

KATHMANDU UNIVERSITY
First internal Examination [C]
June, 2018

Marks scored:

Level : B.E.

Year : II

Course : EEG 207

Semester: I

Exam Roll No. :

Time: 30 mins

F. M. : 10

Registration No.:

Date

JUN 10 2018

SECTION "A"

[20 × 0.5=10 marks]

Choose the most appropriate option. **Symbols** have their usual meaning.

1. The metal having the lowest temperature coefficient of resistance is _____
a. Gold b. Copper c. Aluminum d. Arsenic
2. The conductivity of a conductor can be increased by
a. Increasing its temperature b. Decreasing temperature
c. Increasing its vibration d. Decreasing its vibration
3. The transition temperature of Mercury in degree is _____
a. 18.1 b. 9.22 c. 4.12 d. 1.14
4. _____ is an example of piezoelectric material.
a. Glass b. Quartz c. Corundum d. Neoprene
5. The process of emission of electrons from the hot metal surfaces is called _____.
a. electronic emission b. thermionic emission
c. electron capture d. proton loss
6. The number of atoms per unit cell in body centered cubic unit cell (BCC) structure is ____
a. 1 b. 2 c. 4 d. 8
7. The photoelectric effect occurs only when the incident light has more than a certain critical _____.
a. Intensity b. Frequency c. wavelength d. Speed
8. The minority carrier concentration is largely a function of _____.
a. Forward biasing voltage c. The amount of doping
b. Reverse biasing voltage d. The temperature
9. If χ represents the susceptibility of diamagnetic material then which of the following option is correct?
a. $\chi = -1$ b. 1 c. 2 d. -2
10. The wavelength in angstrom unit of an electron with a kinetic energy of 4 eV is _____.
a. 0.17 b. 2.98 c. 4.34 d. 6.13

KATHMANDU UNIVERSITY
End Semester Examination [C]
June, 2018

JUN 10 2018

Level : B. E.
Year : II
Time : 2 hrs. 30 mins.

Course : EEG 207
Semester: I
F. M. : 40

SECTION "B"

[4 Q × 10 = 40 marks]

Attempt *ANY FOUR* questions. Figure in the margin indicates the full mark. **Symbols** have their usual meaning. Students are required to answer in their own words as far as practicable.

1.
 - a. Differentiate between the electric batteries and fuel cells on the basis of working principle. [4]
 - b. Explain the band theory of semiconductors with suitable examples. Show that the Fermi energy lies exactly half way between the top of the valance band and the bottom of the conduction band of intrinsic semiconductor. [1+5]
2.
 - a. How are superconductors different from the normal conductors? Elaborate the properties of hard superconductors and soft super conductors with examples. [1+4]
 - b. Find the expression for energy of an electron confined in a potential well. [5]
3.
 - a. What do you mean by the packing fraction in crystal structure? Obtain the packing efficiency of body centered cubic unit cell structure. [1+4]
 - b. Write the effect of temperature on the resistivity of metals. [2]
 - c. Find the normalize wave function in terms of 'a' for the following expression, n is an integer: $\Psi = A \sin\left(\frac{n\pi x}{a}\right)$. [3]
4.
 - a. Taking the reference of MOSFET, describe all the steps involved in the IC fabrication process. [4]
 - b. Explain the significance of Fermi-Dirac distribution function with some examples. [3]
 - c. Obtain the Einstein expression that shows the relation between the diffusion length and the mobility of a carrier injected in semiconductor. [3]
5.
 - a. How is Curie –Weiss law different from the Curie-law? Particularize the fact. [3]
 - b. How do light emitting diode and photodiode work? Explain. [3]
 - c. Write short notes on:
 - a. Applications of optical materials [2+2]
 - b. Electronic polarization

