

B.E. ELECTRONICS ENGINEERING
FOURTH YEAR semester VIII

SUBJECT: Power Electronics

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Rationale: The subject of Power Electronics shall create understanding and strong basic concepts in power devices and their applications in industry.

DETAILED SYLLABUS

Power Devices

Construction, ratings, characteristics:- (including SOA Rating) power transistors, SCR, TRIAC, GTO- SCR, IGBT, MCT

Drive Circuits

Using BJT, UJT, DIAC, Isolation circuits using an optocoupler and transformer

Protection circuits

Snubbers, MOVs, di/ dt inductor, semiconductor or fuses

Cooling of Semiconductor devices

Basic Theory- thermal resistance, simple heat sink calculations.

Types of cooling : (a) natural convection (b) forced air cooling (c) liquid cooling

(d) vapour phase cooling

Half wave and full wave uncontrolled and controlled rectifier circuits

With resistive load and R-L load. Output average and RMS voltages. Effect of freewheeling diode.

A.C phase control circuits

Using BJT, OP Amps, Special IC's such as TCA 785. Firing scheme for 3 phase supply

Power Inverters

Series Parallel and bridge inverter (single phase) working, important waveforms, control circuits and applications.

Choppers

Principle of operation, Jones chopper (working, important waveforms, control circuit and applications).

Motor Controllers

A.C motor controllers: induction squirrel cage motor control- voltage control, V/ F control, torque- speed characteristics, Control of wound rotor motor, Slip power recovery.

D.C motor controllers: armature voltage control of separately excited DC shunt motor. IR compensation. Field current control, torque-speed characteristics, micro controller based control circuit for motor control. (Block diagram and working)

BOOKS**Text Books:**

1. M Rashid, Power Electronics, Prentice Hall of India Publication

Additional Reading:

1. Ned Mohan, Undeland, Robbins, Power Electronics, John Wiley Publication
2. Landers, Power Electronics, McGraw Hill
3. Dubey G.K, Electrical Devices, Narosa Press
4. General Electric, SCR Manual
5. M.D Singh & K.B Khanchandani, Power Electronics, TATA McGraw Hill, first edition
6. P.C Sen, modern Power Electronics, Wheeler Publication

TERM WORK

1. Term work shall consist of at least 10 practicals and two assignments covering the topics of the syllabus.
2. A term work shall be conducted with a weightage of 10 marks.

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING
FOURTH YEAR semester VIII

SUBJECT: Data Communication and Networking

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks

Rationale: This subject introduces the fundamental concepts of data network architecture. Starting with the key aspects of transmission, interfacing, link control and multiplexing, it covers the internal mechanisms and network interfaces that have been developed to support data communications over long distance networks and over short distance

DETAILED SYLLABUS

Introduction

Network, Protocols and standards, Line configuration, Topology, Transmission modes, categories of networks, Internetworks, Transmission media, Transmission impairments, Performance of Transmission media, The OSI model, TCP/IP, DTE ---DCE Interface.

Multiplexing

FDM, Synchronous TDM, Statistical TDM, Asymmetric Digital Subscriber lines, XDSL

Data Link Control

Flow control, Error Detection- two dimensional Parity checks, Internet checksum, CRC.
Error control, Transmission efficiency of ARQ controls, HDLC, point to point protocol.

Circuit Switching

Circuit Switching networks, circuit switches- space division switches, Time --- division switches, Time-space-time switches, Routing in circuit switching Networks, control signaling, SS7

Packet Switching Networks

Network and services and internal network operation, packet network topology, Datagram and Virtual circuits, Routing in packet networks, shortest path algorithms- The Bellman-Ford algorithm, Dijkstra's algorithm, other Routing approaches, congestion control.

