NORTH MAHARASHTRA UNIVERSITY, JALGAON.425 001

:- Syllabus for T.Y.B.Sc.:- Electronics.

Paper I :- Mathematical Methods for Electronics and Classical Electrodynamics.

First Term:- Mathematical Methods for Electronics.

1. Vector Algebra & Vector Analysis- Revision of vector algebra,scalar triple and vector triple product, differentiation and integration of vectors, Physical significances of grad, div and curl. Green's theoram in a plane, Gauss divergence theorem and Stake's theorem with proofs. (P.10)

2. Curvilinear Coordinate System - Orthogonal curvilinear coordinates grad,div, curl & Laplacian in orthogonal c.c. Cylindrical Coordinate system & Spherical Polar coordinate system. (P.6)

3. Differential Equations-
Ordinary and partial differential equations, Laplace's equations, separable variables, linear first & Second order diff.equation Singalarities of Diff. equation, Fuch's theorem (Statement only) Frobenius methods of series solution of Legendre's Hermites & Bessel's diff.equations. (.P.12)

4. Special Functions- Generating functions of Legendre's Pn (x), Hermite's Hn(x) & Bessel function of first kind Jn(x) & their properties. ().P.6)

5. Laplace's transform and fourier series- Definition of Laplaces transform, Laplace transforms of some elementary functions (t^n e^{at}, Sin(at),cos(at),Sinh(at), Cosh (at). Laplace transform using table and by partial fractions only Defination of Fourier series, Determination of fourier coeffs for half wave & full wave rectifier, Saw tooth and square wave generator. Fourier series. Even and odd functions. Complex form of Fourier series. (P.12)

Reference Books-

1. Mathematical Physics - Chattopadhya.
2. Mathematical Methods in Physical Sciences- M.L. Boas.
3. Mathematical Physics- Satya Prakash.
4. Mathematics for Physicists- Arfken.
5. Mathematics for physicists & Engineer's- L.A. Pipes.
6. Mathematical Physics- Rajput & Gupta.

PAPER II CLASSICAL AND QUANTUM MECHANICS

FIRST TERM.

CLASSICAL MECHANICS

1. **Newton's laws and constant fields :-**

Applications of Newton's laws to the motion of a charged particle under constant electric field, under constant magnetic field, under mutually perpendicular electric and magnetic fields, under parallel electric and magnetic fields. Mechanics of system of particles, conservation of linear and angular momentum, conservation of energy. Projectile motion in a resistive medium taking resistive force prapotional to momentum of a projectile, Rocket motion in gravitational fields. (10 Periods)

2. **Motion in a central force fields**

Reduction of two body problem into the equivalent one-body problem. Reial and Transvers components of velocity and acceleration, Motion in an inverse square law of force, qualitative discussion of orbit, Equation of orbit, Kepler's laws. (10 Periods)

3. **Scattering of Particles**

Elastic and inelastic collisions, laboratory and centre of mass system of co-ordinates, Differential and total cross-section, impact parameter, Rutherford seattesing, Relation of cross section in Laboratory and centre of mass system. (10 Periods)

4. **Lagrangian and Hamiltorien formalation :-**

Constraints, generalised co-ordinates, D'Alebert's Principle, Lagrange's equation from D'Alembert's principle, Symmetry and conservation laws, cyclic co-ordinates, Phase-space, Hamiltonian and Hamilton's equation of motion, Simple applications of Hamilton's & Lagrange's equations of motion to simple pendulum, double pendulum, compound pendulum projectile motion, Linear Harmonic Oscillator, Atwood's machine.

(18 Periods)

REFERENCE BOOKS :-

1. Classical Mechanics - R.G. Takawale and P.S. Puranik.
2. Classical Mechanics - H. Goldstein.
3. Classical Mechanics - N.C. Rana and P.S. Joag.

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T.Y.B.Sc. Syllabus.

PAPER I : SECOND TERM : CLASSICAL ELECTRODYNAMICS.

