

V.S.B. College of Engineering Technical Campus, Coimbatore
Department of Electronics and Communication Engineering

SUBJECT NAME: MG6851 PRINCIPLE OF MANAGEMENT

2 MARKS & 16 MARK QUESTIONS WITH ASSIGNMENT QUESTIONS

UNIT I OVERVIEW OF MANAGEMENT

1. Define any one definition of Management.
2. What is Efficiency and Effectiveness?
3. Define Administration
4. Name the 3 factors that the organization compass depends on.
5. Who is referred as the father of scientific management? What are the principles of scientific Management?
6. What do you understand by Management science theory?
7. List out the managerial roles described by Henry Mintzberg.
8. Define Gang Plank
9. What are the Key functions of management?
10. What are the Levels of management?
11. How many types of Business organizations are there and list them out.
12. Name the types of Partners.
13. Define Liquidation and Amalgamation
14. What are the two important trading certification that a public limited company has to
15. Obtain from the registrar if companies?
16. How does a Joint Stock company raise its finance for their business?
17. Name the types of co-operative societies.
18. What are the problems in the Government Company?
19. What do you mean by Joint Sector Company?
20. What are the 5M's of organizational resources?
21. Name the three essential skills according to Katz that the managers need to perform the duties.

16 MARK

1. Explain briefly about the scientific approach of management & also specify the features. (May/June 2012) (Nov/Dec2012)
2. List and explain the function of management. (May/June 2012) (Nov/Dec 2012)
3. State the contributions of F.W. Taylor towards scientific management. (May/June2012)
4. List out the 14 principles of Henry Fayol. (May/June 2007/12)
5. Discuss the role of manager. (May/June2012)
6. Describe the important functions management.
7. Discuss the scope and nature of management. (Nov/Dec2012)
8. What are the environmental factors that affect business? Explain? (Nov/Dec2012)
9. Enumerate the trends and challenges of management the globalized era.
10. Describe about the evolution of management thought.
11. Explain about the major tendencies favoring the development of a unified global theory of management.
12. Define management and what is meant by management process?
13. How do the required managerial skills differ in organization hierarchy?
14. Mention the different schools of management .discuss the contribution of human behavior school.
15. With suitable example describe the various types of business organization.
16. With illustrations from Indian and international context, explain in detail the different types of business organization with their suitability.

17. Is management a science or art? & discuss the steps in method study.

UNIT II PLANNING

1. Define Planning.
2. What are the elements that an organization's mission statement consists of?
3. Give two examples of Policy.
4. What are the two different approaches for setting Objectives?
5. What is MBO?
6. Mention any 2 Benefits of MBO.
7. Define Strategy.
8. What are the different types of Strategy?
9. What is Retrenchment Strategy?
10. What are the levels of Strategy?
11. What are the 3 major variables that the BCG Matrix based on?
12. What are the five competitive forces in the company environment according to
13. Porter?
14. What are the different types of Organizational policies?
15. Mention the different categories of Policy?
16. Mention any two distinction between policies and Objectives
17. Define Inflation, Recession.
18. Mention any 4 factors involved in demand forecasting.
19. What is Quantitative forecasting Technique?
20. What are five techniques of trend projection based on time series data?
21. What are the types of Economic Indicators?

16 MARK

1. What is planning? Explain steps involved in planning. (Nov/Dec2006) (Nov/Dec2007)
2. What are objectives? How will you set objectives for a manufacturing organization?
3. Discuss various forecasting techniques normally adopted. (Nov/Dec2007)
4. In detail explain the importance of planning in the present Indian business environment also highlight the different types of plans. (April/May2008)
5. Explain in detail the steps in the Decision –making process with examples. Also explain in detail any two Decision making tools. (April /May2008) (April/May2011)
6. i) ||planning is looking ahead and control is looking back||- comment.
ii) Elucidate the steps to be followed in the planning process. (April /May2007)
7. Briefly discuss about the various tools used for developing organizational strategies.
8. Define MBO. Describe the benefits and weakness of MBO and ways to overcome them.(May/June2009)
9. Distinguish between programmed & non programmed Decisions and discuss the modern approaches to Decision making under uncertainty. (May/June2009)
10. Write short notes on the following:
 - i. Management by objectives
 - ii. Types of strategies. (Nov/Dec2012)
11. Explain the principle of planning.
12. Describe the various types of Decision (May/June2012)
13. With the help of block diagram, explain the process of management by objectives (MBO).

UNIT III ORGANIZING

1. What is meant by organization?

2. What do you understand by effective organizing?
3. What is organization structure
4. Explain the Formal organization.
5. Explain the Informal organization.
6. What do you know by organization chart?
7. Explain about the types of organization charts.
8. Who is called as Intrapreneur and Entrepreneur?
9. What is departmentation?
10. What are the types of Departmentation?
11. What is a matrix organization?
12. Define a committee organization
13. What is Strategic Business Unit (SBU)?
14. Discuss the principles of Span of Management.
15. Discuss the term Reengineering.
16. What is Power and Authority?
17. What is Empowerment?
18. Explain Decentralization and Recentralization.
19. Define Staffing.
20. Define Recruitment.
21. Define Selection.
22. What is called as interview?
23. What is called as Orientation?
24. What are the methods for on the job training?
25. What are the methods for off the job training?
26. Define the term Job Analysis.
27. Define the terms Job Description and Job Specification.
28. What is performance appraisal?
29. What is called as Virtual organization?
30. Define Line and Staff Authority.
31. List out the benefits of Line and Staff Authority.
32. Trace the reasons for conflict between Line & Staff executives.
33. What are the disadvantages of Line and Staff Authority?
34. Explain the Functional Authority.
35. What is the concept of Delegation of Authority?
36. Explain the delegation process.

16 MARK

1. Explain the nature and purpose of organization.
2. Explain the qualitative forecasting. (Nov/Dec2006)
3. Explain MBO which a focus on IT industry.(Nov/Dec2006)
4. Name the factors determine Departmentation also mention the bases of Departmentation and give examples. (Nov/Dec2007)
5. Bring out the factors affecting centralization/Decentralization. Also highlight the merits and demerits of centralization/Decentralization with examples.
6. Enumerate in detail about the selection process which is widely followed in selecting IT professionals. Also highlight the different types of interviews that can be used in the selection process. (April/May2008)
7. What do you mean by Departmentation? Discuss in detail about the different
8. Strategies adopted in Departmentation.(May/June2007)
9. Describe the various steps in providing appropriate human resources.(May/June2007)
10. Define matrix organization. Why matrix organization is used? Discuss the problems with matrix management and guidelines for making matrix management effective.
11. Analyze the position requirements, important characteristics of job design and

- characteristics needed by managers. Characteristics. (May/June2009)
12. i) Mention the factors which are responsible for the emergence of informal organization.
 - ii) What are the steps involved in the process of delegation? (April /May2011)
 13. State and explain the basic steps involved in a typical selection procedure.
 14. i) Distinguish between formal and informal organization.
 - ii) Explain line organization with neat sketch.(May/June2012)
 15. i) Explain the concept of Decentralization.
 - ii) Explain the importance of performance appraisal. (May/June2012)
 - iii) Explain any four methods of performance appraisal. (Nov/Dec2012)

UNIT IV DIRECTING

1. State the Maslow's hierarchy of needs?
2. Define motivation?
3. Define leadership?
4. What is —noise|| in a communication system?
5. Define communication?
6. Define effective communication?
7. What are the types of communication?
8. List the 3 types of basic motivating needs proposed by McClelland.
9. List out the important electronic media which is useful for communication.
10. What is innovation?
11. Write about the different noise barriers you know?
12. Define principle of clarity?
13. What are the three elements of Vroom's Expectancy model?
14. Define Instrumentality?
15. Define Expectancy?
16. Write about Porter and Lawler model?
17. What are the most prominent needs according to McClelland?
18. How can you make job enrichment effective?
19. What is the purpose of communication?
20. Define Noise?
21. What are the types of communication?
22. Define Oral communication?
23. Define written communication?