ATM and Frame Relay

ATM protocol Architecture, Logical connections, ATM cells, Transmission of ATM cells, ATM Adaptation Layer, Frame Relay, Frame Relay protocol architecture

Local Area Network

LAN applications, LAN architecture, Bus LANs, Ring LANs, Star LANs, Wireless LAN, LAN Bridges, IEEE 802.3 Medium access control for 10 Mbps and 100 Mbps LAN, Token Ring and FDDI

ISDN

Architecture, ISDN channels, User access, ISDN Protocols, Broadband ISDN

BOOKS**Text Books:**

1. William Stallings, Data and computer communication – Pearson Education, 6th edition (topics 2,3,4,6,7,8)
2. Leon Garcia and Widjaja, Communication Networks, Tata McGraw Hill, second edition(topics 3,4,5)
3. Forouzan, Data Communication and Networking, Tata McGraw Hill, 3rd edition (topic 1)

Additional Reading:

1. William A Shay- Understanding Data communications and Networks- Thomson Learning
2. Andrew Tenenbaum, Computer Networks, Prentice Hall of India

TERM WORK

1. Term work shall consist of at least eight practicals and two assignments covering the topics of the syllabus
2. A term work test shall be conducted with a weightage of ten marks

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING
FOURTH YEAR semester VIII

SUBJECT: Mechatronics

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks

Rationale: Mechatronics is a synergistic combination of Mechanical, Electrical and Computer Engineering and Information Technology, which includes control systems as well as numerical methods to design products. This subject shall lay the foundations of this multidisciplinary field of engineering.

DETAILED SYLLABUS

Introduction to Mechatronics

Mechatronics key elements, Mechatronics design process, approaches in Mechatronics

Modeling and Simulation of Physical System

Simulation and Block Diagrams, Analogies and Impedance Diagrams, Electrical Systems, Mechanical Translation systems, Mechanical rotational system, Electromechanical coupling, Fluid systems

Sensors and Transducers

Introduction to Sensors and transducers, Sensors for motion and position Measurement, force, torque, and Tactile sensors, flow sensors, Temperature – sensing devices, Ultrasonic sensors, range sensors, active vibration control Using magnetostrictive transducers, Fiber optic devices in mechatronics

Actuating Devices

Direct current motor, permanent magnet stepper motor, fluid power actuation, Fluid power design elements, Piezoelectric Actuators.

Hardware components for Mechatronics

Transducer signal conditioning and devices for data conversion, programmable Controllers.

Signals, systems and controls

Introduction to signals, systems, and controls, system representation, Linearization of Nonlinear systems, time delays, measures of system Performance, root locus and bode plots

Real- Time Interfacing

Introduction, Elements of a Data Acquisition and Control system, overview of the I/O process, Installation of the I/O card and software, installation of the Application software, examples of interfacing

Closed Loop controllers

Continuous and discrete processes, control modes, two step mode, proportional mode, derivative control, integral control, PID controller, digital controllers, control system performance, controller tuning, velocity control and Adaptive control

Advanced applications in mechatronics

Sensors for condition monitoring, Mechatronic control in automated Manufacturing, artificial intelligence in mechatronics, Fuzzy logic applications in Mechatronics, Micro sensors in mechatronics

BOOKS**Text Books:**

1. Devdas Shetty and Richard.A.Kolk, mechatronics system design, Thomson Asia Pte. Ltd. Second reprint, 2001
2. W.Bolton, Mechatronics, Pearson Education Asia, Third Indian Reprint 2001

Additional Reading:

1. David G Alciatore and Michael.B.Histand, Introduction to Mechatronics and Measurement systems, Tata McGraw hill, Second Edition, 2003.

