

# **M.Sc. ELECTRONICS**

## **MODEL PAPERS**

(To come into effect from the academic year 2011-2012)



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**MODEL PAPERS  
M.SC ELECTRONICS  
FIRST SEMESTER  
Paper I – ANALOG AND DIGITAL CIRCUITS**

Time: Three hours

Maximum marks: 80

**Answer ALL questions  
Each questions carry equal marks**

1. (a) Explain the construction and operation of Tunnel diode.  
(b) Explain the I-V characteristics of Tunnel diode.  
Or  
(c) Describe the operation of zener diode.  
(d) Write short note on Thyristor.
2. (a) Discuss in detail the design of D.C. Voltage power supply using IC 723 regular.  
(b) Define load regulation  
(c) Explain the design of switch mode regulated power supplies (SMPS).  
(d) Explain the limitations of SMPS.
3. (a) Explain the design of two stage cascaded transistor.  
(b) Determine its frequency response without feedback.  
Or  
(c) Describe the design of complementary Symmetry amplifier using MOS power FETS.  
(d) Explain negative feedback.
4. (a) Explain the design and analysis of a RC phase shift oscillator.  
Or  
(b) Discuss in detail using circuit diagram the operation of colpilt's oscillator.
5. (a) Draw the circuit diagram and operation of decade counter.  
Or  
(b) Explain the working of seven segment decoder driver and write a note on digital phase meter.

**MODEL PAPERS**  
**M.SC ELECTRONICS**  
**FIRST SEMESTER**  
**Paper II – MICROWAVES, RADARS AND SATELLITE COMMUNICATIONS**

Time: Three hours

Maximum marks: 80

Answer ALL questions

1. (a) Explain the working of TRAPATT diode.  
(b) Explain the principle of operation of Gunn diode.  
Or  
(c) Explain velocity modulation in Klystron.  
(d) Explain the working of magnetron.
2. (a) Give an account on parametric amplifiers.  
(b) Explain the working of balanced mixer.  
Or  
(c) How do you determine the impedance using Q urater?  
(d) What do you understand by SWR?
3. (a) Discuss in detail FM microwave radio system.  
Or  
(b) Explain troposcatter propagation in microwave communication in detail.
4. (a) Derive an expression for Rader Range euqtion.  
(b) Explain what is meant by Doppler shift.  
Or  
(c) Discuss in detail the working of MST Radar.
5. (a) Give an account on MTI Radar.  
(b) Briefly explain the working of power amplifier of a transponder.  
Or  
(c) Give an account on geostationary satellites.  
(d) What is meant by multiple access of a satellite?

**MODEL PAPERS**  
**M.SC ELECTRONICS**  
**FIRST SEMESTER**  
**Paper III – LINEAR AND DIGITAL IC'S AND APPLICATIONS**

Time: Three hours

Maximum marks: 80

**Answer ALL questions**  
**All questions carry equal marks**

1. (a) Describe the fundamentals of monolithic IC technology.  
(b) Explain Active and Passive components of ICs.  
Or  
(c) Describe the fabrication of FET.  
(d) Explain the fabrication of a circuit.
  2. (a) Explain the characteristics of a TTL logic family.  
(b) Write a note on modified integrated circuit.  
Or  
(c) Show how a CMOS device can drive a TTL circuit.  
(d) Explain the features of CMOS gates.
  3. (a) What is an operational amplifier? Explain how it can be used as an integrator.  
(b) Write about frequency response of non-inverting amplifier.  
Or  
(c) Draw the circuit diagram and explain the operation of Differentiation amplifier.
  4. (a) Describe the Servo motor control.  
(b) Explain the under and over voltage protection.  
Or  
(c) With the help of a circuit diagram explain the operation of an monostable multivibrator.  
(d) Write a short note on V to I and I to V converter.
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1. (a) Write the basic principle of PLL and explain how PLL is used for frequency multiplication.  
Or  
(b) Draw the circuit diagram of frequency translation 555 timer and explain its operation.  
(c) Describe the 8038 function generators.