16 MARK

1. i) Explain: Democratic type of leadership with examples.
- ii) Discuss two factor theory of motivation. (Nov/Dec2006)
- iii) Explain job enrichment organizations to maintain competitiveness.
- iv) Explain the barriers in communication. (Nov/Dec2006)
2. Explain Maslow's theory of motivation and compare and contrast xy theory.
3. Discuss communication through electronic media for effective business.
4. Elucidate the different leadership styles .explain in detail about the Blake and Mouton's managerial grid. (April /May2008) (May/June2009)
5. Describe the relationship of hygiene factors, motivation factors and job enrichment.
6. What does Maslow's hierarchy of needs tell us about people's needs?(8)
7. What is the basic leadership style and explain them critically.
8. What are the barriers to effective communication?
9. Name the motivation theories .explain any two them. (April /May2011)
10. Discuss on the components of organizational culture? (April /May2011)

11. Discuss the different theories of motivation. (May/June2012)
12. Define communication .explain the process of communication. Explain
 - i) the various types of communication with its relative merits and demerits. (May/June2012)
 - ii) the various types of organizational communication.
 - iii) The role of electronic media in the effective communication.
 - iv) Barriers in effective communication.

UNIT V CONTROLLING

1. What is controlling?
2. What are the importances of controlling?
3. What are the steps involved in the process of control?
4. State the requirements of effective control.
5. What is a standard?
6. What are the types of critical point standards?
7. What is budgetary control?
8. How budget can be used as a controlling technique?
9. What are the types of budgets?
10. What are zero based budgets?
11. Define MIS.
12. List the applications of computers in management.
13. Explain the use of computer in handling the information.
14. How Information Technology used in controlling?
15. What do you mean by telecommuting?
16. Define Productivity. .
17. List out the tools and techniques for improving the productivity.
18. Explain the economic order quantity (EOQ).
19. What is Quality circle?
20. What do you mean by outsourcing?
21. What is value engineering?
22. What is Total Quality Management (TQM)?
23. What do you know by direct control?

16 MARK

1. What are the requirements for effective controlling?
2. What is role of IT controlling? (Nov/Dec2006)
3. What is productivity? Explain the methods of improving productivity in IT industry?
4. Explain the impact of liberalization quoting examples from software industry.
5. What are the steps in controlling process and state the essentials of effective control.
6. What is budgetary control and explain its significance.(Nov/Dec2007)
7. Bring out the importance of productivity measures in any organization. Also in detail enumerate the different productivity enhancement tools used by the organization in the present competitive scenario. (May/June2007).
8. Bring out the different characteristics of an effective budget. Also bring out the different types of Budget with its relative merits and demerits. (May/June2007).
9. Explain the traditional and modern technologies of budgeting in detail. (May/June2009).
10. Describe the tools and techniques other than operation research for improving the productivity and discuss the future of operations research.(May/June2009).
11. What are the steps involved in the process of controlling?
12. Give an account of some popular non-budgetary control techniques.
13. Define the productivity and identify the problems involved in measuring the productivity of knowledge workers.

14. What are the basic steps in planning the system in operations management?
15. Give an account of some popular non-budgetary control techniques, with special reference to break-even analysis and ratio analysis. (May/June 2012)
16. What tools and techniques do you suggest to improve productivity in Indian organizations?
17. Explain the concept and process of controlling.
18. Write a note on the different types of control. (Nov/Dec 2012)

SUBJECT NAME: CS6303 COMPUTER ARCHITECTURE

2 MARKS & 16 MARK QUESTIONS WITH ASSIGNMENT QUESTIONS

UNIT I OVERVIEW & INSTRUCTIONS

1. What are the eight great ideas in computer architecture?
2. What are the five classic components of a computer?
3. Define ISA.
4. Define ABI.
5. What are the advantages of network computers?
6. Define Response Time
7. Define Throughput.
8. Write the CPU performance equation.
9. If computer A runs a program in 10 seconds, and computer B runs the same program in 15 seconds, how much faster is A over B.
10. What are the basic components of performance?
11. Write the formula for CPU execution time for a program.
12. Write the formula for CPU clock cycles required for a program.
13. Define MIPS
14. What are the fields in an MIPS instruction?
15. Write an example for immediate operand.
16. Define Stored Program Concepts.
17. Define Addressing Modes.
18. Give the basic performance equation.
19. States the Amdahl's Law.
20. Define Moore's Law
21. Differentiate between RISC and CISC.
22. What is the difference between Machine Language and Assembly Language?
23. Differentiate between Assembler and Compiler.
24. What are the basic functional units of a computer?
25. What is Bus and draw the block diagram?

16 MARKS

1. Discuss in detail about eight great ideas of computer Architecture.
2. Explain in detail about technologies for building processors explain the various addressing modes.
3. Define addressing mode and explain the basic addressing modes with an example for each.
4. Explain operations and operands of computer hardware in detail.
5. Discuss the logical operations and control operations of computer
6. Write short notes on power wall.
7. Discuss in detail the various measures of performance of a computer.
8. Differentiate between uniprocessor and microprocessors.
9. Explain the various components of a computer.
10. Consider three different processors P1, P2, and P3 executing the same instruction set. P1 has a 3 GHz clock rate and a CPI of 1.5. P2 has a 2.5 GHz clock rate and a CPI of 1.0. P3 has a 4.0 GHz clock rate and has a CPI of 2.2.
 - i. Which processor has the highest performance expressed in instructions per second?

- ii. If the processors each execute a program in 10 seconds, find the number of cycles and the number of instructions?
 - iii. We are trying to reduce the execution time by 30% but this leads to an increase of 20% in the CPI. What clock rate should we have to get this time reduction?
11. Assume a program requires the execution of 50×10^6 FP instructions, 110×10^6 INT instructions, 80×10^6 L/S instructions, and 16×10^6 branch instructions. The CPI for each type of instruction is 1, 1, 4, and 2, respectively. Assume that the processor has a 2 GHz clock rate.
- i. By how much must we improve the CPI of FP instructions if we want the program to run two times faster?
 - ii. By how much must we improve the CPI of L/S instructions if we want the program to run two times faster?
 - iii. By how much is the execution time of the program improved if the CPI of INT and FP Instructions are reduced by 40% and the CPI of L/S and Branch is reduced by 30%?
12. Assume a two address format specified as source, destination. Examine the following sequence of instructions and explain the addressing modes used and the operation done in every instruction
- i. Move (R5)+,R0
 - ii. Add (R5)+,R0
 - iii. Move R0, (R5)
 - iv. Move 16(R5),R3
 - v. Add #40, R5
13. Explain the following addressing modes in detail with diagram
- a) Immediate addressing,
 - b) Register addressing,
 - c) Base or displacement addressing,
 - d) PC-relative addressing,
 - e) Pseudo direct addressing
14. State the CPU performance equation and discuss the factors that affect performance.
15. Consider the computer with three instruction classes and CPI measurements as given below and Instruction counts for each instruction class for the same program from two different compilers are given. Assume that the computer's clock rate is 4GHz. Which code sequence will execute faster according to execution time?

Code from	CPI for this Instruction class		
	A	B	C
CPI	1	2	3
Code from	CPI for this Instruction class		
	A	B	C
Compiler 1	2	1	2
Compiler 2	4	1	1

UNIT II ARITHMETIC OPERATION

1. Add 6_{10} to 7_{10} in binary and Subtract 6_{10} from 7_{10} in binary Addition
2. Write the overflow conditions for addition and subtraction.
3. What are the floating-point instructions in MIPS?
4. Define Guard and Round
5. Define ULP
6. What is meant by sticky bit?
7. Write the IEEE 754 floating-point format.
8. What is meant by sub-word parallelism?
9. Multiply 100010×100110
10. What are the steps in the floating-point addition?