Electrostatics- Fields in vaccum, potential, Gauss's theorem Poisson and Laplace's equations, Methods of images. Solution of Boundery values problems in cylindrical, spherical & rectenguler coordinates. (P. 12).

D.P. E. fields, Susceptibility, dietectric constants, true & induced charge densities.

2. Boundary conditions:-Boundary conditions at the interface of two dielectrics, Boundary value Problems in dielectrics (Using vector treatment only.) (P.8)

3. Magnetostatics- Revision of Biot- Savert's Law, force between two current carrying coils, B.H.M. ,Amperes circuital theorem Lorentz. force, magnatic vector potential, Hysteresis. (P. 10)

4. Electro-dynamics- Fareday's Law of induction, Modified Amperes Law, Maxwell's equations, wave equation, solution of wave equation in free space, Poynting vector, Electromagnetic energy, Boundary conditions, Reflections and refractions of waves from the non-conducting boundary. (Normal incidence) (P. 12)

REFERENCE BOOKS :-

1. Foundations of Electromagnatic Theory - Reits and Millford
2. Electromagnatics - Dr. B.B. Laud.
3. Feymeman Lectures Series - Vol.2.
4. Electricity & Magnetism- Ismoliov.
5. Introduction to electromagnetic fields & waves:- Corson Lorrain.
6. Classical Electromagnetic radiation Marien J. B.

PAPER-II : QUANTUM MECHANICS

SECOND TERM

1) Wave particle duality :- Dual nature of light, de Broglie hypothesis, various expressions for de Broglie wave length, Uncertainty principle, different forms of Uncertainty principle, Wave function, its interpretation & characteristics.

(8 Periods)

2. Schrodinger equation :- Formulation of time dependent and time independent Schrodinger wave equation (one, two, three dimensional), Boundary conditions, eigenfunctions and eigenvalues, momentum eigen functions and eigenvalues expection values, Ehrenfest theorem, probability density probability current density.

(12 Periods)

3. Applications of Schrodinger equation :- Potential well, 1-D rigid box. Motion of a particle in square-well, finite and infinite depth, potential step. Rectangular potential steps Barrier potential, One dimensional harmonic Oscillator. Concept of parity of wavefunction, Parity of harmonic oscillator wave function Schrodinger's equation for rigid rotator, hydrogen atom, separation of radial and angular parts, solution of radial Schrodinger equation to obtain energy eigenvalues, significance of quantum numbers (n, l, m_a, m_s).

(20 Periods)

4. Operators :(X,P,H,L) :- Concept of operator, commutators, commutation algebra, commutation relations for angular momentum operators, parity operators.

(8 Periods)

1. Quantum Mechanics - L. Schiff.
2. Quantum Mechanics, Powell and Krassman.
3. Perspectives of Modern Physics - A. Beiser.

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PAPER-III : COMPUTER PROGRAMMING IN FORTRAN-77 AND OPERATIONAL AMPLIFIERS

COMPUTER PROGRAMMING IN FORTRAN-77

FIRST TERM :

1. Introduction to computer programming :- Programming languages; High level languages low level languages, algorithm and flowcharts. (3 Periods)
2. FORTRAN-77 :- Character set, constants, variable names, arithemetic expressions. (4 Periods)
3. Type of FORTRAN STATEMENTS :- Executable and nonexecutable, arithemetic replacement statements, unconditional GO TO statement, computed GO TO statement, arithematic IF, Relational operators, logical IF statement, logical operators. (8 Periods).
4. SUBSCRIPTED VARIABLES :- One dimensional, to dimensional, DIMENSION statement. (4 Periods)
5. LOOP STRUCTURES :- DO loops, CONTINUE statement, nested DO loops. (4 Periods).
6. INPUT-OUTPUT-STATEMENTS :- List directed and format directed statements, FORMAT statements, format specifications, I.F.E. specifications, DATA statement, type declaration. (8 Periods).
7. Subprograms :- FUNCTION statements, FUNCTION subprograms, sub-routine subprograms, Differences between FUNCTION and subroutine subprograms. (8 Periods)
8. Character Handling :- A field specification
9. Iterative methods :- 1. Bisection method: 2. Newton Raphson method (Derivation of formula & Algorithm of both method. (4 Periods).

