

15AEC14-PULSE AND DIGITAL CIRCUITS

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Objectives:-

1. To study various wave shaping circuits and their applications.
2. To study different circuits that produce non-sinusoidal waveforms (multivibrators) and their applications
3. To study various voltage time base generators and their applications.
4. To study different logic families and their comparison.

Outcomes: Students will be able to design different pulse circuits based on the above concepts.

UNIT I

Linear Wave Shaping: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. High Pass RC network as Differentiator, Low Pass RC network as integrator, attenuators and its applications as a CRO probe, RL circuits and its response for step input, Illustrative Problem .

UNIT II

Non-Linear Wave Shaping: Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, applications of voltage comparators, clamping operation, clamping circuits taking source and Diode resistances into account, Clamping circuit theorem, practical clamping circuits, Illustrative Problems.

UNIT III

Multivibrators: Transistor as a switch, Break down voltages, Transistor-Switching Times, Triggering circuits. Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger circuit using BJT.

UNIT IV

Time Base Generators: General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators–basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Transistor Current time base generators.

UNIT V

Synchronization And Frequency Division: Pulse Synchronization of relaxation Devices, Frequency division in sweep circuit, Stability of relaxation Devices, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals.

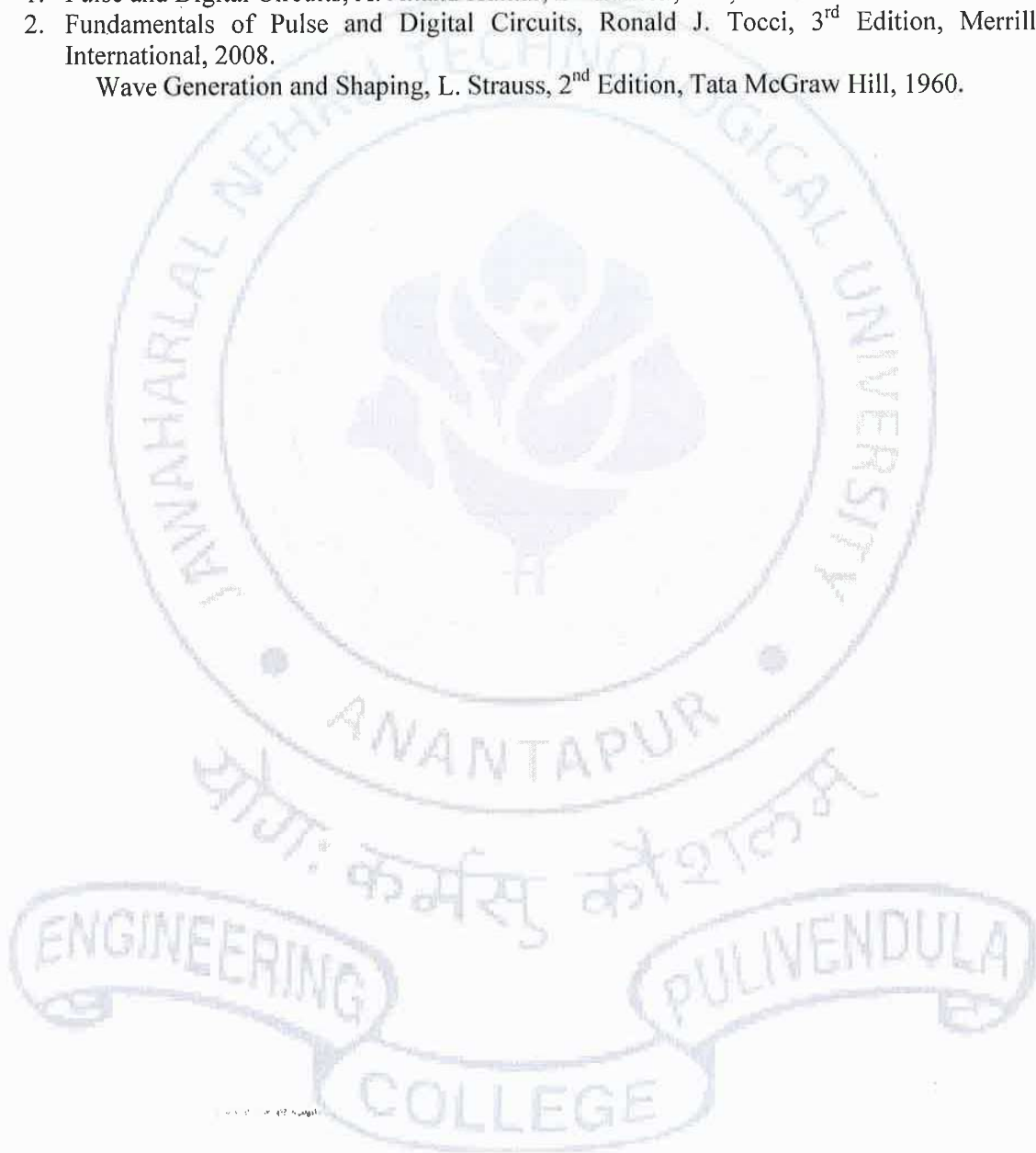
Sampling Gates: Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Four Diode Sampling Gate, Reduction of pedestal in gate circuits, Six Diode Gate, Application of Sampling Gates.

Text Books:

1. Pulse, Digital and Switching Waveforms, J. Millman, H. Taub and Mothiki S. Prakash Rao, 2nd Edition, Tata McGraw Hill, 2008.
2. Solid State Pulse Circuits, David A. Bell, 4th Edition, PHI, 2002.

References:

1. Pulse and Digital Circuits, A. Anand Kumar, 2nd Edition, PHI, 2011.
2. Fundamentals of Pulse and Digital Circuits, Ronald J. Tocci, 3rd Edition, Merrill's International, 2008.
Wave Generation and Shaping, L. Strauss, 2nd Edition, Tata McGraw Hill, 1960.



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