11. What are the main features of Booth's algorithm?
12. How can we speed up the multiplication process?
13. What is guard bit?
14. What are the ways to truncate the guard bits?
15. Define carry save addition (CSA) process.
16. In floating point numbers when so you say that an underflow or overflow has occurred?
17. What is an n-bit ripple carry adder?
18. Write the Add/subtract rule for floating point numbers.
19. When can you say that a number is normalized?
20. What is register?
21. Define Memory address register.
22. Define Addressing modes
23. What is stack & queues?
24. Define clock rate.

16 MARKS

1. Give the basic organization arithmetic control unit. Draw a flowchart for ALU operation.
2. Describe the hardware implementation of addition and subtraction unit in detail.
3. Explain the Restoring and non-restoring problems and its hardware implementation. Mention its advantages and disadvantages.
4. Describe the floating operations
5. Explain the sub word parallelism in detail.
6. Discuss the multiplication algorithm in detail with diagram.
7. How would you describe the division algorithm with diagram?
8. How floating point addition is carried out in a computer system? An example for a binary floating point addition.
9. Summarize in detail the floating point multiplication algorithm. How would you solve the multiplication of signed 2's complement numbers? Give algorithm and example
10. Assume A and B for a pair of signed 2's complement numbers with values: $A = 010111$, $B = 101100$. Develop algorithm to implement $A*B$.
11. Add the numbers 0.510 and -0.437510 using binary Floating point Addition algorithm
12. Multiply 1.10×10^3 and 9.200×10^{-5} using binary Floating point multiplication
13. Calculate the division of A and B, $A : 3.264 \times 10^3$ B: 6.52×10^2
14. Show the IEEE 754 binary representation of the number -0.75 in single and double precision.
15. Explain the concept of carry look ahead adder with neat diagram

UNIT III PROCESSOR & CONTROL UNIT

1. What is meant by data path element?
2. What is the use of PC register?
3. What is meant by register file?
4. Draw the diagram of portion of data path used for fetching instruction.
5. Define Sign Extend.
6. What is meant by branch target address?
7. Differentiate branch taken from branch not taken.
8. What is meant by delayed branch?
9. What are the three instruction classes and their instruction formats?
10. Write the instruction format for the jump instruction.
11. What is meant by pipelining?
12. What are the five steps in MIPS instruction execution?
13. Write the formula for calculating time between instructions in a pipelined processor.
14. What are hazards? Write its types.

15. What is meant by forwarding?
16. What is pipeline stall?
17. What is meant by branch prediction?
18. What are the 5 pipeline stages?
19. What are exceptions and interrupts?
20. Define Vectored Interrupts
21. What is Opcode?
22. What is super pipelining?
23. Describe briefly about Asynchronous Data Transfer.
24. What is data hazard? Mention its types.
25. What are the methods to handle Data hazard?
26. What are the methods to handle control hazard?

16 MARKS

1. Explain the various types of hazards in pipelining.
2. Write notes on super scalar operation.
3. Give the organization of the internal data path of a processor that supports a 4-stage pipeline for instructions and uses a 3- bus structure and discuss the same.
4. What is pipelining? Explain in detail.
5. What are the various hazards encountered in pipelining? Explain in detail.
6. Discuss the basic MIPS implementation of instruction set.
7. Describe MIPS implementation with necessary multiplexers and control lines.
8. What are control hazards? Describe the methods for dealing with the control hazards.
9. Design and develop an instruction pipeline working under various situations of pipeline stall.
10. What is data hazard? How do you overcome it? What are its side effects?
11. Compare the data and control path methods in pipelining.
12. Can you make the distinction between sequential execution and pipelining?
13. Construct the model for building a datapath.
14. Recommend the techniques for dynamic branch prediction.
15. Examine the approaches would you use to handle exceptions in MIPS.
16. What motive is there in using control path implementation in pipelining?

UNIT IV PARALLELISM

1. What is meant by ILP?
2. What are multiple issues? Write any two approaches.
3. What is meant by speculation?
4. Define Static Multiple Issue
5. Define Issue Slots and Issue Packet
6. Define VLIW
7. Define Superscalar Processor
8. What is meant by loop unrolling?
9. What is meant by anti-dependence? How is it removed?
10. What is the use of reservation station and reorder buffer?
11. Differentiate in-order execution from out-of-order execution.
12. What is meant by hardware multithreading?
13. What are the two main approaches to hardware multithreading?
14. What is SMT?
15. Differentiate SMT from hardware multithreading.
16. What are the three multithreading options?
17. Define SMP.
18. Differentiate UMA from NUMA.

19. What is meant by hardware multithreading?
20. Define Loop level Parallelism.
21. What is meant by speculation?
22. Distinguish between strong scaling and weak scaling.
23. Define Name dependence.
24. Define Anti-dependence.
25. Define Output dependence.

16 MARKS

1. Write short notes on Instructions level parallelism.
2. Explain in detail about parallel processing challenges.
3. What is meant by Flynn's classification?
4. Write short notes on multi core processors.
5. Write short notes on hardware multithreading.
6. List the main characteristics of Instruction level parallelism.
7. What are the facts or challenges faced by parallel processing programs?
8. What is the main idea of using message passing in multiprocessor?
9. How would you show your understanding of using hardware in multithreading?
10. Describe data level parallelism in SIMD and MISD machine.
11. How would you use shared memory concept in multi-processor?
12. Compare and contrast Fine grained and Coarse grained multithreading.
13. What are the features of Multicore processors?
14. How would you classify the types of multithreading?
15. How would you formulate the ideas of Flynn's classification?

UNIT V MEMORY AND I/O SYSTEMS

1. What are the temporal and spatial localities of references?
2. What are the various memory technologies?
3. Differentiate SRAM from DRAM.
4. What is meant by flash memory?
5. Define Rotational Latency
6. What are the writing strategies in cache memory?
7. What is direct-mapped cache?
8. What are the steps to be taken in an instruction cache miss?
9. Define AMAT
10. What are the various block placement schemes in cache memory?
11. Define MTTF and AFR
12. Define Availability
13. Define TLB
14. What are the three ways to improve MTTF?
15. What is meant by virtual memory?
16. Differentiate physical address from logical address.
17. Define Page Fault
18. What is meant by address mapping?
19. Define write-back.
20. What are the schemes in cache memory?
21. What is meant by DMA?
22. What is cache memory?
23. What do you mean interleaved memory?
24. What is Interrupt?
25. What is Interrupt request?

16 MARKS

1. Write notes on memory hierarchy.
2. Write notes on various types of memory technologies
3. What are the various types of cache mapping mechanisms? Explain in detail.
4. Describe the three mapping techniques used in cache memories with suitable example.
5. Discuss the virtual memory management technique in detail.
6. Explain the various secondary storage devices in detail.
7. Describe the data transfer method using DMA.
8. Explain about the interrupts in detail.
9. Explain the various methods available to handle multiple devices using interrupts?
10. Write notes on interrupts in operating system?
11. Explain DMA and the different types of bus arbitration mechanisms.
12. Describe the virtual memory address translation and TLB with necessary diagram.
13. How would you demonstrate the DMA controller for data transfer between memory and peripherals?
14. Can you summarize the concept of interrupts with neat diagrams?
15. What choice in design would you have made for standard input and output interfaces required to connect the I/O device to the bus?
16. How would you classify the bus arbitration techniques in DMA?

ASSIGNMENT

1. Assume a two address format specified as source, destination. Examine the following sequence of instructions and explain the addressing modes used and the operation done in every instruction.
 - Move (R5)+, R0
 - Add (R5)+, R0
 - Move R0, (R5)
 - Move 16(R5), R3
 - Add #40, R5
2. Assume the miss rate of an instruction cache is 2% and the miss rate of the data cache is 4%. If a processor has a CPI of 2 without any memory stall and the miss penalty is 100 cycle for all misses, determine how much faster a processor would run with a perfect cache that never missed. Assume the frequency of all loads and stores is 36%
3. You want to achieve a speed up of 90 times faster with 100 processors. What percentage of the original computation can be sequential?