REFERENCE BOOKS :-

1. Programming FORTRAN-77 - Ram Kumar.
2. PROGRAMMING FORTRAN-77 - Raja Raman.
3. PROGRAMMING FORTRAN-77 - Schaum's series. - Lipschictz.
4. Computer oriented Numbrical analysis : - V.Rajaraman.
5. A structured Disciplined Style - Davis & Heffmon.
6. Programming in PASCAL & FORTRAN - Mr. & Mrs. Upasani.

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SECOND TERM

OPERATIONAL AMPLIFIER

Introduction :- Basic building blocks of an OPAMP, OPAMP Parameters. (2 Periods)

1. A. Basic Opamp circuits :- Voltage scalers, impedance conversii sion, unity gain follower, variable scale factor, instrumentation amplifier logarithmic amplifier (using diode and transistor without error considerations.) current scaling (Basic concept only) A.C. amplifiers.

2. B. Analog Computation :- Basic Intergrator, Integrator with run, set & hold mode, modification of integrators, Basic differentiator, Analog computation (Solution to 1st & IInd order differential equations. (15 Periods)

3. Switching circuits : Comparator (Basic, regenerative) hysteresis loop. Wien-Bridge oscillator, triangular wave & square wave generators, amplitude & duty cycle control for square wave generator, Voltage controlled oscillator. (10 Periods).

4. Physical parrameter :- Measurments and processing : Transducer amplifier Differential bridge configuration, Resistance measurments, capacitance measurment. (8 Periods).

5. Other applications :- Active filters (All types 1st order only) Design, and analysis, Precision rectifier circuits, sample & hold circuits, V to F converter, F to V converter. (10 Periods)

BOOKS :

1. Operational Amplifiers - G.B. Clayton.

2. Linear OPAMP circuits - Gaikwad R.

3. Operational amplifiers and Linear Integrated Circuits. - F.F. Driscoll

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PAPER-IV

SOLID STATE PHYSICS AND PHYSICS OF SEMICONDUCTOR DEVICES

FIRST TERM SOLID STATE PHYSICS

1. Crystal Structure :-Lattice, basis and crystal structure, translational vectors, unit cell, primitive cell and Wigner Seitz cell, symmetry operations, Two and three diamentional lattice types, primitive translational vectors for SC, BCC and FCC, Co-Ordination number, atomic radii, Packing fractions for SC, BCC and FCC structures, Miller indices, inter planer distances, Reciprocal lattice and its properties, Resiprocal lattice of SC,BCC, and FCC lattice Study of NaCl, diamond and CsCl structure. (15 Periods)

2. X-ray diffraction - Crystal as a grating for X-ray, Bragg's law, Bragg's diffraction condition in reciprocal lattice (Ewalds construction), X-ray diffraction mothod (Laue, rotating crystal and powder method). Analysis of cubic crystals by powder method. (7 Periods).

3. Bonding in Solids :- Crystal bonding, covalent bond, metallic bond, ionic bond, cohesive energy, Modelung constant in one diamesional lattice of ionic chain, Atomic and ionic radii, Ionic conductivity. (6 Periods).

4. Lattice vibrations and thermal properties :- Lattice heat capacity classical theory of specific heat Einstein's model, density of vibrational modes of a continuous medium, Debye model, T^3Law. (6 Periods).

5. Free electron theory of metals :- Free electron model, energy levels and density of orbitals in one and three diamensions, electrical conducitivity, resistivity and ohm's law, Hall effect. (6 Periods).

6. Band theory of Solids - Nearly free electron model, origin of energy bands, electronic motion according to band theory (effective mass m) Distinction between metal, Semiconductor and insulator, concept of a hole. (6 Periods)

REFERENCE BOOKS :

1. Introduction to solid state physics - C Kittel, 5th edition Wiley Estern Pv, New Delhi.
2. Solid State Physics - A.J. Dekker. Mac Millan Students edition.
3. Physics of solids L Azaroff, Printice Hall of India.
4. Principles of Solid State - Koer. Wiley estern Pvt. Ltd., New Delhi.

