

M. Sc. II Year		MPH-E412			Semester-IV
ELCETIVE PAPER IV/V		ELECTRONIC DEVICES			
Total Lectures	Time Allotted for End Semester Examination	Marks Allotted for Continuous Assessment	Marks Allotted for End Semester Examination (ESE)	Maximum Marks (MM)	Total Credits
60	3 Hrs	30	70	100	04

NOTE: The question paper shall consist of two sections (Sec.-A and Sec.-B). Sec.-A shall contain 10 short answer type questions of six marks each and student shall be required to attempt any five questions. Sec.-B shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Transistors: JFET, BJT, MOSFET and MESFET– Structure – Working – Derivations of the equations for I-V characteristics under different conditions – High Frequency limits.

UNIT II

Photonic Devices: Eradicative and non radiative transitions – Optical absorption- Bulk and thin film – Photoconductive devices(LDR) – diode photodetectors – solar cell – (open circuit voltage and short circuit current, fill factor) – LED (high frequency limit – effect of surface and indirect combination current, operation of LED) – diode lasers (conditions for population inversion in active region, line confinement factor) – Optical gain and threshold current for lasing – Fabry-Perrot cavity length for lasing and the separation

UNIT III

Memory Devices: Static and Dynamic random access memories SRAM and DRAM – CMOS and NMOS – non-volatile – NMOS – magnetic – optical and ferroelectric memories – charge coupled (CCD)

UNIT IV

Other Electronic Devices : Electro-optic – Magneto-optic and Acousto– Optic effects – Material properties related to get these effects – Important Ferro electric, Liquid Crystal and Polymeric materials of these devices – Piezoelectric – Electrostrictive and Magnetostrictive Effets - Important material exhibiting these properties and their applications in sensors and actuator devices. Acoustic Delay lines – piezoelectric resonators and filters – High frequency piezoelectric devices– Surface acoustic wave devices

UNIT V

Microwave Devices: Tunnel diode – Transfer electron devices (Gunn diode) – Avalanche transit time devices – Impatt diodes – parametric devices.

BOOKS FOR STUDY

- 1 . Semiconductor Devices- Physics and Technology, S.M. Sze, John Wiley & Sons, 1985
- 2 . Introduction to Semiconductors Devices, M.S. Tyagi, John Wiley & Sons, 1991
- 3 . Measurment, Instrumentation and Experiment Design in Physics and Engineering, M. Sayer and A. Mansingh, Prentice Hall, India, 2000.
- 4 . Optical Electronics, Ajoy Ghatak and K. Thyagarajan, Cambridge Univ. Press,1989