SUBJECT NAME: CS6551 COMPUTER NETWORKS

2 MARKS & 16 MARK QUESTIONS WITH ASSIGNMENT QUESTIONS

UNIT 1 - FUNDAMENTALS & LINK LAYER

1. What are the three criteria necessary for an effective and efficient network?
2. Group the OSI layers by function.
3. What are the features provided by layering?
4. What are the two interfaces provided by protocols?
5. What is LAN?
6. What is flow Control?
7. Define Error detection and correction.
8. What is the use of two dimensional parity in error detection?
9. What are the issues in data link layer?
10. What are the ways to address the framing problem?
11. What are the responsibilities of data link layer?
12. Mention the types of errors.
13. What is redundancy?
14. What is the purpose of hamming code?
15. What is mean by error control?
16. What is OSI?

16 MARKS

1. Discuss in detail about Internet architecture.
2. Describe briefly the various layers and functions of OSI model and compare OSI Model with Internet model.
3. With a neat diagram describe in detail about the Network architecture.
4. Illustrate the need for error detection with typical examples. Demonstrate the various methods used for error detection and error correction.
5. Explain in detail about the implementation of network software.
6. Show the various performance metrics of network with examples.
7. Give in detail Framing and its types.
8. Compare Stop and Wait ARQ scheme with sliding window ARQ scheme.
9. Summarize Link layer functions in detail.
10. Suppose we want to transmit the message $M = 111011$ with divisor bit as $C = 1101$ whose polynomial is given by $C(x) = x^3 + x^2 + 1$. Formulate the message that should be transmitted using polynomial long division and predict the occurrence of errors in the receiver.

UNIT 2 - MEDIA ACCESS & INTERNETWORKING

1. What are the responsibilities of Network Layer?
2. What is DHCP?
3. Define ICMP?
4. What is the need of internetwork?
5. What are the types of class full addressing?
6. What do you mean by ARP?
7. What do you mean by RARP?
8. What are the functions of MAC?
9. Define the term medium access control mechanism
10. What is bridge?

11. What is a repeater?
12. Define router.
13. What is a switch?
14. What is mean by Ethernet?
15. Advantages of Ethernet.

16 MARKS

1. What are Ethernet protocols? List the various protocols and explain them with neat diagrams?
2. What is CSMA/CD? How does it work? Distinguish between 1-persistent and non-persistent CSMA.
3. Briefly explain the Bluetooth Technology. List the application and limitation of Bluetooth Technology.
4. Explain MAC sub layer protocol and frame structure of IEEE 802.11.
5. Compare wired networks and Wireless networks.
6. Explain the operation of Token Ring LAN?
7. Define Switch and Routing. Explain how you would use them for connecting the Network.
8. Develop Basic Internetworking with IP, CIDR and ARP.
9. Distinguish between DHCP and ICMP.
10. Compare Switching and Bridging with relevant diagrams and examples.
11. Discuss in detail about standard ETHERNET and Gigabit Ethernet.

UNIT 3

1. What is routing?
2. What is the purpose of address resolution protocol (ARP)?
3. Define an internetwork
4. State the duties of network layer
5. What is multicasting?
6. What are different types of multicast routing?
7. What is multicast? What is the motivation for developing multicast?
8. Define sub netting
9. Mention any four applications of multicasting
10. Describe the process of routing packets
11. What are the some routing algorithm types?
12. What is a benefit of DHCP?
13. What are the services offered by network layer?
14. What are datagram's?
15. What is IP addressing?
16. How can the routing be classified?
17. What are the salient features of IPv6?

16 MARKS

1. Define multicasting and explain the detail about multicast address?
2. Illustrate shortest path algorithm? Explain the same with suitable diagrams and examples.
3. What is a RIP? Explain in detail about RIP and OSPF with diagrams. Can you distinguish between them?
4. How would you use DVMRP and PIM?
5. What elements would you choose for Broadcasting?
6. Show the different approaches in Packet Switching. Explain them in detail.
7. List the different Datagram approach? Also show the advantages of LSR over DVR. List the limitations of Link State Routing Algorithm.

8. Explain the Distance Vector Routing Algorithm? Mention the limitations of the same.
9. Categorize the function of BGP? Explain in detail BGP with categories.
10. What would you recommend for the building and distribution of link state packets in link state routing Algorithm?
11. Discuss in detail the various aspects of IPV6 with relevant diagrams.

UNIT 4

1. What are the fields on which the UDP checksum is calculated? Why?
2. What are the advantages of using UDP over TCP?
3. What is TCP?
4. Define congestion
5. List the flag used in TCP header?
6. Give the approaches to improve the QOS.
7. What do you mean by QOS?
8. What is multiplexing?
9. What is the de-multiplexing?
10. What is RTT?
11. What is the segment?
12. What is a port?
13. List the services of end to end services.
14. What is congestion?
15. What are the functions of transport layer?
16. What are the types of QOS tools?
17. List some ways to deal with congestion
18. Define network congestion?
19. Explain the three types of addresses in TCP/IP?
20. What is the flow characteristics related to QOS?
21. What are the techniques to improve QOS?
22. Define Socket address
23. What are the two types of protocols used in Transport layer?
24. Define Throughput.
25. Define UDP
26. What is the need of port numbers?
27. What are the types of port numbers used in transport layer?

28. Why TCP services are called Stream delivery services?
29. Define jitter
30. Compare connectionless service & connection oriented service
31. What is Unicast & Multicast communication?

16 MARKS

1. Describe the working principle of TCP congestion control.
2. Discuss the flow control mechanism with an example.
3. Illustrate RED algorithm with relevant diagrams.
4. Describe the concept of sliding window protocol.
5. Enumerate the mechanism of three way handshake protocol for TCP
6. Explain about UDP with neat sketch on it.
7. Examine the concept of congestion avoidance in TCP?
8. Show the important features of differentiated services with examples.
9. Arrange the valid points about the congestion control approaches.
10. Explain the operation of TCP with neat sketch.
11. Prepare the necessary points about RSVP protocol with neat sketch.

UNIT 5

1. Define the 2 types of user agents in the electronic mail system.
2. What is DNS?
3. What is the purpose of inverse domain?
4. What is SMTP?
5. State the Purpose of SNMP
6. What is the Domain name system responsible for?
7. What are the four main properties of HTTP?
8. What is SMTP used for?
9. What is virtual terminal?
10. What are the basic functions of email?
11. Define www?
12. What is the web browser?
13. What is URL?
14. What do you mean by TELNET? 15. What are the responsibilities of Application Layer?
15. Write down the three types of WWW documents.
16. What is fully Qualified Domain Name?
17. What is Generic Domains?
18. What is simple mail transfer protocol?
19. What do you mean by File transfer protocol?
20. What are the two types of connections in FTP?
21. Define HTTP.
22. What are the types of messages in HTTP transaction?
23. What are the parts of a browser?
24. Name the four aspects of security.
25. What is POP?
26. What is the function of SMTP?
27. How does MIME enhance SMTP?

28. Why is an application such as POP needed for electronic messaging?

16 MARKS

1. Describe how SMTP protocol is used in E-mail applications
2. Discuss in detail about HTTP with neat diagram
3. Write short notes on IMAP and MIME with an example
4. Draw the architecture of WWW and describe the various blocks in detail.
5. With a relevant example discuss how the domain space is divided. Distinguish between a fully qualified domain name and a partially qualified domain name. Give relevant example.
6. Explain the final delivery of email to the end user using pop3.
7. Describe the role of a DNS on a computer network with reference to its components and working.
8. Write short notes on PGP, SSH.
9. Examine the importance of Dynamic domain name system.
10. Interpret architecture and services of e-mailing system.
11. Compose the short notes on SNMP and SOAP. Prepare the valid points on Traditional application

ASSIGNMENT

1. Explain detail about Internet Protocol.
2. Write with detail explanation about CDMA and GSM technology.
3. Detail about the SNR and BER for Digital modulation Schemes.
4. Discuss in detail about Wireless LAN
5. Explain detail about the types of Antennas using in Wireless PAN.