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SECOND TERM

PHYSICS OF SEMICONDUCTOR DEVICES

1. Growth of Semiconductor crystals :- Semiconductor materials of industrial interest, Growth of Semiconductor material from malt, liquid phase epitaxy, Vapor phase Epitaxy, Molecular beam Epitaxy. (7 Peridds)

2. Energy Bands and charge carriers in semiconductor:- Bonding forces & energy bands in solids, charge carriers in semiconductors, carrier concentrations, Drift of carriers in electric & magnetic field. (6 Periods)

3. Excess carriers in semiconductors :- Optical absorption, Lumine escence carrier life time and photoconductivity, Diffusion of charge carriers. (6 Periods)

4. JUNCTIONS :- Fabrication of p-n junction (alloyed, diffused & ion implantation), Equillibrium conditions forward & reverse biased junctions, Reverse bias break-down, Transient & a.c. conditions capacitance of p-n junction, Deviation from the simple theory Metal Semiconductor contacts (Ohmic & Schottky) (15 Periods)

5. Biplotar Junction transisters :- Amplification & switching, Fundamentals of BJT operation, BJT fabrication, Minority carrier distuibutions & terminal currents. (10 Periods)

Reference

1. Solid State Electronic Devices - Ben G. Streetman (3rd edition)
2. Semiconductor devices - Adhir Bar Lev.
3. Integrated Electronics - Millman and Halkias.
4. Integrated circuits - K.R. Botkar.

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PAPER-V - ELECTRONIC COMMUNICATIONS

First Term - (Communication Principles)

1.) General Principles and Ideas of communications

Message, Signal, Noise, channel, Communications as means of information transfer, measure of Information, Bit, Channel capacity, Elements of Information theory, Modulation, Need of modulation, Types of modulation.

(7 Periods)

2. Amplitude Modulation & Detection :-

Theory and Mathematical Expression for AM,AM index, Band width of transmission, power relation in carrier and side bands, study of AM systems (Standard AM, DSB, SSB, & VSB), Modulated ~~cla~~ class-C amplifier, Balanced modulator, phase shift method, Block diagram of AM transmitter and function of each block in brief.

Idea of AM detection, detection circuits, Linear envelope detector, conditions for satisfactory, Detection, Distortions in Envelope detection, Expression for output detected, Automatic Volume control, Block Diagram of AM super heterodyne ~~Receive~~ Receiver, Explanation of each block (in brief) general characteristics of receiver (stability, selectivity, fidelity, signal to noise ratio, noise figure).

(15 Periods)

3. Frequency Modulation and Detection :-

Theory and Mathematical expression for FM and PM, frequency deviation, frequency and phase modulation index, comparison between AM & FM, study of FM systems - FM modulators, FET reactance modulator, varactor diode modulator, FM transmitter, block diagram, of FM receiver, Function of each block in brief, Simple phase shift discriminator.

(11 Periods)

4. Pulse Modulation :- Idea of pulse modulation, sampling theorem, analog pulse modulation (PAM, PWM, PPM) Digital pulse

modulation, PCM in detail, Block diagram of degital communication system. (9 Periods)

5. Noise :- Types of noise, Thermal noise, shot noise, 1/F noise noise bandwidth, signal to noise ratio, noise figure, noise reduction (techniques to extract noise from signal) shielding and grounding techniques. (6 Periods)

SECOND TERM :- COMMUNICATION SYSTEMS.

1. Introduction - Elements of communication system (Block diagram)

   Antennas :- Characteristics of antenna, Reciprocity theorem, Induction and radiation field,, radiation propertiel of hertzian dipole (Elementary), Half wave dipole, Loop antenna Yogi antenna.