**MODEL PAPERS**  
**M.SC ELECTRONICS**  
**FIRST SEMESTER**  
**Paper IV – C PROGRAMMING AND DATA STRUCTURES**

Time: Three hours

Maximum marks: 80

**Answer ALL questions**

1. (a) Discuss with example the different types of operators available in C language.  
 (b) Write C program for finding largest of three numbers.  

Or

 (c) Write notes on the following with an example:
  - (i) While
  - (ii) Switch
  - (iii) For.
 (d) Write a C program to find the roots of a quadratic equation  $ax^2 + bx + c = 0$
  
2. (a) Write a C program to count the number of words in a sentence.  
 (b) Explain following string functions with examples:
  - (i) strcmp ( )
  - (ii) strcat ( )
  - (iii) strcpy ( )

Or

 (c) Discuss storage classes in C language.  
 (d) Write a C program to perform the multiplication of two 3 x 3 matrices.
  
3. (a) Explain the random access to files and input/output operations on files.  
 (b) Explain the advances of user defined functions and what is a multifunction program.  

Or

 (c) Define structure in C. How the data is represented in structure? Explain with examples.  
 (d) Write a function using pointers to exchange the value stored in two locations in the memory.
  
4. (a) Write a C program to input ten integers and arrange them in ascending order using arrays.  
 (b) Write a note on stack and queue.  
 (c) What is linked list? Explain concept of linked list. What are the advantages of linked lists?  
 (d) Write notes on:
  - (i) Circular queue
  - (ii) Single linked list
  - (iii) Circular list.
  
5. (a) Explain I/O address in Turbo C/C++ environment for flashing LED.  
 (b) Write a C program to convert a post fix string to prefix.  

Or

 (c) Discuss the following library functions:
  - (i) import
  - (ii) import b
  - (iii) outport b.
 (d) Write a 'C' program for functions with arguments and return values.

**MODEL PAPERS  
M.SC ELECTRONICS  
FIRST SEMESTER**

**Paper V-MATHEMATICAL METHODS OF SIGNAL AND SYSTEM ANALYSIS**

Time: Three hours

Maximum marks: 80

**Answer ALL questions**

1. (a) State and prove Cauchy's integral formula.

(b) Prove that

$$\int_0^{2\pi} \frac{\cos^2 3\theta}{1-2p \cos 2\theta + p^2} d\theta = \pi \cdot \frac{1-p+p^2}{1-p}, \quad (0 < p < 1)$$

Using the knowledge of calculus of residues.

Or

(c) State and prove Laurent's theorem.

(d) Given  $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ , find  $v$  such that  $f(z) = u+iv$  is analytic

2. (a) State and prove Laplace transform of periodic function.

(b) Prove that  $L\{J_0(t)\} = 1/(s^2+1)^{1/2}$ , where  $J_0(t)$  is zeroth order Bessel function. Hence evaluate  $L\{e^{-at} J_0(at)\}$ .

Or

(c) Explain any four important properties of inverse Laplace transform.

(d) Find the inverse Laplace transform of

$$L^{-1}\{8/(S^2+1)^3\}$$

3. (a) Find the Fourier series for  $f(x)$  in the interval  $(-\pi, \pi)$  where

$$f(x) = \begin{cases} \pi+x, & -\pi < x < 0 \\ \pi-x, & 0 < x < \pi \end{cases}$$

(b) Find sine and cosine transform of  $x^n e^{-ax}$ .

Or

(c) Define the properties of Fourier transform. Prove modulation theorem.

(d) Find the Fourier sine transform of  $\frac{x}{1+x^2}$ .

4. (a) Describe the properties of the region of convergence for the z-transform.

(b) Determine the z-transform of the sequence.

Or

(c) Write a detailed note on the properties of LTI systems.