SUBJECT NAME: EC6601 VLSI DESIGN

2 MARKS & 16 MARK QUESTIONS WITH ASSIGNMENT QUESTIONS

UNIT I MOS TRANSISTOR PRINCIPLE

1. What is Moore's law?
2. What is CMOS technology?
3. What are the advantages of CMOS over NMOS technology?
4. What are the advantages of CMOS technology?
5. What are the disadvantages of CMOS technology?
6. What is design rule?
7. What is stick diagram?
8. What is micron design rule?
9. What is Lambda design rule?
10. What is DRC?
11. Mention MOS transistor characteristics?
12. Compare NMOS and PMOS?
13. Compare enhancement and depletion mode devices?
14. What is threshold voltage?

15. What are different operating modes of MOS transistor?
16. What is accumulation mode?
17. What is depletion mode?
18. What is inversion mode?
19. What are three operating regions of MOS transistor?
20. What is cut-off region?
21. What is Non-saturated region?
22. What is saturated region?
23. What is body effect?
24. What are the specifications of MOSFET?
25. What are the different generations of integrated circuits?
26. What are the major advantages of IC?
27. What is the objective of layout rules?
28. Define Threshold voltage.
29. Define body effect or substrate bias effect.
30. What are the different regions of operation of a MOS transistor?
31. Define accumulation mode.
32. What are the secondary effects of MOS transistor?
33. What is CMOS latchup? How it can be prevented?
34. What are the different fabrication processes available to CMOS technology?
35. What is intrinsic and extrinsic semiconductor?
36. What are the steps involved in manufacturing of IC?
37. What is meant by 'Epitaxy'?
38. What is the purpose of masking in fabrication of IC?
39. What is diffusion process? What are doping impurities?
40. What is isolation?
41. What are the various CMOS technologies?
42. What is channel stop implantation?
43. What are the advantages of CMOS inverter over the other inverter configurations?
44. What are stick diagrams?
45. What are the device parameters affected by scaling?
46. What are the different color codes used for single poly silicon nMOS technology?
47. Define a super buffer.

16 MARKS

1. Explain in detail about the ideal I—V characteristics and non ideal I—V characteristics of a NMOS and PMOS devices.
2. Explain in detail about the body effect and its effect in NMOS and PMOS devices.
3. Derive the expression for DC transfer characteristics of CMOS Inverter.
4. Explain the enhancement and depletion mode operation of NMOS transistor.
5. Explain detail about channel length modulation.
6. Explain the MOSFET device models.
7. Explain layout design rules in detail.
8. Explain the process parameters of MOS and CMOS.
9. Define scaling principle. Explain about fundamental scaling limits.
10. Discuss in detail about electrical properties of CMOS.
11. Discuss in detail with a neat layout, the design rules for a CMOS inverter.
12. Discuss in detail with necessary equation the operation of MOSFET and its current voltage characteristics.

13. Draw and explain the D.C and transfer characteristics of a CMOS inverter with necessary conditions for the different regions of operation.
14. Discuss the principle of constant field scaling and also write its effect on device characteristics.
15. Explain the small signal model of MOS transistors with neat diagram and expression.
16. Draw the stick diagram and layout of a NMOS inverter.

UNIT II COMBINATIONAL LOGIC CIRCUITS

1. Draw the circuit of a nMOS inverter.
2. Give the expression for pull-up to pull-down ratio (Z_{pu}/Z_{pd}) for a nMOS inverter driven by another nMOS inverter.
3. Draw the circuit of a CMOS inverter
4. What are the possible modes in nMOS enhancement transistor?
5. In saturation region, what are the factors that affect I_{Ds} ?
6. What is Channel-length modulation?
7. Define Rise time
8. Define Fall time
9. Define Delay time
10. Give some of the important CAD tools.
11. What are two components of Power dissipation?
12. Define Elmore delay model?
13. What are the general properties of Elmore delay model?
14. What are the types of power dissipation?
15. What is static power dissipation?
16. What is Dynamic power dissipation?
17. What are the methods to reduce dynamic power dissipation?
18. What are the methods to reduce static power dissipation?
19. What is short circuit power dissipation?
20. Define design margin ?
21. Write the applications of transmission gate ?
22. What is pass transistor?
23. List the advantages of pass transistor?
24. What is transmission gate ?
25. Why low power has become an important issue in the present day VLSI circuit realization?
26. What are the various ways to reduce the delay time of a CMOS inverter ?
27. Explain the basic operation of a 2- phase dynamic circuit?
28. What makes dynamic CMOS circuits faster than static CMOS circuits ?
29. What is glitching power dissipation?
30. List various sources of leakage currents?
31. Compare and contrast clock gating versus power gating approaches.

16 MARKS

1. Explain interconnect delay modeling using elmore's constant delay approach.
2. Explain the dc Characteristics of Pass transistor logic.
3. Explain the DC Characteristics of TG. List its application.
4. Explain the characteristics of pseudo-NMOS ratioed circuit.
5. Explain the properties of static and dynamic CMOS logic.

6. Explain about CMOS domino logic and Dual rail domino logic.
7. Explain the optimization technique deployed to reduce dynamic and static power dissipation.
8. Discuss about the sources of power dissipation.
9. Explain the low power design principle of CMOS logic.
10. Realize AND/NAND ,OR/NOR and XOR/XNOR using CPL.
11. Realize AND/NAND ,OR/NOR and XOR/XNOR using PTL.
12. Explain in detail about static and dynamic CMOS logic Circuits.
13. Discuss in detail about the ratioed circuit and dynamic circuit CMOS logic configurations
14. Describe the basic principle of operation of dynamic CMOS ,domino and NP domino logic with neat diagrams.
15. Explain the static and dynamic power dissipation in CMOS circuits with necessary diagrams and expressions.
16. Discuss the design techniques to reduce switching activity in a static and dynamic CMOS circuits.
17. Briefly discuss about the classification of circuit families and comparison of circuit families.

UNIT III SEQUENTIAL LOGIC CIRCUITS

1. What are the classification of CMOS circuit families ?
2. What is the characteristics of Static CMOS design ?
3. List the important properties of Static CMOS design ?
4. What is Dynamic CMOS logic ?
5. What are the properties of Dynamic logic ?
6. What are the disadvantages of dynamic CMOS technology ?
7. What is CMOS Domino logic ?
8. What is called static and dynamic sequencing element ?
9. What is clock skew ?
10. What are synchronizers ?
11. What is the difference between maly and moore state machines?
12. Define propagation delay and contamination delay?
13. Define Setup time and Hold time.
14. Define Pipelining.
15. Difference between latches and Flip-Flop.
16. How the limitations of a ROM-based realization is overcome in a PLA-based realization.
17. In what way the DRAMs differ from SRAMs?
18. Explain the read and write operations for a one-transistor DRAM cell.
19. What is MTBF?
20. What do you meant by Max delay constraint and Min delay constraint ?
21. What are the static properties of complementary CMOS Gates?
22. What are the major limitations associated with complementary CMOS gate?
23. What is meant by ratioed logic?
24. What is true single phase clocked register?
25. Define a tally circuit.
26. Give the NAND realization
27. Draw the CMOS implementation of 4-to-1 MUX using transmission gates .

28. What are the types of programmable device?
29. What is CLB?
30. What are the two types of MOSFET?
31. Which MOS can pass logic 1 and logic 0 strongly?
32. What is AOI logic function?
33. What is bubble pushing?
34. Implement $y = \overline{a \cdot b}$ using bubble pushing concept?
35. What is OAI 221 Gate?
36. Write the features of CMOS Domino Logic?
- 37. What are the tally circuits?
38. What are the various forms of inverter based CMOS logic?
39. What is PIP in XILINIX?
40. What are the advantages and disadvantages of PLA?
41. What are the various modeling used in Verilog?

