Maulana Azad National Institute of Technology, Bhopal
Department of Physics
Mid Test Examination, Jan-Feb 2023
B.Tech. I Sem. (Session 2022-23)
Sections: A, B, C, D, E

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

Time: 1 Hr. 30 Mins.　　　　　　　　　　　　　　　　　　**Max. Marks:20**

Note: Answer all questions

Q. No.	Questions	Marks
Q.1	Discuss the Fraunhofer diffraction due to double slit and obtain expression for resultant intensity and position of maxima and minima. Also determine the absent spectra.	06
Q.2	Describe the amplification factors in transistors. Also establish the relation between them.	03
Q.3	What is a wave packet? Derive the relation between phase speed and group speed of a wave.	04
Q.4.	(c) State the values of momentum and energy of a particle in one-dimensional box with impenetrable walls. Find their values for an electron in a box of length 2.0 Å for n = 1 and n = 2 energy states. Given $m = 9.1 \times 10^{-31}$ kg and $h = 6.63 \times 10^{-34}$ J sec.	04
	(d) In a Hall coefficient experiment, a current of 0.25 A is sent through a metal strip having thickness 0.2 mm and width 5 mm. The Hall voltage is found to be $R \times 10^{-3}$ mV (where R is your *Roll No.*) when a magnetic field of 2000 gauss is used. Find the carrier concentration?	03

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