(d) Find the inverse z-transform using partial fraction method, of the following:

$$X(z) = \frac{z^2}{z^2 - 1.5z + 0.5}$$

5. (a) Explain the concept of probability. Discuss conditional probability and independent events.

(b) A coin is tossed four times in succession. Determine the probability of obtaining exactly two heads.

Or

(c) Explain Discrete Random variable discuss the continuous random variables and probability density function.

(d) Three regular dice are thrown. Assign probabilities for the following events:

The sum of the points appearing on the dice is (i) 4, (ii) 9, (iii) 15.

**MODEL PAPERS**  
**M.SC ELECTRONICS**  
**SECOND SEMESTER**  
**PAPER – I    ADVANCED COMMUNICATION SYSTEMS**

Time : Three Hours

Max.Marks: 80

**Answer ALL questions.**

1. a). What is M-ary coding?  
b). What are the features of PSK modulation format?  

**(OR)**

c). Discuss bit error rate and bit error performance.  
d). Give a detailed note on spread spectrum modulations.
  
2. a). Compare base band modulation and band pass modulation.  
b). Explain DPSK technique for digital transmission.  

**(OR)**

c). Write about speech coding of wireless systems.  
d). Discuss the concept of diversity branch and signal paths combining and switching methods.
  
3. a). Discuss in detail the concept of cellular frequency reuse.  
b). Differentiate TDMA, FDMA and CDMA.  

**(OR)**

c). Explain the architecture of Global system for mobile (GSM).  
d). Write the applications of spread spectrum techniques in cellular PCS and mobile communication.
  
4. a). Write a short note on matched filter.  
b). Discuss PCSS (personal communication Satellite System).  

**(OR)**

c). Write a short note on transponder units:
  - i). Wide band receiver
  - ii). Input de-multiplexer
  - iii). Power amplifier
  - iv). Antenna subsystem.
  
5. a). Show that in a QPSK system, the symbol rate is equal to half the base band bit rate  
b). Explain the basic concept of DPSK technique.  

**(OR)**

c). What are the requirements for a space craft to achieve synchronous bit?  
d). Give the characteristics of satellite systems and write about satellite infrastructures.

**M.SC ELECTRONICS  
SECOND SEMESTER  
MODEL PAPERS  
PAPER – II MICRO CONTROLLERS AND INTERFACING**

Time : Three Hours

Max.Marks: 80

**Answer ALL questions.**

1. a). Draw the architecture of 8051 micro controller and explain its function.  
b). Give the pin description of 8051 micro controller and explain the function of all the signals.  

**(OR)**

c). Explain the memory organization of 8051 microcontroller. With relevant diagrams.
  
2. a). Explain the addressing modes of 8051 with relevant example instructions.  
b). Explain the instruction set of 8051 microcontroller with examples.  

**(OR)**

c). Explain the operating modes of timers in 8051.  
d). Explain the operation of Interrupts mechanism of 8051.
  
3. a). Describe architecture of 89 C 51 microcontroller with relevant diagrams.  
b). Draw the pin diagram of the micro controller 89 C 51 and the function of the signals.  

**(OR)**

c). Explain the different power saving options in 89 C 2051.  
d). Explain the method of measuring pulse width and frequency using the microcontroller 89 C 51.
  
4. a). Explain the memory organization of PIC 16 C 6X micro controller.  
b). Explain the configuration and operation of I/O parts of 16 C 6X microcontroller.  

**(OR)**

c). Discuss the operation of program memory and data memory in Flash microcontroller 16 F 8 XX.  
d). Explain the operating modes of timers in 16 F 8 XX micro controller.
  
5. a). With suitable diagrams and programs explain how keyboard and 7-segment LED display can be Interfaces to a microcontroller.  

**(OR)**

b). Discuss the interfacing of ADC and DAC converters to a micro controllers using relevant diagrams and programs.