16 MARKS

1. List the types of pipelining system. Explain the construction of pipeline using latches and registers.
2. Explain the memory organization and memory access timing.
3. Explain the method of clock generation in digital circuits.
4. Explain the design and organization of SRAM.
5. Explain the design and organization of DRAM.
6. Explain the memory access timing of DRAM and SRAM.
7. Discuss the techniques to reduce switching activity in a static and dynamic CMOS circuits.
8. Explain in detail about the pipelining concept used in sequential circuits.
9. Explain the design of asynchronous sequential circuits.
10. Explain the design of synchronous sequential circuits.
11. Write a brief note on sequencing dynamic circuits.
12. Explain in detail about the principle concepts used in sequential circuits.
13. How do you achieve low power in memory circuits? Explain in detail.
14. Discuss in detail about dynamic RAM.
15. Illustrate the principles of synchronizer and arbiter.

UNIT IV DESIGNING ARITHMETIC BUILDING BLOCKS

1. How path can be implemented in VLSI system?
2. Comment on performance of ripple carry adder.
3. What is the logic of adder for increasing its performance?
4. What is multiplier circuit?
5. Which factors dominate the performance of programmable shifter?
6. What is meant by data path?
7. Write down the expression for worst-case delay for RCA.
8. Define Braun multiplier.
9. Write down the expression to obtain delay for N-bit carry bypass adder.
10. Why we go to Booth's algorithm?
11. Draw the truth table for Modified booth's algorithm.
12. List the different types of shifter.
13. Give the basic nMOS PLA structure.

14. What do you mean by CMOS PLA.
15. Define finite state machine.
16. What are the importances of the PLA/FSM in VLSI?
17. Give the structure of a CPLD.
18. Give the CPLD packages available.
19. What is meant by FPGA?
20. Give the general structure of FPGA.
21. What are the different commercial FPGA products?
22. What are the types of reprogrammable GA?
23. What is the type's o FPLA?
24. What are the applications of PAL?
25. What is finite state machine (FSM)?
26. What are the characteristics of PLA/FSM?
27. What is CLB?
28. Define mealy machine?
29. Define Moore machine?

16 MARKS

1. Design 4 bit ripple carry adder and explain.
2. Design and explain the following adders
 - i. Carry skip adder
 - ii. Carry select adder
 - iii. Carry save adder
 - iv. Carry by pass adder
 - v. Conditional sum adder
3. Explain the design of parallel prefix adder.
 - i. Sklansky adder
 - ii. Kogge stone adder
 - iii. Brent kung adder
4. Explain the design of parallel array multiplier
 - i. Wallace tree
 - ii. Booth Multiplier
5. Explain run time power reduction management technique in detail.
6. Explain speed and area trade off I data path logic circuits in detail.
7. Explain the circuit design of Manchester carry chain adder.
8. How architectural optimization is achieved in digital system?
9. Explain design time power reduction management technique in detail.
10. Explain the mirror full adder circuit.
11. State booth multiplier and list its advantages.
12. What is 4*4 carry save multiplier. Calculate its critical path delay
13. Explain the following circuits 1. Data path circuit 2. Any one adder circuit
14. Explain with neat diagram baugh-wooley multiplier
15. Explain ripple carry adder.
16. Describe about carry look-ahead adder and its carry generation and propagation.

UNIT V IMPLEMENTATION STRATERGIES

1. Define full custom design.
2. Define Semi custom ASIC?

3. Basic building blocks in FPGA.
4. Give the classification of ASIC?
5. Write the difference between standard IC and Custom IC?
6. What is meant by Embedded IC?
7. Write the steps used for design flow?
8. What are the characteristics of the FPGA?
9. What is meant by design entry?
10. What is meant by Logic synthesis?
11. What is meant by System partitioning?
12. Define Global routing.
13. Define detailed routing.
14. List detailed some Routing algorithms.
15. What is meant by FPGA?
16. Give the general structure of FPGA.
17. What are the different commercial FPGA products?
18. What are the applications of PAL?
19. Differentiate between channeled and channel less gate array.
20. What are the different levels of design abstraction at physical design.
21. What are macros?
22. What are programmable Interconnects?
23. What are the types of ASICs?
24. What are the types of programmable devices?

16 MARKS

1. Explain ASIC flow and types of ASIC.
2. Explain full custom and semi custom design.
3. Explain the following
 - i. Channeled gate array ASICs
 - ii. Structured gate array ASICs
 - iii. Programmable array logic
 - iv. Standard cell based ASICs
4. Explain the FPGA interconnect routing procedures of ACTEL antifuse and Metal-Metal antifuse.
5. Explain the architecture of Xilinx 3000 FPGA.
6. Explain the programming methods of PLDs.
7. Explain FPGA global routing procedure.
8. Explain FPGA detailed routing procedure.
9. Explain the general architecture of FPGA and bring about different programmable blocks used.
10. Discuss in detail about full custom design and semi custom design.
11. Describe about Gate-Array Based ASICs.
12. Write short note on programmable Logic devices.
13. Write short notes on standard cell design and cell libraries.
14. Write the significance of PLA/FSM in VLSI design.
15. Explain the programmable interconnects and I/O blocks used in FPGA.

ASSIGNMENT

1. Consider the design of a CMOS compound OR-OR-AND-INVERT (OAI22) gate computing $F = (A+B) \cdot (C+D)$.
 - a) Sketch a transistor level schematic

- b) Sketch a stick diagram
 - c) Estimate the area from the stick diagram
 - d) Layout your gate with a CAD tool
 - e) Compare the layout size to the estimated area
2. Sketch pseudo-nMOS 3-input NAND and NOR gates. Label the transistor widths. What are the rising, falling and average logical efforts and parasitic delay of each gate.
 3. A 180nm standard cell process have an average switching capacitance of 150 PF/mm^2 . A chip composed of random logic with an average activity factor of 0.1. Estimate the power consumption of the chip if it has an area of 70 mm^2 and runs at 450 MHz at $V_{DD} = 0.9 \text{ V}$.
 4. Design a static CMOS circuit to compute $F=(A+B)(C+D)$ with least delay. Each input can present a maximum of 30λ of transistor width. The output must drive a load equivalent to 500λ of transistor width. Choose transistor sizes to achieve least delay and estimate the delay in λ .
 5. For a process of K'_p of $75 \mu\text{A/V}^2$, $V_{tp} = -0.4 \text{ V}$, and $V_{DD} = 1.8 \text{ V}$, calculate the static power dissipation of a 32 word, 48-bit ROM that contains a 1:32 pseudo-nMOS row decoder and pMOS pulls up on the 48 bit lines. The W/L ratio of the pMOS pull-ups is 1. Assume one of the word lines and 50% of the bit-lines are high at any given time.

SUBJECT NAME: EC6602 ANTENNAS AND WAVE PROPAGATION

2 MARKS & 16 MARK QUESTIONS WITH ASSIGNMENT QUESTIONS

UNIT I FUNDAMENTALS OF RADIATION

1. Define an antenna.
2. What is meant by radiation pattern?
3. Define Radiation intensity
4. Define Beam efficiency
5. Define Directivity
6. What are the different types of aperture?
7. Define different types of aperture
8. Define Aperture efficiency
9. What is meant by effective height?
10. What is meant by Polarization?
11. What is meant by front to back ratio?
12. Define antenna efficiency
13. What is radiation resistance ?
14. What is meant by antenna beamwidth?
15. What is meant by reciprocity theorem?
16. What is meant by isotropic radiator?
17. Define gain
18. Define self impedance
19. Define mutual impedance
20. What is meant by cross field.
21. Define axial ratio
22. What is meant by Beam Area.?
23. What is duality of antenna?