   (10 Periods)

2. Propagation :- Free space propagation, space wave propagation, effect of earths curvature, line of sight propagation, duct propagation, sky wave propagation, (Ionospheric propagation) plasma frequency, reflection of sky waves by the ionosphere, maximum usable frequency, critical frequency, virtual height, skip distance, fading, surface wave propagation, wave tilt, ground wave propagation. (12 Periods)

3. T.V. Communication systems :- Fundamentals of B/W TV, Simplified block diagram of complete TV system, TV camera tubes (Vidicon, image orthicon) TV scanning, (Interlaced scanning), Broadcast TV channels, TV transmission, study of B/W TV receiver (Function of each block) (12 Periods)

4. Optical Fiber Communication :- Elements of an optical communication system, principle of optical transmission in a fiber, single mode propagation, merits and demerits of optical fibercommunication, Use of optical fiber in telephony.

   (8 Periods)

5. Satellite Communication :- Elements of satellite communication system, satellite orbit, communication satellite as relay station, Spacing, elevation angles, distance of satellite to location on earth, Uplink, down link, block diagram of earth

station transmitter and receiver, Applications of satellite communication. (6 Periods)

REFERENCES :+

1. Electronic communication systems - Kennedy.
2. Electronic communication - Roddy and coolen.
3. Electronic communications - Deshpande & Deshpande.
4. Satellite communication -Technology - Robert L. Douglas.
5. Satellite Communications - R.M. Gagliardi.
6. Video and Television systems - Grob.
7. Antenna and wave propagation - M.D.P. rasad.
8. Antenna and wave propagation - Umesh Sinha.
9. Basic Television - A.K. Maini.
10. Optical communication - Keisar.

PAPER-VI MICROPROCESSORS

FIRST TERM - MICROPROCESSORS - I

1. Introduction to digital Micro computer :-

Block diagram of digital micro computer (Cpu, I/o devices, memory, Bus) Significance of the terms : Hardware, software, Firm Ware program, data, Brief idea of higher level and lower level languages. Meaning of terms : assembler, compiler.

(6 Periods)

2. Architecture of 8085 Microprocessor.

Block diagram and function of each block. Pinout diagram with brief description of each pin. addressing methods. Instruction set of 8085 microprocessor. Timing and state transition diagrams, Hardware and software intrupts.

(14 Periods)

3. Stack and Assembler.

Concept of stack, memory stack / Cascade stack. Use of stack, Nested subroutine, Double stack, Multiple stacks.

Features of Assembler.

i) Pseudo operations and delimiter.

ii) Assembly language statement.

Lable field, Op-code field, operand field, comment field.

(12 Periods). cont..11

4. Assembly Language format :-

Simple programs, simple program loops, character coded data, Codeconversion, Arithmatic problems, Subroutines.

(12 Periods)

SECOND TERM MICROPROCESSORS-II

1. Data transfer scheme - Programmed data transfer, Synchronous, Asynchronous data transfer, Interrupt driven data transfer, Serial Data transfer. (8 Periods)

2. Programmable peripheral interface (Intel 8255)

Block diagram and pin configuration control word formates, Mode 0,1,2, operations. Interfacing of 12 bit ADC and DAC.

(8 Periods)

3. Interfacing peripherals and Applications.

Introduction to interfacing devices. Basic Interfacing concepts, Decoding, Study of Intel IC-8212. Peripheral I/O Mapped I/O) memory maped I/O. Applications such as Key board, Interfacing output displays, (Software expected) Interfacing matrix type keyboard. (Key debounce, soft ware using subroutine is expected). Interfacing memory : RAM , ROM

(20 Periods)

4. Introduction to 8086 Microprocessor.

Block diagram, pin configuration comparison with 8085

(6 Periods)

LIST OF REFERENCES :-

1. Computer fandamentals - Tokhiem.
2. Microprocessor Arechitecture, programming and applications with the 8085/8080 A - Ramesh Goankar.
3. Introduction to Microprocessor, software, Hardware and proramming - Lance A. Leaventhal.
4. 8080A, 8085 Assembly Language proramming - Lance A. Leaventhal.
5. Introduction to Microprocessors - Vol. I & II - Adam osborne.
6. Introduction to 8086 - Douglas Hall.
7. Introduction to 8086 - Liu. Gibson.

