Maulana Azad National Institute of Technology, Bhopal

Department of Physics

Mid Term Examination, Feb 2022

B.Tech. I Sem (Session 2021-22)

Sections: A, B, C, D, E

Subject: Physics **Subject code: PHY-102**

Time: 1 hr 30 Min. **Max. Marks: 20**

Note: Answer all questions

Q. No.	Questions	Marks
1.	Describe the working of Michelson Interferometer with a suitable diagram. Also discuss one of its applications.	**5**
2.	Two parallel slits having width 0.19 mm are separated by 0.41 mm. The slits are illuminated by light of wavelength 6500 Å, the diffracted light is focused at a distance of ***R*** cm. Calculate positions of I^{st} secondary maxima and minima. (***R*** = *Last three digits of your* ***Roll No***.)	**3**
3.	Derive an expression for the concentration of electrons in an intrinsic semiconductor. What would be the position of Fermi level? Explain.	**5**
4.	(a) What is Hall effect? Explain how Hall effect helps in determining the sign of charge carrier in a material. (b) Establish the relationship between amplification factors 'α' and 'β'.	**2** **2**
5.	Find the energy level in sodium for which probability of occupation is 0.75. Fermi energy of sodium is 3.13 eV at 300 K.	**3**

Some useful constants:

Mass of Electron: 9.1×10^{-31} Kg

Boltzmann Constant: 8.617×10^{-5} eV.K^{-1}

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