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QUALIFICATION

Diploma in the appropriate branch of Engineering /Technology awarded by a University / Government after undergoing regular course of study for not less than three years or its equivalent.

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Technical Education

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02

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EXPECTED SYLLABUS

VWORKSHOP INSTRUCTOR ELECTRONICS AND COMMUNICATION ENGINEERING SYLLABUS

Electronic Circuits

Solid state devices – Characteristics of PN junction and Zener diode, Tunnel diode, NPN and PNP transistor – N channel and P channel, JFET and MOSFET – Rectifier – half wave and full wave, filters – capacitor, inductor, LC filter, pie section – analysis and characteristics. Transistor – CB, CE, CC configuration, calculation – voltage gain, current gain – harmonic distortion, power amplifier – class A, class B, class C, class AB, class D, class S – Push Pull, Complementary Symmetry – Analysis.

Biasing methods of Transistor – AC and DC load lines, frequency response – gain calculation, gain in db – Analysis. Transistor as a switch – applications – Darlington pair. Different coupling methods of transistor amplifiers – RC, DC, Transistor Coupled, tuned amplifier – multi stage amplifier – stragged tunning – cascade and cascade – gain bandwidth product – analysis. FET amplifiers – CS, CD.

Comparison of FET and BJT – Feed back in amplifiers – negative and positive feed backs, effect of feed backs. Oscillators – Barkhausen criterion. RC phase shift, Wein bridge, LC, Hartley and Colpitts oscillators, crystal oscillator – Analysis, Multivibrators – Astable, Bistable, Monostable – calculation of Time period, triggering methods, Schmitt trigger, LTP, UTP – Hysterisis – Applications and analysis.

Linear Integrated Circuits & Wave Shaping Circuits

Differential amplifiers – analysis – CMRR, Op-amps – ideal characteristics, block schematic slew rate, input and output offset, virtual ground. Concept of 741 Op-Amp, gain bandwidth product, open loop and closed loop gain. Linear Op-amp circuits, Inverter and non-inverter amplifiers, summing amplifiers, subtractor, instrumentation amplifiers, Precision rectifiers – analysis.

Non-linear Op-Amp circuits

Log, Anti Log amplifiers, Schmitt trigger, comparator, astable and monostable multivibrators – analysis. Active filters – LPF, HPF, BPF, BSF, Universal filters – Butterworth and Chebyshev filter first and second order, transfer function – realization – analysis. Triangular wave generator, sawtooth generator, Oscillator – Wein bridge, phase shift – analysis of circuits, 555 internal block diagram –applications – design of astable and monostable using 555 – VCO, PLL, phase detector – principle of operation – capture and lock range – applications – analysis.

Integrator and differentiator using passive devices, op-amps – design and analysis – application. Miller and Bootstrap sweep, V to I and I to V converters – analysis.

Digital Electronics, Microprocessor and Micro controllers

Number system – binary, octal, hexadecimal, decimal converters, Binary codes –numeric and alpha numeric codes – gray, BCD, excess-3, self complementing codes –weighted and unweighted codes. Error detection and correction codes – parity, hamming codes. Boolean algebra theorem, De Morgan's theorem, logic gates, logic function, truth tables, SOP and POS forms, combinational and sequential circuits, simplification and implementation of logic expressions using K-maps, half adder, full adder, half subtractor, full subtractor, multiplexer,

demultiplexer, encoder, decoder, priority encoder, serial adder, parallel adder, ripple and look ahead carry adders, Flip

flops – RS, JK, T, D, edge and level trigger flip flops, excitation tables, counter – synchronous and asynchronous, up down – design, Analysis of sequential networks, derivation of state graphs and tables.

Shift register – SISO, SIPO, PIPO, PISO, universal shift register, timing diagram, Johnson and Ring counter. Memory – RAM, ROM, FLAASH, NVRAM, EPROM, EEPROM, EDORAM, Memory organization.

Logic families – fundamentals of RTL, ECL, DTL, IIL and TTL transfer

characteristics Fan in and Fan out, propagation delay, Schottkey and other TTL gates, CMOS inverter – stepped power product. Tri state logic, open collector and wired logic.

ADC and DAC – R – 2R ladder binary weighted, accuracy, resolution, conversion speed, offset error, ADC sample and hold, error of ADC, flash converter, successive

approximation and dual slope.

Microprocessors – 8086 architecture – addressing modes – instruction set – programs– Interrupts – maximum and minimum modes, interfacing chips – 8255, 8359, 8251, 8279, 8254, 8257.

Basics of 80286 and 80386 - 8051 Micro controller – architecture – interrupt – instruction set, programs.

Communication Engineering

Classification of signals, elementary signal, LTI system, Noises, Different types of Noises, Signal to noise ratio, Shannon theorem, entropy, baud rate, maximum

channel capacity.

Electromagnetic radiation and wave propagation – ground, sky, space waves, polarization, atmospheric layers and its characteristics.

Amplitude modulation – Analysis, generation and detection of AM signals, DSB, SSB, VSB.

AM transmitter – TRF and Super hetrodyne receiver, noise analysis of AM receiver.

Frequency modulation – narrow band and wide band FM, generation of FM signals,direct and indirect methods, FM demodulation techniques, Noise in FM receiver, preemphasis and de-emphasis.

Phase modulation – basics of phase modulation.

DSP – Discrete Fourier transforms – properties of DFS, decimation in time, frequency algorithm, FFT algorithm for a composite number, Signal Flow graph, digital filter design, antennas, half wave, folded dipole, microwave antenna, rhombic, parabolic, Yagi-Uda, horn, helical antenna.

Television transmission – interlaced scanning, composite video signals, audio modulation, working principles of picture tubes.

Television Camera – different types – working principle – CCD camera. NTSC and PAL colour system, Basic idea TV transmitter and receiver, PAL and NTSC decoder, basic ideas on digital TV, HD TV and satellite TV receiver. Basic of optical and satellite communication.

Digital Modulation techniques – sampling theorem, PCM, PAM, PPM, PWM generation and demodulation. ASK, FSK, PSK, MSK, QPSK, BPSK generation and demodulation.

Multiplexing Techniques – Basic of CDMA, TDMA, FDMA, Spread spectrum, frequency hopping, fading, GSM, GPRS, Blue tooth basics.

Microwave devices – Klystron, Magnetron, TWT, SWR, Impatt, Trapatt diodes.

Radar – different types, basic operation, range equation.

Basic of GPS.

Power Electronic, Opto Electronic, PLC and Measuring Equipments

Thyristors – different types – SCR, UJT, TRIAC, DIAC, SCS, IGBT – working principle and characteristics. Triggering and commutation schemes – different types. Converters – series and parallel, Inverters – single phase and three phase, choppers, cycloconverter. Different types of industrial heating, electronic wielding, industrial applications of ultrasonic, SMPS, servo controlled voltage stabilizer, 3 pin IC regulators.

Basics of PLCs, characteristics of LDRs, photo diode, photo transistor, photo voltaic cell, photo detector, LED, opto coupler, and laser diodes and optical amplifiers. Multimeter – working principle, characteristics, accuracy, sensitivity, selectivity, resolution, Construction of CRTs working principle of DSO and spectrum analyser.Working principle of LED, LCD plasma displays, logic probes, and logic analysers.

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