MARWARI COLLEGE, RANCHI

(AN AUTONOMOUS UNIT OF RANCHI UNIVERSITY FROM 2009)

COURSES OF STUDY FOR BACHELOR OF COMPUTER MAINTENANCE HONOURS

Under

Department of Physics

Number of Papers: 20

Full Marks: 1600

Number of Semesters: 6

B.C.M. Hons. Part - I: 400 Marks

B.C.M. Hons. Part - II: 400 Marks

B.C.M. Hons. Part - III: 800 Marks

Framework of BCM syllabus

BCM - I SEMESTER

THEORY

CODE TITLE UNIT

1BCM 1001 Analog Computers

1BCM 1002 Programming in C

PRACTICAL

1BCM 1003 Analog and C Programming Lab

BCM - II SEMESTER

THEORY

2BCM 2001 Digital Electronics

2BCM 2002 Computer Organization

PRACTICAL

2BCM 2003 Digital and Computer Organization and Computer Organization Lab

BCM - III SEMESTER

THEORY

3BCM 3001 Microprocessor and its interfacing Device I

3BCM 3002 C++ Programming

PRACTICAL

3BCM 3003 C++ Prog. and Microprocessor and Interfacing Device Lab

BCM - IV SEMESTER

THEORY

4BCM 4001 Microprocessor and Interfacing Device II

4BCM 4002 Database Management System

PRACTICAL

4BCM 4003 Microprocessor and DBMS Lab

BCM - V SEMESTER

THEORY

5BCM 5001 Networking technology I

5BCM 5002 Java Programming

5BCM 5003 Personal Computer Maintenance I

PRACTICAL

5BCM 5004 Java Programming and PC Maintenance I and Networking Lab

BCM - VI SEMESTER

THEORY

6BCM 6001 EDP

6BCM 6002 Networking Technology II

6BCM 6003 PC Maintenance II

PRACTICAL

6BCM 6004 Final Project

Semester	Code	Paper	Full Marks	Mid Sem	End Sem	Pass Marks
		SUMMARY OF BCM SYLLABUS				
First	1BCM 1001	Analog Computers	75	25	50	34
	1BCM 1002	Programming in C	75	25	50	34
	1BCM 1003	Analog and C Programming Lab	50(25**E**+25**I**)		50	23
Second	2BCM 2001	Digital Electronics	75	25	50	34
	2BCM 2002	Computer Organization	75	25	50	34
	2BCM 2003	Digital and Computer Organization Lab	50(25**E**+25**I**)		50	23
Third	3BCM 3001	Microprocessor and its interfacing Device I	75	25	50	34
	3BCM 3002	C++ Programming	75	25	50	34
	3BCM 3003	C++ Prog. and Microprocessor and Interfacing Device Lab	50(25**E**+25**I**)		50	23
Fourth	4BCM 4001	Microprocessor and Interfacing Device II	75	25	50	34
	4BCM 4002	Database Management System	75	25	50	34
	4BCM 4003	Microprocessor and DBMS Lab	50(25**E**+25**I**)		50	23
Fifth	5BCM 5001	Networking technology I	100	30	70	45
	5BCM 5002	Java Programming	100	30	70	45
	5BCM 5003	Personal Computer Maintenance I	100	30	70	45
	5BCM 5004	Java Programming and PC Maintenance I and Networking Lab	50(25**E**+25**I**) + 50Job Training	50(JT)	50	45
Sixth	6BCM 6001	EDP	100	30	70	45
	6BCM 6002	Networking Technology II	100	30	70	45
	6BCM 6003	PC Maintenance II	100	30	70	45
	6BCM 6004	Final Project	100		100	45

Note:

E:	External
I:	Internal
P:	Practical
JT:	Job Training

B.C.M. Part - I
SEMESTER - I
Paper - 1
1BCM 1001 Analog Computers (Classes - 50)
Full Marks: 25 (MSE) + **50 (ESE) = 75**   **Time: 3 hrs**   **Pass Marks: 34**
Instructions to Question-setter & Examinee

1.   This paper consist of **50 marks** and divided into three groups:
     Group 1 :   Multiple choice question, fill in the blanks and true false types (**15 x 1= 15**).
     Group 2 :   Concept based questions (5 out of 7 questions, each of 2 marks to be solved; words-limit 50 words) **(5 x 2 = 10)**.
     Group 3 :   Descriptive type questions (4 out of 6 questions, each of 5 marks to be solved; words-limit 250 words) **(5 x 5 = 25)**.

2.   The question must cover the entire syllabus with equal distribution of marks as far as practicable.

Analog Computers

Electronics Components
Working Principles, Symbols, types technical specifications, parameter value identification/measurement techniques and application, areas for resistors, capacitors, transformers, relays, switches, Cables, Connectors, batteries, PCB, Fuses, Etc
TEST AND MEASURING INSTRUEMENTS
Block diagram, working principles and user's guidelines for CRO millimeter, function generator.
NETWORK THEROEM
Kirchhoff's current and voltage laws, maximum power transfer theorem, super position theorem, Thevenin's and Norton's Theorems.
LCR AND WAVESHAPPING CIRCUITS
Series and parallel LCR resonance circuits, Low pass band pass filters, clipping and clamping circuits. Charging and discharging of capacitor in a RC circuit –concept of time constant.
ELECTRONICS COMPONENTS (Active Elements)
Working Principles, Symbols, Types Technical specifications, Parameter value identification and application areas for.
PH junction diodes-linear, varacter, Photodiode, LED, zener diode, opt- isolators, BJTS-characteristics, basic configurations, biasing, operating point, load line, biasing for stabilization of operating point, UJT, MOSFET, SCR, Diac, Triac
AMPLIFIERS
Different terms used with amplifiers, such as signal. Sources, input, output voltage and current gain, power gain, decibel. Input output impedance, classification according to frequency response. Biasing point.
OPERATION AMPLIFIERS
Basic idea of an OPAMP with black box concept. Inverting and non inverting inputs, virtual grpund.ORAMP Parameters, qualifiers descriptions of OPAMP Applications such as inverting, non-inverting, summing and difference amplifiers, comparator and integrator.