16 MARKS

1. Derive the expression for the radiated field from a short dipole.
2. Derive the expression for power radiated by a current element and its radiation resistance.
3. Write short note on i) gain of an antenna ii) directivity iii) aperture efficiency.
4. Explain about impedance matching and balun.
5. Define dipole antenna. Derive the radiation field and radiation resistance from a half wave dipole. Derive the expression for radiation field and radiation resistance.
6. Derive the expression for power radiated and find the radiation resistance of a half wave dipole?
7. Derive the radiation resistance, Directivity and effective aperture of a half wave dipole?
8. Write short note on i) Vector potential ii) modification potential iii) Retarded Potential iv) capacitance Hat.

UNIT II APERTURE AND SLOT ANTENNAS

1. State Huygen's Principle
2. What is Slot Antenna?
3. Which antenna is complementary to the slot dipole?
4. How will you find the directivity of a large rectangular broadside array?
5. What is the relationship between the terminal impedance of slot and dipole antenna?
6. What is the difference between slot antenna and its complementary dipole antenna?
7. Define the characteristic impedance of biconical antenna?
8. Bring out the expressions for voltage across the feed points of the biconical antenna and current flowing through the surface of the cone?
9. What do you mean by sectoral horn?
10. What do you mean by pyramidal horn?
11. What is back lobe radiation?
12. What are the various feeds used in reflectors?
13. What are the different types of horn antennas?

16 MARKS

1. Discuss the radiation from slot antenna?
2. Derive the design equation of the horn antenna and HPBW. How will you find directivity and power gain of the horn antenna?
3. Explain the principle of operation & application of parabolic reflector and its types of feeding
4. Explain the radiation from a rectangular aperture
5. Derive the far field generated by Huygen's source. Determine the power radiated from the open-end of a coaxial line ?
6. Derive the field components radiated from a thin slot antenna in an Infinite cylinder (8)
7. Show the relationship between dipole and slot impedances?

UNIT III ANTENNA ARRAYS

1. Define mutual impedance
2. What is meant by cross field.?
3. Define axial ratio
4. What is meant by Beam Area.?
5. What is duality of antenna?

6. What is point source?
7. What is meant by array?
8. What is meant by uniform linear array?
9. What are the types of array?
10. What is Broad side array?
11. Define End fire array
12. What is collinear array?
13. What is the condition on phase for the end fire array with increased directivity.?
14. Define array factor.
15. Define beam width of major lobe?
16. List out the expression of beam width for broad side array and end fire array.

16 MARKS

1. Define Polarization? Explain the different types of polarization in detail.
2. Obtain the expression for the field and the radiation pattern produced by a 2 element array of infinitesimal dipole with distance of separation $\lambda/2$ & currents of equal magnitude and phase shift 180°
3. Obtain the expression for the field and the radiation pattern produced by a 2 element array of infinitesimal dipole with distance of separation $\lambda/2$ and currents of equal magnitude and same phase
4. What is broadside array? Derive the maxima ,null directions and also the beamwidth of a broadside array.
5. What is End Fire array? Derive the maxima ,null directions and also the beamwidth of a Endfire array.
6. Explain the principle of pattern multiplication with some examples.
7. Explain the different techniques used for tapering of arrays

UNIT IV SPECIAL ANTENNAS

1. Name and draw a frequency independent antenna
2. What is Yagi - Uda antenna?
3. What do you mean by parasitic element?
4. What do you mean by driven elements?
5. Why folded dipole antenna is used in Yagi antenna?
6. What is beam antenna?
7. Which antenna is referred to super gain or super directive antenna?
8. What is a frequency independent antenna?
9. Why log periodic antenna is named so far?
10. What is the condition for an antenna to be frequency independent?
11. What is LPDA?
12. What are the different regions in log periodic antenna and how are they differentiated?
13. Give the expression for design ratio, spacing factor and frequency ration of log periodic antenna.
14. What are the applications of log periodic antenna?
15. What are the parameters to be considered for the design of a helical antenna?
16. What are the types of radiation modes of operation for a helical antenna?
17. List the applications of helical antenna?

18. Name and sketch an antenna which provides circularly polarized waves?

16 MARKS

1. Define Polarization? Explain the different types of polarization in detail.
2. Obtain the expression for the field and the radiation pattern produced by a 2 element array of infinitesimal dipole with distance of separation $\lambda/2$ & currents of equal magnitude and phase shift 180°
3. Obtain the expression for the field and the radiation pattern produced by a 2 element array of infinitesimal dipole with distance of separation $\lambda/2$ and currents of equal magnitude and same phase
4. What is broadside array? Derive the maxima, null directions and also the beam width of a broadside array.
5. What is End Fire array? Derive the maxima ,null directions and also the beam width of a End fire array.
6. Explain the principle of pattern multiplication with some examples.
7. Explain the different techniques used for tapering of arrays

UNIT V PROPAGATION OF RADIO WAVES

1. Define Sky wave.
2. Define Troposphere wave.
3. Define Ground wave.
4. What are the types of Ground wave?
5. What is meant by Space Wave?
6. What is meant by Surface Wave?
7. What is meant by fading?
8. What is the type of fading?
9. What is inverse and multi path fading?
10. What is meant by diversity reception?
11. Define Space diversity Reception.
12. Define frequency diversity Reception.
13. Define polarization diversity reception.
14. What is meant by Faraday's rotation?
15. What are the factors that affect the propagation of radio waves?
16. Define gyro frequency.
17. Define critical frequency.
18. Define Magneto-Ions Splitting.
19. Define LUHF.
20. Define Refractive index.
21. Define maximum Usable Frequency.
22. Define skip distance.
23. Define Optimum frequency?
24. What is wave impedance?

16 MARKS

1. Explain in details about ionosphere.
2. Explain space wave propagation and sky wave propagation.
3. Explain the ground wave propagation.

4. Discuss the effects of earth's magnetic field on ionosphere radio wave Propagation.
5. Describe the troposphere and explain how ducts can be used for Microwave propagation Explain in details, the diversity reception methods.
6. Explain the advantages of Troposphere wave propagation and sky wave propagation.
7. Deduce an expression for the critical frequency of an ionized region in terms of its maximum ionization density.
8. Derive an expression for the refractive index of the ionosphere in terms of the electron number density and frequency

ASSIGNMENT

1. Explain the numerical tools for designing the following antennas
 - i) Microstrip patch antenna
 - ii) Helical antenna
 - iii) Spiral antenna

2. A Pyramidal horn antenna with the aperture length of 10 cm is fed by a rectangular waveguide in TE₁₀ mode. Determine the design parameters of the antenna operating at 2.5 GHz.

3. Design a log periodic dipole antenna to cover all the VHF TV channels from 55 MHz to 220 MHz. The required directivity is 9 dB and input impedance is 50 ohm. The element should be made of aluminium tubing with 2.0 cm outside diameters for the largest element and the feeder lines and 0.48 cm for the smallest element .These diameters yield identical (F/D) ratios for smallest and largest elements.

4. A mobile link has to be established between two points spaced away 1500 km via ionosphere layer of density $4.5 \times 10^6 \text{ cm}^{-3}$ at a height 150 km. Calculate the maximum frequency which can be communicated, critical frequency and skip distance

5. Using pattern multiplication determine the radiation pattern for 8 element array, separated by the distance

SUBJECT NAME: EC6001 – MEDICAL ELECTRONICS

2 MARKS & 16 MARK QUESTIONS WITH ASSIGNMENT QUESTIONS

UNIT-I ELECTRO PHYSIOLOGY AND BIO-POTENTIAL RECORDING

1. What is the nature of cancer cells?
2. Define ICF and ECF.
3. Define resting and action potential.
4. Define sodium pump.
5. Define systolic pressure and diastolic pressure?
6. What are the different valves present in heart?
7. Define heart beat.
8. Mention various bioelectric potentials.
9. Define electrodes and mention its types.
10. Define All or Nothing Law.
11. What is electrode potential or half cell potential?
12. Define polarized and non- polarizable electrodes.
13. What is plethysmograph?