TERM WORK

1. Term work should consist of at least six practicals and four assignments covering the topics of the syllabus
2. A Term work must be conducted with a weight age of 10 marks

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING
FOURTH YEAR semester VIII

SUBJECT: Elective – II, Advanced Digital Signal Processing

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Rationale: This subject provides a comprehensive treatment of signal processing Algorithms for modeling discrete time signals, designing optimum filters and estimating the power spectrum of a random process

DETAILED SYLLABUS

- Discrete-Time random processes
- Spectral Factorization
 - Minimum phase signals and systems
 - Partial Energy and minimum delay
 - Minimum phase and minimum delay property
 - Spectral Factorization theorem
- Spectral Estimation by classical methods
 - The periodogram
 - The modified periodogram
 - Barlett, Welch & Blackman- Tuckey, approach
- Signal Modeling
 - The Least Squares method
 - The Pade Approximation
- Linear Prediction
 - Levinson Recursion
 - Schur Algorithm
 - Lattice Realization
- Spectral Estimation by Parametric Techniques
- Wiener Filtering
 - FIR wiener Filters

BOOKS

Text Books:

Additional Reading:

1. S.M.Kay, Modern Spectral Estimation, Prentice Hall, 1988
2. S.J.Orfanidis, Optimum signal processing: An Introduction, second edition, McGraw Hill, International, 1990

TERM WORK

1. Term work shall consist of at least 10 practicals/assignments covering the topics of the syllabus.
2. A term work test shall be conducted with a weightage of 10 marks

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING
FOURTH YEAR semester VIII

SUBJECT: Elective - II, Biomedical Instrumentation

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Rationale: This subject introduces as interdisciplinary field and shall provide the knowledge of the combination of Biomedical Engineering as well as the technology of instrumentation. This subject teaches application of Electronics Engineering to medicine

DETAILED SYLLABUS

Study of Human Body

Anatomy and Physiology of the human body, body system- Skeletal, muscular, circulatory, respiratory, digestive, excretory, nervous, endocrine, reproductive.

Study of Human cell

Average Human cell, Transport across the cell membrane and membrane potential- Na⁺ & K⁺ transport, action potential, Electrical equivalent circuit of a cell

Bio Electrodes, transducers and amplifiers

Electrode-electrolyte interface, different electrode types, stimulating electrodes, biomedical amplifiers. Transducers for measurement of physiological events

Electrocardiogram

Origin of the heart beat and the electrical activity of the heart, the EDG and its analysis, the Einthoven triangle, Bipolar leads, Unipolar leads, Vector cardiography, Measurement of cardiac output, ECG electrodes, ECG amplifiers, Cardiac Arrhythmias.

Bioelectric signals

Study of Characteristics of various Bioelectric Signals such as EEG, EMG, ERG, EOG and their recording

Signal Measurement

1. Measurement of Blood pressure, Blood flow and cardiac output
2. Impedance Plethysmography
3. Measurements in the respiratory system

Biomedical Instruments

Stimulators, Defibrillators, Pacemakers, Respirators, Bedside monitor, Audiometer and hearing aids. Oximetry, Ear Oximeter, Pulse Oximeter, Blood Gas Analyzer, Spirometry, Pulmonary function Analyzers.

Prosthesis

Introduction to Prosthesis

Electrical Safety

Electrical Safety of patient and medical equipment

BOOKS**Text Books:**

1. Cromwell L.Weibell & Pfeiffer, Biomedical Instrumentation and measurements, Prentice Hall of India, 1993
2. Khandpur R.S., Handbook of Biomedical Instrumentation, Tata McGraw Hill, second edition, 2003

Additional Reading:

1. Ganong W.F., Review of Medical Physiology, Prentice Hall Inc, USA, 1995
2. Webster J.G- Medical Instrumentation- Application and Design, Wiley and Sons Inc, third edition, 1999
3. Carr and Brown, Introduction to biomedical equipment technology, fourth edition, Pearson Press, 2003

TERM WORK

1. Term work shall consist of at least eight practicals and assignments covering the topics of the syllabus, a visit to a hospital for detailed study and functioning of available Biomedical instruments
2. A term work shall be conducted with a weightage of 10 marks

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING
FOURTH YEAR semester VIII

SUBJECT: Elective – II, Embedded Systems

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Rationale: Embedded Systems have permeated all industries and even our homes. They are a combination of hardware and software and run critical areas like communication, transportation and energy systems. This subject shall provide crucial knowledge required to understand, analyze and design embedded systems and real time programming.