B.C.M. Part - I
SEMESTER - I
Paper - 2
1BCM 1002 Programming in C (Classes - 50)

Full Marks: 25 (MSE) + **50 (ESE) = 75**   **Time: 3 hrs**   **Pass Marks: 34**

Instructions to Question-setter & Examinee

1. This paper consist of **50 marks** and divided into three groups:

    Group 1 : Multiple choice question, fill in the blanks and true false types (**15 x 1= 15).**

    Group 2 : Concept based questions (5 out of 7 questions, each of 2 marks to be solved; words-limit 50 words) **(5 x 2 = 10).**

    Group 3 : Descriptive type questions (4 out of 6 questions, each of 5 marks to be solved; words-limit 250 words) **(5 x 5 = 25).**

2. The question must cover the entire syllabus with equal distribution of marks as far as practicable.

Programming in C

History and Importance of C, Sample programming, Basic Structure and execution of C programmers, Constants, Variables, and Data Types and various type of declarations, Different type operators and Expressions, Evaluation of Expressions, Operator Precedence and Associability.

Managing Input and Output operations, Decision Making and Branching Decision Making and Looping.

One – dimensional Arrays and their declaration and Initializations, Two-dimensional Arrays and their initializations, String Variables, String – handling functions, Table and other features of Strings.

Need and Elements for user –defined Functions, Definition of Functions, Return values and their types, Function calls and Declaration, Arguments and corresponding return values, Functions that return multiple values, Nesting of functions, Recursion. The Scope, Visibility and Life time of variables.

Defining Structure, Declaring Structure Variable and Accessing Structure Members,
Initialization of Structure, Comparing Structure Variables, Operation on Individual
Members, Arrays of Structures, Structures within structures, Structures and Functions, Unions, Size of Structures.

Understanding Pointers, Accessing the Address of a Variable, Declaration and Initialization of Pointer Variables, Accessing a Variable through its Pointer. Pointers and Arrays, Pointers and Character Strings, Arrays of Pointers, Pointers and Function Arguments,
File Management in C.

Text Book:
1. E. Balagurusamy – Programming in ANSI C, 3rd Edn. , TMH, New Delhi ; 2004

Reference:
1. Programming with C, B.S.Gottfried (TMH)
2. Y. Kanetkar – Let us C, 4th Edition, BPB Publication , New Delhi; 2002

B.C.M. Part - I
SEMESTER - I
Paper – 3 (Practical)
1BCM 1003 Analog and C Programming Lab.

Full Marks: 50   **Time: 3 hrs**   **Pass Marks: 23**

Analog and C Programming Lab.

B.C.M. Part - I
SEMESTER - II
Paper - 4
2BCM 2001 Digital Electronics (Classes - 50)

Full Marks: 25 (MSE) + **50 (ESE) = 75**   **Time: 3 hrs**   **Pass Marks: 34**

Instructions to Question-setter & Examinee

1. This paper consist of **50 marks** and divided into three groups:
   Group 1 : Multiple choice question, fill in the blanks and true false types (**15 x 1= 15**).
   Group 2 : Concept based questions (5 out of 7 questions, each of 2 marks to be solved; words-limit 50 words) (**5 x 2 = 10**).
   Group 3 : Descriptive type questions (4 out of 6 questions, each of 5 marks to be solved; words-limit 250 words) (**5 x 5 = 25**).

2. The question must cover the entire syllabus with equal distribution of marks as far as practicable.

Digital Electronics

Power supplies
Basic block diagram of power supply- transformer, Rectifier, filter, regulator, bridge, rectifier.
Regulated power supplies: Zener regulator. Series and shunt regulation, IC -723 based ERPs, CVCC, short circuits protections, Fold back
Switched mode power supply, operational principles and design
OCCILATORS and MULTIVIBRATORS
Resistive feedback, Brakhausen criteria, phase shift, wein bridge and crystal oscillator.
Multivibratos- Astable, Monotable and basetable multivibrators
Logic Gattes and families- AND, OR, NOT, NAND, XOR, EXOR, gates symbol and truth tables.
TTL, ECL, CMOS, Logic families, Parameters, Speed, Power consumption packaging density, fan in out, voltage levels, compatibility, noise margin level
Combinational Logic circuits
Encoders, decoders, demultiplexers, ICs, from TTL, ECL, & CD families
Flip-Flop- RS, JK, master slave, d, T flip flops, shift resistors , Parallel/Serial in/out shift registers, ring counters, synchronous and asynchronous counters, scaling circuits stack.
DATA CONVERTORS - ADC, and DAC with emphasis on commercial available/used ICs.

B.C.M. Part - I
SEMESTER -II
Paper - 5
2BCM 2002 Computer Organization (Classes - 50)
Full Marks: 25 (MSE) + **50 (ESE) = 75**   **Time: 3 hrs**   **Pass Marks: 34**
Instructions to Question-setter & Examinee

1.   This paper consist of **50 marks** and divided into three groups:
   Group 1 :   Multiple choice question, fill in the blanks and true false types (**15 x 1= 15).**
   Group 2 :   Concept based questions (5 out of 7 questions, each of 2 marks to be solved; words-limit 50 words) **(5 x 2 = 10).**
   Group 3 :   Descriptive type questions (4 out of 6 questions, each of 5 marks to be solved; words-limit 250 words) **(5 x 5 = 25).**

2.   The question must cover the entire syllabus with equal distribution of marks as far as practicable.

Computer Organization

 NUMBER SYSTEM
Introduction to decimal, binary, octal, hexadecimal number system, BCD Codes, Inter-conversion of binary, decimal and FCD number, excess 3, Gray and Johnson's codes, Concept of parity, ASCII code.
BOOLEAN ARITHMATIC AND THEOREM
Block diagram of a computer I/O devices, CPU, Memory
Personal Computer organization, Block Diagram level
Motherboard, supporting cards, keyboard, display, power supp disk and BIOS
RAM, ROM, Mass storage media, commonly used chips units of storage-bit/byte, Kb and Mb, memory management, segmentation/partitioning, parity checking
FLOPPY/ HARD DISKS
Operational principle and sector information, Medium density, High density, floppy disk, hard disk configuration, Disk formatting.
OPERATING SYSTEM
Introduction, Functions of OS, Time sharing, Multiprogramming, multitasking, multi user O.S
DOS
Diskette operating system- MS-DOS, User environment, soft bootstrapping, DOS commands
Peripherals: Printer, Plotter, mouse, tablet, light pen.
Introduction to UNIX and system administration.
LAN

B.C.M. Part - I
SEMESTER - II
Paper – 6 (Practical)
2BCM 2003 Digital and Computer Organization and Computer Organization Lab.

