>0</sub> is the resistance without field, the Magnetoresistance of the sample is 1 point

- (a)  $\frac{\Delta\rho}{\rho} = \frac{R_B - R_0}{R_0}$
  - (b)  $\frac{\Delta\rho}{\rho} = \frac{\rho_B - \rho_0}{\rho_0}$
  - (c) Options (a) and (b) both correct
  - (d) Only option (b) is correct
- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect. Score: 0  
 Accepted Answers: (c)

9) The four probe arrangement to study the magneto resistance is shown below. 1 point



- (a) Probes A and C are for current, B and D for voltage.
  - (b) Probes A and D are for current, B and C for voltage.
  - (c) Probes A and B are for current, C and D for voltage.
  - (d) Probes B and C are for current, A and D for voltage.
- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect. Score: 0  
 Accepted Answers: (b)

10) For a sample of n type Ge, it is found that V = 200 mV for I = 5mA without magnetic field and 220 mV in presence of a given field. What is the value of Magnetoresistance of the sample? 1 point

- (a) 0.1
  - (b) 4
  - (c) 0.2
  - (d) None of those
- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect. Score: 0  
 Accepted Answers: (a)