DETAILED SYLLABUS

Introduction to Embedded Systems

Software Embedded into a system

Processor and Memory organization

Structural Units in a processor, Processor Selection for an embedded system, Memory devices, Memory selection for an embedded system, Allocation of Memory to program segments and blocks and memory map of a system, Direct Memory access, Interfacing processor, memories and I/O devices

Devices and Buses for Device networks

I/O devices, Timer and counting devices, Serial Communication using the 'I2C', 'CAN' and Advanced I/O Buses between the networked multiple Devices, host system or computer parallel communication between the networked I/O Multiple Devices using the PCI, PCI-X and advanced buses

Device Drivers and Interrupts Servicing Mechanism

Device drivers, Parallel port device drivers in a system, serial port device Drivers in a system, device drivers for internal programmable timing devices, Interrupt servicing (handling) mechanism, Context and the periods of Context-Switching, Deadline and Interrupt Latency.

Programming concepts and embedded programming in C and C++

Software programming in assembly language (ALP) and in High level language 'C', 'C' program elements: Header and source files and preprocessor directives, Program elements: Macros and Functions, Program elements: Data Types, Data Structures, Modifiers, Statements, Loops and Pointers, Queues, Stacks, Lists, Ordered lists, Embedded Programming in C++, 'C' Program compiler and Cross-

Compiler, Source Code Engineering Tools for Embedded C/C++, Optimization of Memory needs

Program Modeling Concepts for Software-Development Process

Modeling processes for software analysis before software implementation, Programming Models for Event Controlled or Response Time Constrained Real Time Programs

Software Engineering Practices in the Embedded Software Development Process

Software algorithm complexity, software development process life cycle and its Models, software analysis, software design, software implementation, software Testing, validating and debugging, real time programming issues during the Software development process, software project management, software Maintenance, unified modeling language(UML)

Inter-Process Communication and Synchronization of processes, tasks and threads

Multiple processes in an application, problem of sharing data by multiple tasks and routines, inter process communication.

Real Time Operating Systems

Operating system services, I/O Subsystems, Network operating systems, Real-Time and embedded system operating systems, interrupt routines in RTOS Environment: Handling of Interrupt source call by the RTOSs, RTOS Task Scheduling models, interrupt latency and response times of the tasks as Performance metrics, performance metric in scheduling models for periodic, Sporadic and Aperiodic tasks, IEEE standard POSIX 1003. 1b functions for standardization of RTOS and Inter-Task Communication Functions, List of Basic Actions in a preemptive scheduler and expected times taken at a processor, Fifteen-point strategy for synchronization between the processes, ISRs, OS Functions and Tasks and for resource management

Hardware-Software Co-design in an embedded system

Embedded system project management, embedded system design and Co-design issues in system development process, design cycle in the development Phase for an embedded system, Uses of Target system or its Emulator and In-Circuit emulator(ICE), Uses of software tools for development of an embedded System, Use of Software Tools for Development of an Embedded system, The software build process for embedded systems-preprocessing, compiling/cross compiling, linking, locating, loading on the target, Uses of Oscilloscopes and Logic Analyzers for system hardware tests, Issues in embedded system design

BOOKS**Text Books:**

1. Rajkamal, Embedded systems-architecture, programming and design, Tata McGraw Hill, first edition, 2003
2. Sriram Iyer and Pankaj Gupta, Embedded Realtime systems programming, Tata McGraw Hill, first edition, 2003

Additional Reading:

1. Qing Li and Caroline Yao, Real-time concepts for embedded systems, Cmpbooks press, first edition, 2003

TERM WORK

1. Term work should consist of at least eight practicals and assignments covering the topics of the syllabus
2. A term work test must be conducted with a weight age of 10 marks

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING
FOURTH YEAR semester VIII

SUBJECT: Elective – II, Robotics

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Rationale: This course familiarizes students with the concepts and techniques in robot manipulator control, enough to evaluate, choose, and incorporate robots in engineering systems.