Full Marks: 50   **Time: 3 hrs**   **Pass Marks: 23**

B.C.M. Part - II
SEMESTER - III
Paper - 7
3BCM 3001 Microprocessor and its interfacing Device I (Classes - 50)
Full Marks: 25 (MSE) + **50 (ESE) = 75**   **Time: 3 hrs**   **Pass Marks: 34**
Instructions to Question-setter & Examinee

1.   This paper consist of **50 marks** and divided into three groups:

   Group 1 :   Multiple choice question, fill in the blanks and true false types (**15 x 1= 15).**

   Group 2 :   Concept based questions (5 out of 7 questions, each of 2 marks to be solved; words-limit 50 words) **(5 x 2 = 10).**

   Group 3 :   Descriptive type questions (4 out of 6 questions, each of 5 marks to be solved; words-limit 250 words) **(5 x 5 = 25).**

2.   The question must cover the entire syllabus with equal distribution of marks as far as practicable.

Microprocessor and its interfacing Device I

Introduction to Microprocessor

Microprocessor basic concepts, Microprocessor architecture, Instruction set, addressing modes, interrupts, memory mapping 8086, 8088,80186,80286,80386.

Architecture of 16 bit processor- Intel 8086/8088, instruction set descriptors.

8086/8088 System Connections: timing and trouble-shooting.

Interrupts structures of 8086- use of DOS interrupts of IBM PC

Digital Interfacing and Industrial Control – ADC and DAC specifications, interfacing and Applications.

Microcomputer- based Industrial Process-Control System and Instrument, site Preparation, wiring, Diagram and control

B.C.M. Part - II
SEMESTER - III
Paper - 8
3BCM 3002 C++ Programming (Classes - 50)

Full Marks: 25 (MSE) + **50 (ESE) = 75**   **Time: 3 hrs**   **Pass Marks: 34**
Instructions to Question-setter & Examinee

1. This paper consist of **50 marks** and divided into three groups:
    Group 1 : Multiple choice question, fill in the blanks and true false types (**15 x 1= 15).**
    Group 2 : Concept based questions (5 out of 7 questions, each of 2 marks to be solved; words-limit 50 words) **(5 x 2 = 10).**
    Group 3 : Descriptive type questions (4 out of 6 questions, each of 5 marks to be solved; words-limit 250 words) **(5 x 5 = 25).**

2. The question must cover the entire syllabus with equal distribution of marks as far as practicable.

C++ Programming

Concepts of OOPS and differences with procedural languages, characteristics of OOPS (Idea of objects, class, data abstraction & encapsulation, inheritance polymorphism, dynamic binding, 1/0 stream, Cin, Count, 1/0 manipulation).
Data types, operators, control structure & looping statements, functions, and arrays.
Objects & classes: classes & objects, constructor, destructor, overloading binary operators, data conversion.
Inheritance: Derived class and base class, protected access specifier, derived class constructors, class hierarchies, abstract base class, public and private inheritance, multiple inheritance, containership (classes within classes).
Pointers: Address and pointers, pointers and arrays, memory management, "New" & "Delete" pointer to objects, linked list, pointer to pointer .
Virtual functions: Virtual functions, friend functions, static functions,"This" pointer.
Files and streams: String, string 1/0, object 1/0,1/0 with multiple objects file pointer, error handling, and redirection.
Templates in C ++

Books Recommended:
I. C++ -Lafore
2. C++ -Balaguruswamy
3. C ++ -Kanetkar
4. OOPS Concept –booch

B.C.M. Part - II
SEMESTER - III
Paper – 9 (Practical)
3BCM 3003 C++ Prog. and Microprocessor and Interfacing Device Lab

Full Marks: 50   **Time: 3 hrs**   **Pass Marks: 23**

B.C.M. Part - II
SEMESTER - IV
Paper – 10
4BCM 4001 Microprocessor and Interfacing Device II (Classes - 50)
Full Marks: 25 (MSE) + **50 (ESE) = 75**   **Time: 3 hrs**   **Pass Marks: 34**
Instructions to Question-setter & Examinee

1. This paper consist of **50 marks** and divided into three groups:

    Group 1 : Multiple choice question, fill in the blanks and true false types (**15 x 1= 15).**

    Group 2 : Concept based questions (5 out of 7 questions, each of 2 marks to be solved; words-limit 50 words) **(5 x 2 = 10).**

    Group 3 : Descriptive type questions (4 out of 6 questions, each of 5 marks to be solved; words-limit 250 words) **(5 x 5 = 25).**

2. The question must cover the entire syllabus with equal distribution of marks as far as practicable.

Microprocessor and Interfacing Device II

Multiple Microprocessor System and Buses
8086/8088 maximum and minimum modes, DMA data transfer, interfacing and refreshing and refreshing dynamic RAM Match Coprocessor- 8087 and I/O processor- 8089. Multiple bus microcomputer system, UME bus, concepts, IEE 488 HPIB, PCI Bus, ESIA bus.
Data Communication
Asynchronous serial data communication (Intel 8521 chip study). Serial data transmission methods and standards: RS- 232, RS-422A, Asynchronous communication software on the INM PC 8240 Chip, Synchronous serial data communication and protocol using 8251 chip.
Microcomputer System Peripherals
CRT terminals, Graphic terminal, Choice of display cards, MGA, CGA, EGA and monitors (monochrome and colors, Floppy disk. Magnetic hard disk and disk storage, Printer mechanisms, Speech synthesis and recognition with a computer.

B.C.M. Part - II
SEMESTER - IV
Paper - 11
4BCM 4002 Database Management System (Classes - 50)

Full Marks: 25 (MSE) + **50 (ESE) = 75**   **Time: 3 hrs**   **Pass Marks: 34**
Instructions to Question-setter & Examinee

1.   This paper consist of **50 marks** and divided into three groups:
   Group 1 :   Multiple choice question, fill in the blanks and true false types (**15 x 1= 15).**
   Group 2 :   Concept based questions (5 out of 7 questions, each of 2 marks to be solved; words-limit 50 words) **(5 x 2 = 10).**
   Group 3 :   Descriptive type questions (4 out of 6 questions, each of 5 marks to be solved; words-limit 250 words) **(5 x 5 = 25).**

2.   The question must cover the entire syllabus with equal distribution of marks as far as practicable.

Database Management System

DATABASE SYSTEM CONCEPTS & ARCHITECTURE:
Definition, Architecture of DBMS, Schemas, Instances, Database Languages, Data Models.

DATA MODELING:
Data Models, ER Diagrams, Subclasses, Superclasses and Inheritance, Specialization & Generalization, Conceptual Object Modeling using UML Class Diagrams, Knowledge Representation Concepts, Exercises.

RELATIONAL DATA MODEL:
Relational Constraints, Domain Constraints, Key Constraints Referential Integrity Constraints, Relational Algebra, Fundamental Operations of Relational Algebra & their Implementation, Interdependence of Operations, Example Queries.