**M.SC ELECTRONICS  
SECOND SEMESTER  
MODEL PAPERS**

**PAPER – III OPTO ELECTRONIC DEVICES AND APPLICATIONS**

Time : Three Hours

Max.Marks: 80

**Answer ALL questions.**

- 1.a). Explain what is meant by population inversion.
- b). Explain the characteristics of laser light.  
**(OR)**
  - c). Give an account on the working principle of spherical mirror cavity.
  - d). Explain the working principle of a semiconductor laser.
- 2.a). Give an account on the working of Kerr modulator.  
**(OR)**
  - b). Explain the modulation and frequency response of laser diode.
- 3.a). Discuss in detail the spectral response and sensitivity of silicon photodiodes.  
**(OR)**
  - b). Give an account on the principle and working of photo multiplier tubes.
- 4.a). Explain what is meant by numerical aperture in optical fibers.
  - b). Distinguish between step index fiber and graded index fiber.  
**(OR)**
    - c). Give an account on opto couplers.
    - d). Briefly explain the different splicing techniques.
- 5.a). Give an account on the principle of working of infrared detector used inTV and remote controllers.  
**(OR)**
  - b). Give an account on the working of opto – isolator for speed control of motors.

**M.SC ELECTRONICS  
SECOND SEMESTER  
MODEL PAPERS  
PAPER – IV CONTROL SYSTEMS**

Time : Three Hours

Max.Marks: 80

**Answer ALL questions.**

- 1.a). Distinguish between linear and non-linear control systems.  
b). Discuss the effect of feedback on overall gain, stability, sensitivity and bandwidth of a control system.  

**(OR)**

  - c). Distinguish between time variant and time invariant systems.
  - d). Explain in detail the general block diagram of a control system bringing out the differences between open loop and closed loop control systems.
  
- 2.a). Describe the differential equation approach for evaluating the transfer function of control systems.  
b). Derive the transfer function of a typical LCR circuit.  

**(OR)**

  - c). What are signal flow graphs? Describe in detail the use of signal flow graph and Mesons gain formula for the evaluation of System transfer function.
  
- 3.a). Distinguish between transient and steady state response.  
b). Describe the working of a proportional integral derivative controller.  

**(OR)**

  - c). What is the necessary condition for the stability of a control system?
  - d). Describe in detail the Hurwitz stability criterion.
  
4. a). What is Bode Diagrams?  
b). Describe in detail the stability analysis using Bode Diagram approach.  

**(OR)**

  - c). What are Phase Margin and Gain Margin?
  - d). Discuss in detail the application of Nyquist plots in determining control system stability.
  
- 5.a). Explain the concept of root locus.  
b). Describe the rules for constructing the root locus of a control system.  

**(OR)**

  - c). Describe how do we determine the roots from root locus.
  - d). Discuss the sensitivity of the roots to the characteristics equation.

**M.SC ELECTRONICS  
SECOND SEMESTER  
MODEL PAPERS**

**PAPER – V TEST AND MEASURING INSTRUMENTATION**

Time : Three Hours

Max.Marks: 80

**Answer ALL questions.**

- 1.a). describe the parameters of sensitivity and loading in analog multimeters.
- b). Explain the methods of measuring dc current and voltage using multimeters.

**(OR)**

- c). What is a power meter?
- d). Draw the circuit diagram of a typical energy meter and explain its working.

- 2.a). List the various types of special purpose Oscilloscopes.
- b). Describe the working of a dual –trace CRO.

**(OR)**

- c). Draw the block diagram of a sampling oscilloscope and explain its working.
- d). How storage is done in phosphor storage CRO?

- 3 a). What is the general principle of electronic multimeters?
- b). Describe the working of integrating type DVM.

**(OR)**

- c). Explain the method of conversion of DVM to measure temperature.
- d). List the salient features of 7107 DVM IC.

- 4.a). Describe the function generator using 8038 IC.
- b). Mention a few applications of waveform analyzers.

**(OR)**

- c). Give the basic circuit to measure high frequencies with a digital frequency meter.
- d). State the importance of time base unit in digital frequency meters.

