Unit – IV

Plasma Production: Townsend's theory of gas discharge, Paschen's law, Low-pressure cold cathode discharge, Radio-frequency discharge, Plasma diagnostic techniques: Resistivity of plasma Langmuir single probe method, Langmuir double probe method, microwave method of plasma density determination, Plasma Heating, Confinement of plasma, magnetic mirror, stellarator, Tokamak and inertial confinement.

References/Books:

1. Introduction to plasma physics and controlled fusion Chen, Francis F, Springer, 3rd edition, 2016.
2. The physics of fluids and plasmas: an introduction for astrophysicists. Choudhuri, Arnab Rai. Cambridge University Press, 2015.
3. Principles of Plasma Discharges and Materials Processing, Lieberman and Lichtenberg, Wiley-Inter-science; 2nd edition, 2008.
4. Introduction to dusty plasma physics. Shukla P. K. and Mamun A. A., CRC Press; 2001.

241/PHY/AE201-A

Ability Enhancement Course

COURSE ID: 241/PHY/AE201

ELECTRONIC DEVICES

Marks (End Semester exam): 35 **Credits: 02**

Marks (Internal): 15 **Time: 4 Hours**

Course Objectives (COs):

After successful completion of the course on Electronic Devices, a student will be able to:

- *Designing and working of diodes, solar cell, transistor and their applications.*
- *Explore the operation and advantages of operational amplifiers.*
- *Learn to design filters and analog to digital converter.*
- *Learn and understand about oscillators circuits.*
- *Understanding and working of 8085 nicroprocessor.*

Students assigned the electronic/ general physics laboratory work will perform at least 8 experiments of the following sections:

1. To study the V-I characteristics of a Zener diode and its use as voltage regulator.
2. Study of V-I & power curves of solar cells, and find maximum power point &

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efficiency.

3. To design a Wien bridge oscillator for given frequency using an op-amp.
4. To design a phase shift oscillator of given specifications using BJT.
5. To design a digital to analog converter (DAC) of given specifications.
6. To design an inverting/ non-inverting amplifier using Op-amp (741,351)
7. To investigate the use of an op-amp as an Integrator and Differentiator..
8. To design a circuit to simulate the solution of simultaneous equation and 1st/2ndorder differential equation.
9. To Design filters (Low pass, High pass, band pass and band rejection) of the given specifications.
10. To Design multistage amplifiers of the given specifications.
11. To Design a triangular wave to sine wave converter.
12. To design, analyse and demonstrate positive and negative voltage level detectors.
13. To design and analyse Pulse Width Modulation using op-amp.
14. To study the zero-crossing detector and comparator using op-amp.
15. To design RC-Oscillator using an Op-Amp.
16. To design a Square Wave Generator.
17. Programs using 8085 Microprocessor: Addition, subtraction, multiplication and division.

References/Books:

1. Electronic Instrumentation and Measurement Techniques, W. D. Cooper and A. D. Helfrick (2nd Ed., Phi Learning, 2008)
2. Electronic Devices and Circuits, J. Millman and C. C. Halkias and S. Jit (4th Ed., McGraw-Hill, 2015)
3. Measurement, Instrumentation and Experimental Design in Physics and Engineering, M. Sayer and A. Mansingh (Prentice Hall India, 2010)
4. Microprocessor Architecture Programming and applications with 8085, R.S. Goankar, 2002, Prentice Hall.
5. Microprocessor 8085: Architecture, Programming and interfacing, A. Wadhwa, 2010, PHI Learning.
6. Basic Electronics: A text lab manual, P.B.Zbar, A.P.Malvino, M.A.Miller, 1994, McGraw Hill.
7. OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2000, Prentice Hall.