ER AND EER TO RELATIONAL MAPPING:
Mapping EER Model Concepts to Relation, Tuple Relational Calculus, Domain Relational Calculus Queries.

DATABASE DESIGN:
Functional Dependencies, Irreducible Sets of Dependencies, Lossless Decomposition, 1st, 2nd & 3rd NF, Boyce Codd NF, Multivalued Dependency & 4th NF, Join Dependency & 5 NF, Domain Key normal Form, Denormalization.

TRANSACTION –
Schedules, Serializability, Precedence Graph, Concurrency Control Techniques, Implementation of Transaction in Programs, Cursors and Transaction, Recovery, Checkpoints.

DATABASE SECURITY & AUTHORIZATION:
Specifying Privileges, Revoking Privileges, propagation of Privileges, Statistical Database Security.

TEXT BOOKS:
   1. Fundamental of Database Systems – Elmasri Navathe-Pearson Education Asia
   2. Database – Principles, Programming and Performance – Parick O' Neil Elizabeth O' Niel, Harcort Asia PTE Limited.

REFERENCES BOOKS:
   1. An Introduction to Database Systems – C.J. Date, Addison Wesley, Pearson Education Press
   2. Database System Concepts- Abraham Silberschat, Henry F. Korth, S. Sudarshan, Tata McGraw Hill.

Books Recommended:
1. DBMS -Korth
2. DBMS -C.J. Date
3. Oracle –E. Byross
4. DBMS -Mazumdar

B.C.M. Part - II
SEMESTER - IV
Paper – 12 (Practical)
4BCM 4003 Microprocessor and DBMS Lab

Full Marks: 50   **Time: 3 hrs**   **Pass Marks: 23**

B.C.M. Part - III
SEMESTER - V
Paper - 13
5BCM 5001 Networking technology I (Classes - 50)

Full Marks: 30 (MSE) + **70 (ESE) = 100**   **Time: 3 hrs   Pass Marks: 45**
Instructions to Question-setter & Examinee

1.   This paper consist of **70 marks** and divided into four groups:

Group 1 :   Multiple choice question, fill in the blanks and true false types (**15 x 1= 15**).

   Group 2 : Concept based questions (5 out of 7 questions, each of 5 marks to be solved; words-limit 50 words) (**5 x 5 = 25**).

   Group 3 : Descriptive type questions (3 out of 5 questions, each of 10 marks to be solved; words-limit 250 words) (**3x10 = 30**).

2.   The question must cover the entire syllabus with equal distribution of marks as far as practicable.

Networking technology I

Media and Topologies

1.1 Recognize the following logical or physical network topologies given a diagram, schematic or description:
• Star
• Bus
• Mesh
• Ring

1.2 Specify the main features of 802.2 (Logical Link Control), 802.3 (Ethernet), 802.5 (token ring), 802.11
(wireless), and FDDI (Fiber Distributed Data Interface) networking technologies, including:
• Speed
• Access method (CSMA / CA (Carrier Sense Multiple Access/Collision Avoidance) and CSMA / CD
(Carrier Sense Multiple Access / Collision Detection))
• Topology
• Media

1.3 Specify the characteristics (For example: speed, length, topology, and cable type) of the following cable standards:
• 10BASE-T and 10BASE-FL
• 100BASE-TX and 100BASE-FX
• 1000BASE-T, 1000BASE-CX, 1000BASE-SX and 1000BASE-LX
• 10 GBASE-SR, 10 GBASE-LR and 10 GBASE-ER

1.4 Recognize the following media connectors and describe their uses:
• RJ-11 (Registered Jack)
• RJ-45 (Registered Jack)
• F-Type
• ST (Straight Tip)
• SC (Subscriber Connector or Standard Connector)
• IEEE 1394 (FireWire)
• Fiber LC (Local Connector)
• MT-RJ (Mechanical Transfer Registered Jack)
• USB (Universal Serial Bus)

1.5 Recognize the following media types and describe their uses:
• Category 3, 5, 5e, and 6

• UTP (Unshielded Twisted Pair)

• STP (Shielded Twisted Pair)

• Coaxial cable

• SMF (Single Mode Fiber) optic cable

• MMF (Multimode Fiber) optic cable

1.6 Identify the purposes, features and functions of the following network components:

• Hubs

• Switches

• Bridges

• Routers

• Gateways

• CSU / DSU (Channel Service Unit / Data Service Unit)

• NICs (Network Interface Card)

• ISDN (Integrated Services Digital Network) adapters

• WAPs (Wireless Access Point)

• Modems

• Transceivers (media converters)

• Firewalls

1.7 Specify the general characteristics (For example: carrier speed, frequency, transmission type and topology) of the following wireless technologies:

• 802.11 (Frequency hopping spread spectrum)

• 802.11x (Direct sequence spread spectrum)

• Infrared

• Bluetooth

1.8 Identify factors which affect the range and speed of wireless service (For example: interference, antenna type and environmental factors).

Protocols and Standards

2.1 Identify a MAC (Media Access Control) address and its parts.

2.2 Identify the seven layers of the OSI (Open Systems Interconnect) model and their functions.

2.3 Identify the OSI (Open Systems Interconnect) layers at which the following network components operate:

• Hubs

• Switches

• Bridges

• Routers

• NICs (Network Interface Card)

• WAPs (Wireless Access Point)

2.4 Differentiate between the following network protocols in terms of routing, addressing schemes, interoperability and naming conventions:

• IPX / SPX (Internetwork Packet Exchange / Sequence Packet Exchange)

• NetBEUI (Network Basic Input / Output System Extended User Interface)

• AppleTalk / AppleTalk over IP (Internet Protocol)

• TCP / IP (Transmission Control Protocol / Internet Protocol)

2.5 Identify the components and structure of IP (Internet Protocol) addresses (IPv4, IPv6) and the required setting for connections across the Internet.