- 5.a). What is meant by signal recovery?
- b). Give the necessary theory of lock-in amplifier.

**(OR)**

- c). Draw the block diagram of lock-in amplifier and explain its working.
- d). Mention a few applications of Lock-in amplifiers.

**MODEL PAPERS**  
**M.SC ELECTRONICS**  
**THIRD SEMESTER**  
**PAPER – I DIGITAL SIGNAL PROCESSING**

Time : Three Hours

Max.Marks: 80

**Answer ALL questions.**

1. a). Test the following systems for linearity.
  - i).  $y(n) = nx^2$
  - ii).  $y(n) = x(n) \text{ bx } (n-1)$ .
 b). Define the impulse, unit step and ramp signals.  
 (OR)
  - c). Explain the representation of discrete time signals in frequency domain.
  - d). Test the casualty and stability of the following system.  

$$Y(n) = x(n) - x(-n-1) + x(n-1)$$
  
2. a). Describe radix- 2 decimation in time FFT.  
 (OR)
  - b). Determine the system function for the casual LTI system with difference equation.  

$$Y(n) = \frac{1}{2} y(n-1) + \frac{1}{4} y(n-2) = x(n)$$
  
3. a). Describe the bilinear transformation method to design IIR filters.
  - b). What is frequency wrapping? Explain.  
 (OR)
    - c). Compare IIR and FIR filters.
    - d). Explain FIR filter design using Kaiser window.
  
4. a). Discuss the use of FFT in filtering.
  - b). Explain briefly the application of DSP in Radar signal processing.  
 (OR)
    - c). Discuss the spectrum analysis using FET.
    - d). Explain the application of FFT in speech processing.
  
5. a). Bring out the essential differences between DSP and other microprocessor architectures.
  - b). What is the need for special DSP's in digital signal processing?  
 (OR)
    - c). Write a detailed over view of various DSP architectures.

**M.SC ELECTRONICS  
THIRD SEMESTER  
MODEL PAPERS  
PAPER – III FIBER OPTIC COMMUNICATIONS**

Time : Three Hours

Max.Marks: 80

**Answer ALL questions.**

1. a). Explain the principle of total internal reflection.  
b). Give an account on the planar dielectric wave guide.  
**(OR)**  
c). Derive the wave equation for graded index fiber.  
d). Explain what is meant by inter-modal dispersion.
  
2. a). Explain group delay material dispersion.  
b). Explain the terms : absorption and attenuation.  
**(OR)**  
c). Explain about signal distortion in optical fibers.  
d). What do you mean by wave guide dispersion?
  
3. a). Describe source output pattern and power launching in optical fibers.  
b). What are various lensing schemes?  
**(OR)**  
c). Discuss about various splicing techniques.  
d). What do you mean by mechanical misalignment?
  
4. a). Discuss in detail about link power budget.  
**(OR)**  
b). Give an account on Wavelength Division Multiplexing.
  
5. a). Discuss in detail about frequency and time domain intermodal dispersion.  
**(OR)**  
b). How do you account for fiber fault?  
c). Explain OTDR attenuation.

**M.SC ELECTRONICS  
THIRD SEMESTER  
MODEL PAPERS  
PAPER – IV PC ARCHITECTURE AND INTERFACING**

Time : Three Hours

Max.Marks: 80

**Answer ALL questions.**

1. a). Discuss the following processors.  
i). 80386  
ii). Pentium  
iii). AMD

**(OR)**

- b). Write a notes on following  
i). Types of power supplies  
ii). RS – 232 port  
iii). Parallel ports

1. a). Describe the bus slots and I/O cards.  
b). Discuss the different types of mother boards.  
**(OR)**  
c). Explain the working of multimedia cards and LAN cards.

2. a). Describe the detailed description on various semiconductor memories.

**(OR)**

- b). Write a notes on  
i). Upper memory area  
ii). Pen drive Flash memory

3. a). Discuss the detailed description on Floppy disk drives.