14. What are the characteristics of op-amp?
15. What is preamplifier?
16. What are the functions of chopper amplifier?
17. What is the need of bio-amplifier?
18. Mention the basic requirements for bio amplifiers.
19. What are the types of bio-amplifiers?
20. What are the microphones used in PCG?
21. What are the characteristics of resting potential?

16 MARKS

1. Draw the waveform of the Action Potential and explain.
2. Explain the various classifications of Biopotential Electrodes.
3. Explain the types of Biological Amplifier.
4. Explain the Working Principles of an EEG Recorder?
5. Write down the Nernst Equation and Goldman Equation and about the contents used.
6. Write Short notes on PCG.
7. Draw the block diagram of ECG machine and give justification for the inclusion of each circuit block of the machine.
8. Explain about EMG.
9. Draw the bipolar limb lead system of an ECG.

UNIT II BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT

1. What are the two types of BP measurement?
2. What is Korotkoff sound?
3. What is cardiac output?
4. What are the various methods to measure cardiac output?
5. What are the types of heart sound?
6. Write the equation to find pH value?
7. Expand the terms BSR and GSR.
8. What is the use of plethysmograph?
9. What are the various methods of blood flow measurement?
10. What are two methods of pulse measurement?
11. For what purpose chemical electrodes are used?
12. For what purpose silver-silver chloride is used?
13. Define electrophoresis.
14. For what purpose PO₂ electrode is used?
15. Discuss about blood cells.
16. Give the changes in the hemoglobin content of red blood cells.
17. Define cardiac output.
18. For what purpose colorimeters and photometers are used?
19. What is SEN?
20. In what way the composition of blood sample is determined?
21. Define transmittance and absorbance.
22. What is flame photometer?
23. In what way cardiac output is used?
24. Define stroke volume.
25. Define total lung capacity.
26. Define vital capacity.
27. Define residual volume.

28. Define inspiratory reserve volume (IRV).
29. Define expiratory reserve volume (ERV).
30. Define mean velocity of blood.
31. Give the uses of gas analyzers.
32. Give the uses of blood flow meters.
33. Name three methods to obtain the direct measurement of blood pressure.
34. Name the principal ions involved in the phenomena of producing cell potentials.
35. Why glass electrode is very much preferred as active electrode in a pH meter?

16 MARKS

1. Explain how the PH of blood is measured.
2. Explain how the PO₂ of blood is measured.
3. Explain how the PCO₂of blood is measured.
4. Write down the application of Electrophoresis and explain the basic principles involved.
5. Explain the working principle of an Electromagnetic blood flow meter.
6. Describe the operation of the blood cell counter.
7. Define the term residual volume, tital volume, vital capacity and total lung capacity
8. Discuss the Fick's method for determining cardiac output.
9. Describe the working principle of a flame photometer.
10. Explain about blood pressure measurement.
11. Explain about ultrasonic blood flow meter (Doppler type).
12. Explain about Respiratory measurement Technique.
13. Explain the following.
 - Temperature measurement.
 - Pulse measurement.
 - Pressure measurement.

UNIT-III ASSIST DEVICES

1. What is pacemaker?
2. What are the types of pacemaker?
3. Write the classification of pacemaker based on the mode of operation.
4. What is demand pacemaker?
5. What is fibrillation? What are the types of fibrillation?
6. What is counter shock?
7. What is stimulator?
8. Define diastole.
9. Define systole.
10. For what purpose pacemaker is used?
11. How the heart muscle can be stimulated?
12. List the methods of stimulating the heart muscles.
13. For what purpose external stimulation and internal stimulation are employed?
14. Compare external pacemaker and internal pacemaker.
14. What are the various electrodes used for defibrillation?
15. What is IPP?
16. What is meant by monophasic waveform?
17. What is the need for ventilator?
18. What is the use of Heart Lung Machine?
19. What is a defibrillator? State its use.

20. What is NSR?
21. List the types of PM on the basis of electrodes used.
22. Define Heart Lung Machine.

16 MARKS

1. What is fibrillation? Discuss in detail direct current defibrillator.
2. Explain in detail about the Heart Lung Machine.
3. Explain two methods of dialysis with neat block diagram.
4. What is pacemaker? Discuss in detail.
5. Write short notes on telestimulation.
6. What are the precautions to be followed in hospitals while using defibrillators?
7. Write technical properties of electrodes used in Defibrillator.
8. Write briefly about the power sources used for implantable type of pacemaker.

UNIT IV PHYSICAL MEDICINE AND BIOTELEMETRY

1. What are the advantages of diathermy?
2. What are the types of diathermy?
3. Define macro shock.
4. Define micro shock.
5. What are the devices used to protect against electrical hazards?
6. Define let go current.
7. Define leakage current.
8. What is Biotelemetry?
9. What is a single channel radio telemetry system?
10. Define – radio pill.
11. How telemetry can be used in transmitting stimulus signals to a patient?
12. What is the modulation techniques used for biotelemetry? Mention the reason for adopting that modulation scheme .
13. What are the advantages of biotelemetry system?
14. Specify the frequencies used for biotelemetry.
15. What are the types of thermography?
16. What are the devices used to protect against electrical hazards?
17. What are the two methods of shortwave diathermy?
18. Define Ultrasound diathermy.
19. List the types of Induction Electrodes.
20. Write the assigned Radio Frequencies for Shortwave Diathermy

16 MARKS

1. Explain in detail the components of a biotelemetry.
2. Explain about single channel telemetry system.
3. Explain about multi channel telemetry.
4. What are the problems associated with the implant telemetry circuits? Explain the uses of biotelemetry.
5. Explain the basic principle of operation of an ultrasonic Diathermy unit.
6. What is radio pill? Explain.
7. Write short notes on ‘Frequency Selection’ with respect to Biotelemetry.
8. Explain the basic concepts (including the modulation types) of radio transmission used in biotelemetry.
9. Explain about micro shock and macro shock.

10. Draw the block diagram of ultrasonic diathermy.
11. Explain in brief the salient features of microwave diathermy.
12. Discuss the range and area of irritation of different heating techniques in diathermy.
13. Write a note on area monitoring in the case of radiation safety.
14. Explain the physiological effects of current on human body.
15. Describe the possibilities of occurrence of micro shock hazards in a hospital.

UNIT V RECENT TRENDS IN MEDICAL INSTRUMENTATION

1. What is Thermography?
2. What are the medical applications of Thermography?
3. What is endoscope? List its types.
4. What are the advantages of laser surgery?
5. What are the applications of laser in medicine?
6. What is diathermy?
7. Name the types of lasers used in medicine.
8. What is thermograph?
9. What is endoscopy?
10. Give the non-surgical applications of laser.
11. What is photocoagulation?
12. What is the principle of cryogenics?
13. Give the principle of Electro surgical coagulation.
14. Which laser is used for surgery?
15. Mention the advantages of performing Laser surgery.
16. List out the characteristics of laser.
17. Name the laser most commonly used for ophthalmic application. Why?
18. Give the applications of telemedicine.
19. Write the importance of telemedicine.
20. Give the benefits of telemedicine.

16 MARKS

1. Explain the basic principle of operation of an ultrasonic Diathermy unit.
2. Explain the working principle of an Infrared Thermography unit with a neat block diagram.
3. Explain about Thermography.
4. What is an Endoscope? Discuss the Working of an Endoscopic unit.
5. Draw the block diagram of ultrasonic diathermy.
6. Explain in brief the salient features of microwave diathermy and its working principle.
7. Discuss the range and area of irritation of different heating techniques in diathermy.
8. Give an account on biological effects of radiation exposure and limits.
9. Describe the construction and working of any one of the personnel radiation monitoring equipment.
10. Bring out the salient points of instrumentation in
 - Endoscopy unit.
 - Bio Medical Laser.

ASSIGNMENT

1. Explain in detail the different types of electrodes used in biomedical applications.
 - (i) Microelectrode.
 - (ii) Depth and needle electrode
2. Define EEG. With neat diagram explain the 21 electrode system for recording brain potentials.