2.6 Identify classful IP (Internet Protocol) ranges and their subnet masks (For example: Class A, B and C).

2.7 Identify the purpose of subnetting.

2.8 Identify the differences between private and public network addressing schemes.

2.9 Identify and differentiate between the following IP (Internet Protocol) addressing methods:

• Static

• Dynamic

• Self-assigned (APIPA (Automatic Private Internet Protocol Addressing))

2.10 Define the purpose, function and use of the following protocols used in the TCP / IP (Transmission Control

Protocol / Internet Protocol) suite:

• TCP (Transmission Control Protocol)
• UDP (User Datagram Protocol)
• FTP (File Transfer Protocol)
• SFTP (Secure File Transfer Protocol)
• TFTP (Trivial File Transfer Protocol)
• SMTP (Simple Mail Transfer Protocol)
• HTTP (Hypertext Transfer Protocol)
• HTTPS (Hypertext Transfer Protocol Secure)
• POP3 / IMAP4 (Post Office Protocol version 3 / Internet Message Access Protocol version 4)
• Telnet
• SSH (Secure Shell)
• ICMP (Internet Control Message Protocol)
• ARP / RARP (Address Resolution Protocol / Reverse Address Resolution Protocol)
• NTP (Network Time Protocol)
• NNTP (Network News Transport Protocol)
• SCP (Secure Copy Protocol)
• LDAP (Lightweight Directory Access Protocol)
• IGMP (Internet Group Multicast Protocol)
• LPR (Line Printer Remote)

2.11 Define the function of TCP / UDP (Transmission Control Protocol / User Datagram Protocol) ports.

2.12 Identify the well-known ports associated with the following commonly used services and protocols:

• 20 FTP (File Transfer Protocol)
• 21 FTP (File Transfer Protocol)
• 22 SSH (Secure Shell)
• 23 Telnet
• 25 SMTP (Simple Mail Transfer Protocol)
• 53 DNS (Domain Name Service)
• 69 TFTP (Trivial File Transfer Protocol)
• 80 HTTP (Hypertext Transfer Protocol)
• 110 POP3 (Post Office Protocol version 3)
• 119 NNTP (Network News Transport Protocol)
• 123 NTP (Network Time Protocol)
• 143 IMAP4 (Internet Message Access Protocol version 4)
• 443 HTTPS (Hypertext Transfer Protocol Secure)

2.13 Identify the purpose of network services and protocols (For example: DNS (Domain Name Service), NAT

(Network Address Translation), ICS (Internet Connection Sharing), WINS (Windows Internet Name Service),

SNMP (Simple Network Management Protocol), NFS (Network File System), Zeroconf (Zero configuration),

SMB (Server Message Block), AFP (Apple File Protocol), LPD (Line Printer Daemon and Samba).

2.14 Identify the basic characteristics (For example: speed, capacity and media) of the following WAN (Wide Area

Networks) technologies:

• Packet switching
• Circuit switching
• ISDN (Integrated Services Digital Network)

• FDDI (Fiber Distributed Data Interface)

• T1 (T Carrier level 1) / E1 / J1

• T3 (T Carrier level 3) / E3 / J3

• OCx (Optical Carrier)

• X.25

2.15 Identify the basic characteristics of the following internet access technologies:

• xDSL (Digital Subscriber Line)

• Broadband Cable (Cable modem)

• POTS / PSTN (Plain Old Telephone Service / Public Switched Telephone Network)

• Satellite

• Wireless

2.16 Define the function of the following remote access protocols and services:

• RAS (Remote Access Service)

• PPP (Point-to-Point Protocol)

• SLIP (Serial Line Internet Protocol)

• PPPoE (Point-to-Point Protocol over Ethernet)

• PPTP (Point-to-Point Tunneling Protocol)

• VPN (Virtual Private Network)

• RDP (Remote Desktop Protocol)

2.17 Identify the following security protocols and describe their purpose and function:

• IPSec (Internet Protocol Security)

• L2TP (Layer 2 Tunneling Protocol)

• SSL (Secure Sockets Layer)

WEP (Wired Equivalent Privacy)

• WPA (Wi-Fi Protected Access)

• 802.1x

2.18 Identify authentication protocols (For example: CHAP (Challenge Handshake Authentication Protocol),

MS-CHAP (Microsoft Challenge Handshake Authentication Protocol), PAP (Password Authentication

Protocol), RADIUS (Remote Authentication Dial-In User

B.C.M. Part - III
SEMESTER - V
Paper - 14
5BCM 5002 Java Programming (Classes - 50)
Full Marks: 30 (MSE) + **70 (ESE)** = 100   **Time: 3 hrs   Pass Marks: 45**
Instructions to Question-setter & Examinee

1.   This paper consist of **70 marks** and divided into four groups:
   Group 1 : Multiple choice question, fill in the blanks and true false types **(15 x 1= 15).**
   Group 2 : Concept based questions (5 out of 7 questions, each of 5 marks to be solved; words-limit 50 words) **(5 x 5 = 25).**
   Group 3 : Descriptive type questions (3 out of 5 questions, each of 10 marks to be solved; words-limit 250 words) **(3x10 = 30).**

2.   The question must cover the entire syllabus with equal distribution of marks as far as practicable.

Java Programming

Java Evolution and Overview of Java Language: How Java differs from C and C++, Java and Internet, Java and World Wide Web, Introduction, Simple Java Program, More of Java, An Application with Two Classes, Java Program Structure, Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style.

Constants, Variables, and Data Types: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Values of Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values.

Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evolution of Expressions, Precedence of Arithmetic Operators, Type Conversion in Expressions, Operator Precedence and Associatively, Mathematical Functions.

Decision Making and Branching: Introduction, Decision Making with if Statement, Simple if Statement, The if... else Statement, Nesting of if ... else Statements, The else if Ladder, The switch Statement, The ?: Operator.

Decision Making and Looping: Introduction, The while Statement, The do Statement, the for Statement, Jumps in Loops, Labeled Loops.

Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a. Class, Overriding Methods, final Variables and Methods, Final Classes, Finalize Methods, Abstract Methods and Classes, Visibility Control.

Arrays, String and Vectors: Arrays, One-Dimensional Arrays, Creating an Array, Two-Dimensional Arrays, Strings, Vectors, Wrapper Classes.

Interfaces: Multiple Inheritances: Introduction, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables.

Packages: Putting Classes Together: Introduction, Java API Packages, Using system Packages, Naming Conventions, Creating Packages, Accessing a Packages, Using a Package, Adding a Class to a Package, Hiding Classes.

Multithreaded Programming: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority and Synchronization.

Managing Errors and Exceptions: Introduction, Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging.

Applet Programming: Introduction, How Applets Differ from Application, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, More About Applet Tag, Passing Parameters to Applets.

Managing Input/Output Files in Java: Introduction, Concepts of Streams Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams, Other Useful I/O Classes, using the File Class, Input/Output Exceptions, Creation of Files.