cont. 12

A) GENERAL LABORATORY EXPERIMENT - PRACTICAL COURSE-I

1. To study AM for 3% modulation and detection using a diode (At least 2 seats of reading for different % of modulation ~~should~~ should be taken. The % should be decided by the colleges).
2. To build and study digital multiplexing. (F1 and F2 are generated by 555, Tracing of wave forms is essential)
3. AM superheterodyne receiver (Tracing of the circuit at each stage & identification of various stages)
4. To design, build and test clock using IC's
   1 KHZ clock using IC 74123.
5. To design, build and test PAM using IC 555 and OPAMP.
6. To study PWM and PPM using IC 555 and the oscillescope.
7. To determine the Hall coefficient of a given crystal.
8. To determine the conductivity of a given sample using four probe method.
9. To design, build and Test Lagarithmic Amplifier using diode as a logging elemnt.
10. To design and build a precision rectifier circuit and use it for A.C. measurement. (Half wave and full wave).
11. To design, build and test highpass/low pass active filters. (Second Order).
12. To study voltage to current conversion using OPAMP.
13. To design, build, and test switching mode power supply (SMPS) for 5V. and 1A using IC-728.
14. To design, build and test D.C. to D.C. converter and to study its efficiency. (Use any step down transformer (6-0-6/ 9-0-9) as step up transformer).
15. To study characteristics of a solar cell (Till factor and efficiency).
16) To build and test T to V converter using instrumentation amplifier using 741.
17) Resistance measurement using OPAMP (Low and high resistance measurements)
18. Determination of energy gap of a semiconductor.

cont..13

19. Power control by SCR (Speed control of the fan.)
20. Design, build and test clipping circuits using OP-AMP.
21. FM Modulation and demodulation using PLL (IC 565).

NOTE :- 16. Experiments should be performed from the above list.

1) Industrial Electronics text book by paul B'Z bar, 3rd edition for SCR.
2) Operational amplifier experimental manual by G.B. Clayton.
3) National semiconductor data manual (565).
4) Integrated Electronics by K.R. Botkar.

PRACTICAL COURSE-II SECTION - I

SECTION-I MICROPROCESSOR

1) a) To find largest number from a given set of nos. loaded in membry.

b) To find the smallest number from a given set of numbers loaded in the memory.

2) To add the corresponding nos. in the two strings of equal length in place / memory locations.

3) a) To arrange the given numbers loaded in the memory in ascending order.

b) To arrange the given numbers loaded in the memory in decending order.

4) To find the average of the given set of the numbers loaded in the memory. To display the result as quotient and remainder.
5) To prepare a program for a two digit decimal counter.
6) To enter a two digit decimal number through the keyboard, convert it into nex number and display the result.

SECTION-II

7) Interfacing of Thumb wheel switches and 7-segment display.
8) Interfacing of Reed Relay switches. Calculation of specific delay control of Reed Relay is expected.
9) Interfacing of ADC.
10) Interfacing of DAC for generation of triangular, sowtooth and waveforms.

cont..14

11. Study serial communication using SID and SOD.
12. Interfacing 4 simple switches and 4 corresponding LED's for identification of key closure.

NOTE : 1) Minimum 8 experiments should be performed from the above list taking atleast 4 from each section.

2) Flow chart and comments are essential for each - experiment.

COMPUTER PROGRAMMING IN FORTRAN-77

SECTION-I

1) Find the largest/smallest number from a given set of numbers.
2) To arrange given number in ascending/descending order using one dimensional array.
3) To find first 50 prime number, starting from any prime number.
4) To calculate sine/cosine function using Taylor's series and compare it with library function.
5) To find the multiplication of two matrices A and B.
6) To find the inversion of a square matrix.
7) To find the greatest common divisor (GCD)/Least common multiplier (LCM) of given numbers.