**(OR)**

- b). Describe the detailed notes on Hard disk drivers.

4. a). What is an operating system of a computer? Discuss the various versions of windows.

**(OR)**

- b). How do configuring the computer for optimum performance?  
c). Explain the boot process.

**M.SC ELECTRONICS  
THIRD SEMESTER  
MODEL PAPERS  
PAPER – V SENSORS, SIGNAL CONDITIONERS**

Time : Three Hours

Max.Marks: 80

**Answer ALL questions.**

1. a). Discuss the classification of transducers.  
b). Explain the important of transducers.  

**(OR)**

c). Discuss non – linearity in the response of transducers. Briefly explain the methods of linearization.
  
2. a). Describe the construction and operation of platinum resistance thermometer.  

**(OR)**

b). Explain with suitable diagram the working of digital thermometer.
  
3. a). Describe the working of variable resistance displacement transducers.  
b). Explain the application of strain guage.  

**(OR)**

c). Write a detailed not on seismic instruments as an accelerometer.
  
4. a). Briefly discuss the theory of bellows and bourdon tube.  

**(OR)**

b). Discuss the theory of vibrating element pressure sensors.
  
5. a). Explain the measurement of torque using load cell.  

**(OR)**

d). Describe any one method for flow measurement.

**M.SC ELECTRONICS  
FOURTH SEMESTER  
MODEL PAPERS  
Paper I – VLSI DESIGN (VERILOG HDL)**

Time: Three hours

Maximum marks: 80

**Answer ALL questions**

1. (a) Explain the Top-Down and Bottom –up design methodologies used in Hierarchical modeling concepts.  
(b) Explain the design hierarchy of a 4-bit ripple counter.  
Or  
(c) Explain various systems tanks available in verilog HDL.  
(d) Explain Port connection rules.
2. (a) Write a module for 4-to-1 multiplexer in gatelevel modeling.  
(b) Explain the use of Gate Delays to model timing in logic circuits with examples.  
Or  
(c) Explain the Four types of looping statements in verilog HDL with examples and modules.
3. (a) Define a function. Explain the differences between tasks and functions.  
(b) Write a module for the implementation of Left/Right shifter.  
Or  
(c) Write a verilog simulation of negative edge triggered D-FLIP-FLOP using assign and deassings statements.  
(d) Explain system tasks \$strobe and \$random giving examples.
4. (a) Explain various Delay models used in verilog simulation with examples.  
(b) Define \$setup, \$hold and \$width training checks used in verilog simulations.  
Or  
(c) Give the circuit diagram and Verilog description of a simple CMOS Flip-FLOD.  
(d) Give the verilog description of a 2-to-1 multiplexer using CMOS switches.
5. (a) What is UDP? Define the distinct parts UDP in Pseudo syntax form and write UDP rules.  
(b) What is a sequential UDP? Write a UDP for edge triggered T-FLIP-FLOD.  
Or  
(c) What are the uses of PLI and explain PLI interface?  
(d) Explain the linking and Invocation of PLI tasks.



**M.SC ELECTRONICS  
FOURTH SEMESTER  
MODEL PAPERS  
Paper II – NETWORKING TECHNOLOGY**

Time: Three hours

Maximum marks: 80

**Answer All questions  
All questions carry equal marks**

1. (a) Describe in detail the concept of e-mail and internet.  
Or  
(b) Give an account on the principle and working of Bridges and Routers.
2. (a) Give an account on Internet protocol model.  
Or  
(b) Describe in detail the working of SMDS.
3. (a) Give an account on the performance of TCP/IP networks.  
Or  
(b) Explain the working of Intelligent networks.
4. (a) Give an account on the structure of adaptation layer  
Or  
(b) Describe the working of Internetworking with ATM.
5. (a) Describe in detail the switching designs of SDS and TDS.  
Or  
(b) Give an account on the working of WDM systems.