Text Book:

1. E. Balagurusamy, Programming with Java, A Primer Second Edition, Tata McGraw Hill, New Delhi.

Reference Books:

1. H.M.Deitel & P.J.Deitel- JAVA- How to Program, 5th Edn, Pearson Education,New Delhi-2004.
2. P.Naughton and H. Schildt-JAVA: The Complete Reference, TMH, New Delhi 2005.
3. D.Jana- Java and Object Oriented Programming Paradigm, PHI, New Delhi-2005

B.C.M. Part - III
SEMESTER - V
Paper - 15
5BCM 5003 Personal Computer Maintenance I (Classes - 50)
Full Marks: 30 (MSE) + 70 (ESE) = 100   Time: 3 hrs   Pass Marks: 45
Instructions to Question-setter & Examinee

1.   This paper consist of **70 marks** andp divided into four groups:

   Group 1 : Multiple choice question, fill in the blanks and true false types **(15 x 1= 15).**

   Group 2 :   Concept based questions (5 out of 7 questions, each of 5 marks to be solved; words-limit 50 words) **(5 x 5 = 25).**

   Group 3 : Descriptive type questions (3 out of 5 questions, each of 10 marks to be solved; words-limit 250 words) **(3x10 = 30).**

2.   The question must cover the entire syllabus with equal distribution of marks as far as practicable.

Personal Computer Maintenance I

The IBM PC- The structure of the PC system, inside the system unit, Video and sound, mass storage, system Configuration
IBM PC OPERATIONS
The basic parts of the IBM PC, Chip location scheme, Central processing unit, Memory design, the IBM PC, bus structure input and output, The power supply, how the system worked, Software structures
Basic Troubleshooting- Introduction to trouble- shooting components recognition, component files, how disk drives fail, how display fail, repair – generated failures and make repairs, safety precautions during troubles-shooting and repair.
Specific Troubleshooting and Repair for the IBM PC
Troubleshooting index, Start up problems, run problems, display problems, monochrome monitors and adapter card, colors/graphic monitors and adapter card. Keyboard problems, others problems

B.C.M. Part - III
SEMESTER - V
Paper – 16 (Practical)
5BCM 5004 Java Programming and PC Maintenance I
and Networking Lab.

Full Marks: 50   **Time: 3 hrs**   **Pass Marks: 23**

B.C.M. Part - III
SEMESTER - VI
Paper - 17
6BCM 6001 EDP (Classes - 50)
Full Marks: 30 (MSE) + **70 (ESE) = 100**   **Time: 3 hrs   Pass Marks: 45**
Instructions to Question-setter & Examinee

1.   This paper consist of **70 marks** and divided into four groups:
   Group 1 : Multiple choice question, fill in the blanks and true false types (**15 x 1= 15**).
   Group 2 : Concept based questions (5 out of 7 questions, each of 5 marks to be solved; words-limit 50 words) **(5 x 5 = 25).**
   Group 3 : Descriptive type questions (3 out of 5 questions, each of 10 marks to be solved; words-limit 250 words) (**3x10 = 30).**

2.   The question must cover the entire syllabus with equal distribution of marks as far as practicable.

EDP

Need, scope and characteristics of Entrepreneurship, special schemes for Technical Entrepreneurs, STED.
Identification of opportunity.
Exposure to demand based, resource based, service based, import substitute and export promotion Industries.
Market survey Techniques.
Need scope and approaches for project formulation.
Criteria for Principles of Product selection and development.
Structure of project report.
Choice of technology, plant and equipment.
Institutions, financing procedure and financial incentives.
Financial ratio and their significance.
Books of accounts, financial statements and funds flow analysis.
Energy requirement and Utilization.
Resource Management Men, Machine and Materials.
Critical Path Method [CPM] and Project Evaluation Review Techniques [PERT] as planning tools for establishing SSI.
A] Creativity and innovation.
b] Strength Weakness Opportunity and Threat [SWOT] Techniques.
Techno – economic feasibility of the project.
Plant layout and Process Planning for the product.
Quality control/quality assurance and testing of product.
Elements of Marketing and Sales management.
A] Nature of product and market strategy
b] Packaging and advertising.
c] After Sales service.
Costing and Pricing.
Management of self and understanding human behavior.
Sickness in small scale industries and their remedial measures.
Copying with uncertainties, stress management and positive reinforcement.
A] Licensing , registration.
b] Municipal bye laws and insurance coverage.
Important provisions of factory Act , Sales of Goods Act , Partnership Act.
a] Dilution control
b] Social responsibility and business ethics.
Income Tax , Sales Tax and Excise Rules.

Conduct of mini market survey (One day exercise) : Data collection through questionnaire and personal visits.
Entrepreneurial Motivation Training: Through games, role playing discussions and exercises.
(a) Working capital and fixed capital: Practice assessment and management
(b) Exercise on working capital: Practice fixed capital calculation
(a) Analysis of sample project report: Discussion
(b) Break even analysis: Practice
Communication written and oral: Practice

B.C.M. Part - III
SEMESTER - VI
Paper - 18
6BCM 6002 Networking Technology II (Classes - 50)
Full Marks: 30 (MSE) + **70 (ESE) = 100**   **Time: 3 hrs   Pass Marks: 45**
Instructions to Question-setter & Examinee

1.   This paper consist of **70 marks** and divided into four groups:
   Group 1 : Multiple choice question, fill in the blanks and true false types (**15 x 1= 15**).
   Group 2 : Concept based questions (5 out of 7 questions, each of 5 marks to be solved; words-limit 50 words) **(5 x 5 = 25)**.
   Group 3 : Descriptive type questions (3 out of 5 questions, each of 10 marks to be solved; words-limit 250 words) (**3x10 = 30**).

2.   The question must cover the entire syllabus with equal distribution of marks as far as practicable.

Networking Technology II

Network Implementation
1 Identify the basic capabilities (For example: client support, interoperability, authentication, file and print
services, application support and security) of the following server operating systems to access network
resources:
• UNIX / Linux / Mac OS X Server
• Netware
• Windows
• Appleshare IP (Internet Protocol)
2 Identify the basic capabilities needed for client workstations to connect to and use network resources (For
example: media, network protocols and peer and server services).
3 Identify the appropriate tool for a given wiring task (For example: wire crimper, media tester / certifier, punch
down tool or tone generator).
4 Given a remote connectivity scenario comprised of a protocol, an authentication scheme, and physical
connectivity, configure the connection. Includes connection to the following servers:
• UNIX / Linux / MAC OS X Server
• Netware
• Windows
• Appleshare IP (Internet Protocol)
5 Identify the purpose, benefits and characteristics of using a firewall.
6 Identify the purpose, benefits and characteristics of using a proxy service.
7 Given a connectivity scenario, determine the impact on network functionality of a particular security
implementation (For example: port blocking / filtering, authentication and encryption).
8 Identify the main characteristics of VLANs (Virtual Local Area Networks).
9 Identify the main characteristics and purpose of extranets and intranets.
10 Identify the purpose, benefits and characteristics of using antivirus software.
11 Identify the purpose and characteristics of fault tolerance:
• Power
• Link redundancy
• Storage

• Services

12 Identify the purpose and characteristics of disaster recovery:

• Backup / restore

• Offsite storage

• Hot and cold spares

• Hot, warm and cold sites

Network Support

1 Given a troubleshooting scenario, select the appropriate network utility from the following:

• Tracert / traceroute

• ping

• arp

• netstat

• nbtstat

• ipconfig / ifconfig

• winipcfg

• nslookup / dig

2 Given output from a network diagnostic utility (For example: those utilities listed in objective 4.1), identify the
utility and interpret the output.

