

International Islamic University Chittagong
Department of Electrical and Electronic Engineering

Final Assignment Test Autumn-2020

Program: B.Sc. Engg. (EEE)

Course Code: **EEE-3515**

Course Title: **Electrical Properties of Material**

Time: **5 hours** (Writing -**4 hours 30 minutes** + **30 minutes** submission time)

Full Marks: **50** (Written 30 + Viva/Viva-Quiz-20)

[Answer each of the questions from the followings; Figures in the right margin indicate full marks. Answer script must be submitted through online method within 5 hours from starting time. Also, write down the Q. Set on the front page of your answer script]

SET-D

- 1(a).** Fermi Energy and Work function of some common materials are given in the following table. Sketch the approximate energy diagram showing the Vacuum level, Work function and Fermi levels for the materials. Maintain relative energy scale in the sketch. Consider Vacuum as the reference energy level. 3 **CO2** Ap

	Mg	Na
Φ	3.66	2.75
E_F	7.1	3.2

- 1(b).** Explain the formation of energy bands for solid using suitable example. 3 **CO2** E

- 2(a).** How the density of states is more at the middle of the band? Explain with suitable example. 3 **CO2** E

- 2(b).** Let us consider that the width of the energy band is 15 eV. Consider the bottom of the energy band as reference i.e. 0 eV. Determine the following parameters in cm^{-3} and in per eV. 3 **CO2** Ap

- i) Density of states at the 2 eV from the bottom of the band.
- ii) The number of states at the 2 eV of the band considering from the bottom level. Calculate the number of states within a small energy range 0.5 KT about that energy level.

- 3.** Discuss the reason of higher electronic polarization for the material covalent solid that have higher atomic number. 6 **CO2** An

- 4.** Discuss the reason how and why a diamagnetic material experiences repulsive force in front of a permanent magnet. 6 **CO2** E

- 5.** Between type I and type II superconductors, which one would you recommend? Discuss the reason for **recommending** the type of superconductor using the characteristics curve. 6 **CO2** An+E

- 6.** Viva/Viva-Quiz: The time of viva/viva-quiz will be declared in Google classroom. **20**