DETAILED SYLLABUS

Robotic Manipulation

Automation and Robots, Classification, Application, Specification, Notations

Direct Kinematics

Dot and Cross products, coordinate Frames, Rotations, Homogenous, Co-ordinates, Link coordination arm equation, (Five-axis robot, Four-axis robot, Six-axis robot)

Inverse Kinematics

General properties of solutions tool configuration five axis robots, three-four axis, six axis robot (Inverse Kinematics)

Workspace analysis and trajectory planning work envelop and examples, workspace fixtures, Pick and place operations, continuous path motion, Interpolated motion, Straight-line motion

Robot Vision

Image representation, Template matching, Polyhedral objects, Shape analysis, segmentation (Thresholding, region labeling, Shrink operators, Swell operators, Euler numbers, Perspective transformation, Structured Illumination, Camera Calibration)

Task Planning: Task Level programming, Uncertainty, Configuration, Space, Gross motion, Planning, Gasp planning, Fine-motion Planning, Simulation of planer motion, Source and goal scenes, Task planner simulation.

Moments of Inertia

Principles of NC and CNC machines

BOOKS

Text Books:

1. Robert Shilling, fundamentals of robotics-analysis and control, Prentice Hall of India
2. Fu, Gonzales and Lee, Robotics, McGraw Hill
3. J.J, Craig, Introduction to Robotics, Pearson Education

Additional Reading:

1. Staughard, Robotics and AI, Prentice Hall of India
2. Grover, Wiess, Nagel, Oderey, "Industrial Robotics", McGraw Hill
3. Walfram, Stdder, Robotics and Mechatronics
4. Niku, Introduction to Robotics, Pearson Education
5. Klaffer, Chmielewski, Negin, Robot Engineering, Prentice Hall of India
6. Mittal, Nagrath, Robotics and control, Tata McGraw Hill publications

TERM WORK

1. Term work should consist of at least 10 practicals and assignments covering the topics of the syllabus
2. A term work test must be conducted with a weight age of 10 marks

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING
FOURTH YEAR semester VIII

SUBJECT: Elective – II, VLSI Design

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Rationale: This subject lays a strong foundation for understanding VLSI circuits and their performance. Design of different CMOS integrated devices is covered in great detail along with testing.

DETAILED SYLLABUS

Circuit Characterization and Performance Estimation

Resistance and capacitance estimation, switching characteristics, CMOS gate transistor sizing, power dissipation, sizing routing conductors, charge sharing designing margining yield and reliability

System Specification Using Verilog HDL

Basic concepts, structural gate level modeling, switch level modeling, design hierarchies, behavioral and RTL modeling

Arithmetic Circuit in CMOS VLSI

Bit adder circuits, Ripple carry adders, Carry look ahead adders, high speed adders, multipliers

Design of Memories and Programmable Logic

The static RAM, SRAM, Dynamic RAM, ROM ARRAYS, Logic ARRAYS

System Level Physical Design

Large scale physical design, interconnected delay modeling, crosstalk, interconnected scaling, floor planning & routing, I/P & O/P circuit, power dissipation and consumption, low power design considerations

VLSI clocking and system design

Clocked Flipflop, CMOS clock styles, Pipelined systems, Clock generation and distribution, system design considerations

CMOS Testing

The need for testing, manufacturing test principles, design strategies for test, chip level test techniques, system level test techniques, Layout design for improved

Testability.