3 Given a network scenario, interpret visual indicators (For example: link LEDs (Light Emitting Diode) and
collision LEDs (Light Emitting Diode)) to determine the nature of a stated problem.

4 Given a troubleshooting scenario involving a client accessing remote network services, identify the cause of the
problem (For example: file services, print services, authentication failure, protocol configuration, physical
connectivity and SOHO (Small Office / Home Office) router).

5 Given a troubleshooting scenario between a client and the following server environments, identify the cause of
a stated problem:

• UNIX / Linux / Mac OS X Server

• Netware

• Windows

• Appleshare IP (Internet Protocol)

6 Given a scenario, determine the impact of modifying, adding or removing network services (For example:
DHCP (Dynamic Host Configuration Protocol), DNS (Domain Name Service) and WINS (Windows Internet
Name Service)) for network resources and users.

7 Given a troubleshooting scenario involving a network with a particular physical topology (For example: bus,
star, mesh or ring) and including a network diagram, identify the network area affected and the cause of the
stated failure.

8 Given a network troubleshooting scenario involving an infrastructure (For example: wired or wireless)
problem, identify the cause of a stated problem (For example: bad media, interference, network hardware or
environment).

9 Given a network problem scenario, select an appropriate course of action based on a logical troubleshooting
strategy. This strategy can include the following steps:

1. Identify the symptoms and potential causes

2. Identify the affected area
3. Establish what has changed
4. Select the most probable cause
5. Implement an action plan and solution including potential effects
6. Test the result
7. Identify the results and effects of the solution
8. Document the solution and process

B.C.M. Part - III
SEMESTER - VI
Paper - 19
6BCM 6003 PC Maintenance II (Classes - 50)
Full Marks: 30 (MSE) + **70 (ESE) = 100**   **Time: 3 hrs   Pass Marks: 45**
Instructions to Question-setter & Examinee

1.   This paper consist of **70 marks** and divided into four groups:
   Group 1 : Multiple choice question, fill in the blanks and true false types (**15 x 1= 15**).
   Group 2 : Concept based questions (5 out of 7 questions, each of 5 marks to be solved; words-limit 50 words) (**5 x 5 = 25**).
   Group 3 : Descriptive type questions (3 out of 5 questions, each of 10 marks to be solved; words-limit 250 words) (**3x10 = 30**).

2.   The question must cover the entire syllabus with equal distribution of marks as far as practicable.

PC Maintenance II

Routing Preventive Maintenance
Contribution to system failure, heat, cold, dust and other particles, noise interface, power-line problems, corrosion. Magnetism Disk maintenance , disk drive maintenance, using heat5 to spot potential troubles, display screens and health problems, Disc errors, Soft and hard error, Floppy head cleaning, Printer Maintenance and Maintenance of cables
Advance Troubles- Shooting Techniques
Tools of the trade, component and how they fail, using tools to find failed components, other troubleshooting techniques, soldering and unsoldering. Circuit board repair recommended troubleshooting and repair equipment, spare parts.
Software
Failure analysis and maintenance tools, PC tools Norton's Utilities, Viruses and Antivirus Vaccines.

B.C.M. Part - III
SEMESTER - VI
Paper – 20 (Practical)
6BCM 6004 Final Project

Full Marks: 100   **Pass Marks: 45**

Subsidiary Papers:

First Year:

Physics - I

1. Mathematical Physics

Scalar and Vector Fields, differentiation of a vector, idea of line, surface and volume integrals, Gradient, Divergence and Curl and their expression in rectangular Cartesian co-ordinate systems, Gauss, Stokes and Greens Theorems.

2. Elasticity

Elastic Constants and their inter relations, calculation of Torque on a Cylinder, Torsional oscillations.

3. Surface Tension

Excess pressure on curved surface of a liquid from the principles of virtual work. Ripples and gravity waves. Surface and tension and evaporation. Determination of Surface Tension by Quincle's method.

4. Viscosity Viscosity of liquids by Poisseulles method. Rotary viscometer.

5. Theory of Vibration

Analytical Treatment of free damped, forced and resonant vibrations.

6. Intensity and Loudness of Sound

Bel, Phon, measurement of Intensity by Rayleigh disc method. Reverberation time. Deduction of Sabine's Law. Determination of absorption coefficient.

6. Thermal Physics

Measurements: Measurement of thermal conductivity of solids, Forbe ans Lee's method

Laws of Thermodynamics: Carnot's Engine, Carnot's theorem. The second Law of Thermodynamics, Absolute scale of temperature, Ebtropy, Entropy Changes in reversible and irreversible processes.

Kinetic Theory of Gases: Derivation of Maxwell's velocity ditribution law and its verification by Stem's method. Mean Free Pathand priciple of equipartition of energy.

Real Gases: Deviation from ideal gas equation, Van-der-walls equation of state and its derivation. Critical constants, Joule-Thomson effect, Liquefaction of gases.

Radiation Physics: Black Body Radiation, Kirchoff's Law- Stefan and Stefan-Boltzmann Law, Their deduction and verification, Qualitative Explanation of black body radiation by Wein's Law, Rayleigh-Jean's Law and Plank's Law. Solar Constant.

7. Optics:

Coherence: Temporal and spatial coherence, Interference in thin films, Newton's rings, Michelson's interferometer.

Diffraction: Fresnel and Fraunhoffer diffraction, half period zones, Zone plate, Palne Diffraction grating.

Polarization of Light: Double Refraction, Nicol's prism,contruction of wave front in uniaxial crystals. Quarter wave plate, production and detection of plane, circularly and elliptically polarized light. Rotary polarization and polarimeters.