SECTION-II

1) To find log (sin x) taking value from 0 to 2 radians at the interral of 0.2 radian without using library function (Use of FUNCTION and/or SUBROUTINE is expected) Print the out put in a tabular form.
2) To find the square root of a given number using bisection method.
3) To find the root of a given equation using Newton-Raphson method.
4) write a program to generate first twenty terms of Fibonacci series (Use of FUNCTION/SUBROUTINE is essential)
5) To prepare the magic equare of the order 5 x 5.
6) Write a program for converting a given decimal number into its binary equivalent and vice versa.
7) Drawing PCB layout using SMART WORK software package on IBM-PC compatible.

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NOTE :- 1) Studetns should perform any four experiments from each section from the above given list.

2) Algorithm and flow chart of each experiment is essential

PRACTICAL COURSE-III (Project)

Presentation of The Project Report

The method of presentation of the projcet report is a very important aspect of the work done which brings confidence in student and proves validity of the problem and its conclusions. The presentation of project thus involves a few steps which have got to be borne in mind. The steps or items can be enumerated as follows-

1) The Title : The title is a very important part of the project, since it comes first and on the front page of the report at the time of presentation. The student and teacher together should decide a tentative title at the time of allotment of project which may change depending on the achieved results upto the time of presentation. The title should possess the following characteristics.

i) It should give the exact content of the work done by student and if possible it should also give the proper weightages to the different parts of the project.

ii) As far as possible it should be short and attractive, but if necessary it can be long also.

iii) Bold and small letters should be used to give the emphasis on a particular part e.g. Parameter, Property, Designing and Fabrication etc. which is to be pointed out.

2) Certificate : Every project report should contain printed/ cyclostyled/typed declaration certificate duly signed by the teacher-in-charge and Head of the department. A proforma for such a certificate is suggested herewith.

DECLARATION CERTIFICATE

1) Name of the College :----------

2) Name of the student ----------Class----------

Division ----------Batch No.----------

Examination Seat No.----------

cont..16

3) Title of the project :----------

4) Type of the project (Optional) :----------

5) Remark about the attendance : Poor/Average/Good/VeryGood-

6) The present work done is :Continuation of previous work/ Repeatation/first time done in the laboratory.

7) Project was done by the student: Independently/in group (mentioned No.of students)/ a part was done in some other institution.
Name of such other Institution if any ----------

8) ---------- Student has completed/not completed, the project work during the academic year ---------- in this laboratory.

(Head of the Department Teacher in-charge)

Date : Date :

3) Acknowledgement :- Acknowledgement is also a part of the project presentation where the student is supposed to express gratitudes, thanks to the involved perssonalities/institutions who have helped or guided him from time to time during the work.

4) Contents :-

The content is most important part of the project report which contains from 'general introduction' of the work done to the 'results' obtained and guide lines for future action or applications. For the simplicity of presentation and understanding it should be should be divided into chapters, which will be followed by articles and sub articles, as far as possible.. The following is one of the general methods suggested for the presentation of the contents, which may very from type to type of projects depending upon their description and requirements.

CHAPTER-I : INTRODUCTION

The student should consider the following point (articles) when writing the first chapter of the report as 'Introduction'.

1.1 General remark and Historical background.

1.2 Literature Survey.

1.3 Previous work done in the laboratory.

1.4 Aim and approach of the present work.

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CHAPTER-II:BACK GROUND STUDY

If the student has studied the relevant points, parameters, or theories related to the present work in depth and has given a sufficient time for understanding the problem in detail, then it should be mentioned separately in this chapter with articles depending upon the description. If the student has not studied in detail, the same can be included in the literature survey part of the first cha chapter.

CHAPTER-III : INSTRUMENTATION AND FORMULAE/EXPERIMENTAL.

In this chapter student should write in detail each and every minor and major points regarding, from experimental set up to the observation and the precautions taken in the experimentation, which may be as follows-

3.1 Experimental arrangement.

3.2 Designing.

3.3 Method of experimentation.

3.4 Precautions etc.

Student should discuss all the experimental parameters in detail and give as many relevant things as possible in tabular form. All relevent detailed diagrams or figures with proper title should be drawn by the student. If some data are taken and used from other sources, they should be mentioned with proper references.