BOOKS

Text Books:

1. Neil H.E Weste Kamran E Shraghian, Principles of CMOS VLSI Design: A System perspective, Addison Wesley publication
2. John P Uyemura, Introduction to VLSI circuits and systems, John Wiley & sons
3. Samir Palnitkar, Verilog HDL, A guide to digital design and synthesis, Pearson Education

Additional Reading:

TERM WORK

1. Term work should consist of at least 10 practicals and two assignments covering the topics of the syllabus
2. A term work test must be conducted with a weight age of 10 marks

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING
FOURTH YEAR semester VIII

SUBJECT: Elective – II, Telecommunication Network Management

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Rationale: Telecommunication systems have grown extremely large in size and complexity. Elective management solutions have been in use to run these complex networks efficiently. This subject introduces principles and practice for effective management of telecommunication networks

DETAILED SYLLABUS

Foundations

Network management standards, network management model, organization model, information model, abstract syntax notation I (ASN.1), encoding structure, macros, functional model

Network management application functional requirements

Configuration management, fault management, performance management, Error correlation technology, security management, accounting management, service level management, management service, community definitions, capturing the requirements, simple and formal approaches, semi formal and formal notations.

Telecommunication management network (TMN) architecture

Terminology, functional architecture, Information architecture, physical architecture , TNN tube, TMN and OSI

Common Management information service element(CMISE)

CMISE model, service definitions, errors, scooping and filtering features, synchronization, functional units, association services, common management information protocol(CMIP) specification

Information Modeling for TMN

Rationale for Information Modeling, management information model, object oriented modeling paradigm, structure of management information, managed object class definition, management information base(MIB)

Simple Network Management Protocol (SNMP):

SNMPv1: managed networks, SNMP models, organization model, information model
SNMPv2: communication model, functional model, major changes in SNMPv2, structure of management information (SMI), MIB, SNMPv2 protocol, compatibility with SNMPv1, SNMPv3: architecture, applications, MIB security, remote monitoring(RMON) SM and MIB, RMON1 and RMON2.

Network management examples:

ATM integrated local management interface, ATM MIB M1, M2,M3,M4, Interfaces, ATM digital exchange interface management, digital subscriber loop (DSL) and Asymmetric DSL(ADSL) technologies, ADSL configuration management, performance management.

Network management tools:

Network statistics management, network management system, management platform case studies: OPENVIEW, ALMAP

BOOKS**Text Books:**

1. Mani Subramanian, Network management: Principles and Practice, Addison Wesley, Pearson Education Asia publication
2. Lakshmi Raman, Fundamentals of Telecommunication Network Management, IEEE communication society, Prentice Hall of India Edition, 1999
3. Airdarous Salah, Plevyak Thomas, Telecommunication Network Management: Technologies and Implementations, Prentice Hall of India
4. Haojin Wang, Henry Haojin Wang, Haijang Haojin Wang, Telecommunication Network management.

Additional Reading:**TERM WORK**

1. Term work should consist of at least 10 practicals and two assignments covering the topics of the syllabus
2. A term work test must be conducted with a weight age of 10 marks

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING
FOURTH YEAR semester VIII

SUBJECT: Project-B

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Rationale: Project allows the student to work independently to put the knowledge of electronics engineering theory into practice.

DETAILED SYLLABUS

In continuation of SEM VII work, the student group shall collect all necessary information and analyze it, build/fabricate a prototype or develop necessary software and/or hardware or work on a mathematical/empirical model. The group shall test the hardware/software or the mathematical model/empirical developed vigorously by known testing methods.

The student group shall prepare and submit a report on the project. The report shall be printed on A4 size paper and hard bound and prepared in academic style. Broadly the report shall have these parts: Introduction, literature review, data collection and analysis, experiments conducted, design, prototype development/software implemented/empirical model and conclusions.

Acquaintance with survey and research methods and their usage in conducting a systematic investigation and style of report preparation shall form basis of evaluation

TERM WORK

Term work shall consist of the above mentioned activities which shall be evaluated and shall carry a weightage of 25 marks

ORAL EXAMINATION

An oral examination shall be conducted based on the presentation by the group.