Velocity of light: Group and phase velocity. Kerr cell method for determining the velocity of light.

8. Electrostatics:

Electric Polarization and displacement vectors, D=e0 ; E+P relation, Energy density. Dielectric constants and measurements by Hopkinton's null method Quadrant and attracted disc lectrometer.

Text Books

1. Rajput, V.S "Mathematical Physics"

2. Mathur, D.S " General Physics"

3. Khanna and Bedi, "Text book of Sound"

4. Ghatak, A., "Optics"

5. Vasudeva, D.N. "Fundamentals of Magnetism and electricity"

Mathematics-I

Differential Calculus: Successive differentiation, Leibritiz Theorem, Taylor's theorem with Lagrange's forms of remainders, Expansion of a function of one variable in Taylor's and Meclanrin's infinite series. Maxima and Minima of one variable, partial Derivatives, Euler's theorem, change of variables, total differentiation, Errors and approximation. Taylor's series in two variables. Maxima and Minima of two or more variables.

Integral Calculus: Definite integral and its application for area, length and volume.

Multiple integrals. Change of order of integration. Transformation of integral from Cartesian to polar. Applications in areas, volume and surfaces.

Differential Equation: First degree and first order Differential equation: Higher order differential equation with constant coefficients. Linear partial differential equation of first order P.D.E. of higher with constant coefficients.

2-D Coordinate Geometry: Transformation of axis, Standard and general equations of Conic Sections, Equation of Tangents and Normals, Chord of Contact of Tangents, Pole, Polar, Pair of Tangents, Director Circle.

Real Analysis: Sequences and its limits, Supremum and Infimum, Convergent, Divergent and Oscillatory Sequences, Convergence and Divergence of Series, auxiliary series, Comparison test and D'Alembert's ratio Test, Raabe's Test, De-Morgan's and Bertrand's Test, Logarithmic and Higher, Logarithmic Test.

Books:

1. Das BC and Mukherjee, Differential Calculus, Calcutta, U.N. Dhar Publishers.

2. Das BC and Mukherjee, Integral Calculus, Calcutta, U.N. Dhar Publishers.

3. Grewal B.S., Higher Engineering Mathematics, Delhi Khanna Publishers.Second Year:

Mathematics-II

SET THEORY: De-Morgans Laws, associatively and distributive laws regarding indexed family of sets, Relations and Partitions, Countable and Un Countable sets, POSets and Lattices

ABSTRACT ALGEBRA:

Group, Subgroups, Permutations, Order of a group,Co-Sets, Cyclic groups

MATRIX ALGEBRA:

Elementary Transformation, Inverse of a Matrix by Row Operation, Rank, Solution of a System of Linear Simultaneous Equation by Matrix Methods, Eigen Values and Eigen Vectors. Caley Hamilton Theorem

ANALYTICAL GEOMETRY OF 3-DIMENSIONS:

Rectangular, Spherical, Wpolar and Cylindrical Coordinates, Direction Cosines, Planes, Straight Lines, Shortest Distance Between Two Skew Lines, Sphere.

TEXT BOOKS:

1. "Modern Algebra" By A.R.Vasishtha. Krishna Prakashan Media (P) Ltd

Meerut.

2. "Matrices" By A.R.Vasishtha. Krishna Prakashan Media (P) Ltd Meerut.

3. "Analytical Geometry of The Dimensions" By Dasguta Prasad, Bharti

Bhawan

4. "Advanced Course in Modern Algebra" By Prof Dr.K.K.Jha, New Bharat

Prakashan Delhi- 6.

5. "Krishna Series" Analytical Geometry of three Dimension" By A.R.Vasishtha.

Krishna Prakashan Media (P) Ltd Meerut.

Physics - II

1. Magnetism

Gauss law, Ampere's circuital Law, Magnetic induction B=m.(H+M) relation(by Rowland Method), energy density of magnetic field(by solenoid method). Hysteresis and hysteresis loss and measurements by magnetometer and Ballistic galvanometer methods, Dia-, para and ferro magnetic substance magnetic circuits. Susceptibility and permeability and their measurements for Dia-, para- and ferro magnetics.

2. Current Electricity

Field due to solenoid, Theory of moving coil ballistic galvanometer and its usage.

Transients: Growth and decay of currents in L-R, R-C and L-R-C circuits, Simple applications of these circuits, Measurement of L by Rayleigh's method.

Alternating Current Circuit: Power and power factor of a circuits. Wattmeter, vector diagram method and j-operator method of AC circuits.

Analytical treatment of series and parallel circuits including sharpness of resonance. Transformer and its principles by vector diagram method.

Polyphase current. Rotating magnetic field. Induction motor.

3. Classical Mechanics: Generalized co-ordinates and momenta, Lagrange's and Hamilton's equation from D'Alembert's principle, Application to simple pendulum, Compound pendulum and projectiles. Motion in a central field. Kepler's law- their deductions from law of gravitation and vice-versa.

4. Special Theory of Relativity: Michelson-Morley experiments, Postulates of special theory of relativity, Lorentz transformation, Simultaneity and order of events, Lorentz contraction and time dilation, Addition of velocities, Velocity dependence of mass, equivalence of mass and energy.

5. Atomic Physics: Bohr's theory of hydrogen Atom, Discrete levels in atoms, critical potentials, Moseley's Law, Compton effects, Bragg's Law.

6. Quantum Physics: Wave-particle duality, De Broglie's relation and experimental

Verification of matter waves, uncertainty principle.

7. Nuclear Physics: Basic properties and structure of Nuclei, elementary ideas about nuclear forces, nuclear disintegration, Cosmic rays and elementary particles, Geiger-Muller counter.

8. Solid State Physics and Electronics: pn junction, Zener diode. Tunnel diode, Photo-diode, Diode as rectifier, Half wave and full wave rectifier circuits, Calculation of ripple factor. Transistor and its characteristics and constants, Phototransistor, Transistor as an amplifier.

Qualitative idea about amplitude modulation and detection. Simple transmitter and receiver through block diagram, Propagation of radio waves through ionosphere. Electron Microscope, Cathode rays oscilloscope. Elementary idea about TV.

9. Digital Circuits: Basic logic gates, Boolean algebra and its application to simple logic circuits (Half adder) , Realization of basic logic gates from NAND gates.

TEXT BOOKS:

1. Vasudeva D.N, "Fundamentals of Magnetism and Electricity"
2. Gupta and Kumar " Classical Mechanics"
3. Miah W. " ElectroMagnetics"
4. Rajam, J.B. " Modern Physics"
5. Rajam, J.B. " Atomic Physics"