CHAPTER-IV : RESULTS AND DISCUSSIONS.

This chapter of report is very important because whatever the work is done its results and their interpretations is to be done, which should be proper and scientific, Therefore all the results should be given in tabular form with proper parameters, units and dimentions. Further, 'Obtained results' should be compared with the available (reference) or expected results. Accuracy of measurement and percentage error should also be mentioned.

All the results should be interpreted with the help of graphs, Histogrammes. If due to some unknown reasons the obtained results are not in agreement with the expected ones, then explain the

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desparaties.

In the end of this chapter student should mention his important results and his contribution in brief with guidelines for future action.

5) APPENDIX :-

If the student has done some extra work which he could not mentioned in any part of the report, he can mention it in appendix.

6) REFERENCES :-

While writing the project report, the student always refers books, magazines and research papers, these references should be properly presented here. If he has referred a good number of books and research papers from journals, if possible, they should be presented separately by alloting a different 'system' for them, in the body of project report. It will be useful for those students who will refer the report. If the references are few then usual pattern can be used for mentioning the same. These references should be presented in the following way :

1) For Book : 'Author's Name', 'Title of Book', Vol. No., Edition (Mention cheap Edi/student Edi. etc.), publisher's Name, year of publication, chapter No., Page Nos.

2) For Research Paper :- 'Author's Name', 'Title of the Paper', 'Name of the journal(country)', Vol. No. PP, Month, Year.

SOME OTHER IMPORTANT POINTS ABOUT REFERENCES

1) Student should also write from whether he got the research publications, as far as possible.

ii) There should not be any reference at the end (in this 'reference') of the report without mentioning it in the body of project.

iii) Give the reference or references on the top of the proper word used in the body of the report, example see below.

NOTE : Complete project report may be about 30 to 50 pages.

7) SUMMERY :

The last and the most important item (point) in the presentation - write up is the summery. It should be remembered that main 'Primary' aim of the presentation writeupt (& oral) is to show to the examiners, the work the student has put in for the project & to indicate that it is the 'best'. Naturally it is better to help the external examiner while looking in it in as short a time as possible. The 'Contents' and the 'Summery' together should only be able to do this job. In brief, these two should contain all the important points for which the student expects 'marks'

Therefore, the summery should be given important points and not just the titles of the chapter rewritten. It should also contain the important numerical results, critical explanations etc. One may refer in the summary the articals or pages in related chapters, so that if the examiner (or any other reader) gets interested, he may directly look into those points. It is better to write the summary 'point by point' (& numbers them). Make the important points available to examiner in 'cooked' from rather than making him 'struggle' for it.

A hint about 'oral' exam.' may not be out of place here. Always try to 'drive' the interviewer/examiner towards your 'strong points'. Secondly note that very ofter, the questions asked (in series) indicate the 'answer' the examiners expect from you.

In addition to above following suggestions were made by various participants and were accepted.

1) While writing the practical sheets following sequence in general is followed by the students.

a) Name/Title of the experiment.

b) Aim.

c) Components/Apparatus required with specifications.

d) Circuit diagram/Logic diagram.

e) Design considerations.

f) List of the required components from design.

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g) Observat ons.

h) Graphs/wave froms traced from C.R.O.

i) Calculations.

j) Results.

k) Comments on the results.

l) Theory.

2) An industrial tour be arranged by the College for Electronics students. The students may visit

Electronic Industries.

Microwave stations.

Electronic Exchanges.

Satelite Communication Centres.

3) Project Work -

Work load such as contact periods = 4 periods per week should be shown in the time-table.

Students should maintain a rough diary/notebook for the work done by him during the year. Some should be submitted by him to the examiner at the time of examination.

List of the various projects be prepared along with the abstract. The list should be circulated to various College.

4) One of the College from North Maharashtra University, Jalgaon be requested to arrange a workshop for practicals. The participents should perform all the experiments from the syllabus in the workshop.

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