M.Tech. 1ˢᵗ Semester (EEE)

Examination, December-2025

POWER ELECTRONICS DRIVE CONTROL

Paper : MTEEE-501

Time allowed : 3 Hours]   *[Maximum marks : 100*

*Note : Attempt five questions selecting **one** from each section and rest one from any section.*

Section-A

1. Explain the dynamics of motor load system.   20

2. Explain the natural and forced commutation for power MOSFET.   20

Section-B

3. Describe the controlled rectifier circuit for D.C. motor.   20

4. Write down the comparative study for armature control in 1-phase motor.   20

Section-C

5. Explain the motoring operation of separately excited D.C. motor.   20

6. Discuss the regenerative braking of D.C. motor.　　　20

Section-D

7. Discuss the control of Induction Motor by CSI and VSI.　　　20

8. Explain the basic principle of operation of cycloconverter. Also derive its output equation.　　　20

23677

M.Tech. 1st Semester (EEE)
Examination, December-2025
ADVANCED MICROPROCESSOR AND
CONTROLLER
Paper : MTEEE-503

Time allowed : 3 Hours]   *[Maximum marks : 100*

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*Note : Attempt **five** questions in all, selecting **one** from each section. **Question No. 1 is compulsory**. All questions carry equal marks.*

1. Explain the following :   4×5=20

   (a) Word length

   (b) Addressing modes

   (c) Difference between Microprocessor and Micro Controller.

   (d) X85 Addressing modes

Section-A

2. Explain Microprocessor architecture nd Microprocessor's speed architectural characteristics.

     20

23677-P-3-Q-9 (25)   [P.T.O.

3.   Explain in details of PIC microcontroller : 4×5=20

   (a)   Memory addressing architecture

   (b)   Internal data bus

   (c)   Co-processing

   (d)   Microprocessor architecture

Section-B

4.   (a)   Discuss in detail about Instruction set of Microprocessor. Give suitable examples.   10

   (b)   Discuss in brief about concept of device polling and interrupt.   10

5.   Explain :   2×10=20

   (a)   DM controllers

   (b)   Basic Instruction types

Section-C

6.   (a)   Explain the structure and working of parallel I/O serial communication.   10

   (b)   Write short note on special I/O devices.   10

7.   Illustrate in detail about architecture of 8051 microcontroller with neat diagram.   20

Section-D

8.   (a)   Explain the design process involved in development of microprocessor based products.   10

   (b)   Explain implementing and testing a design.   10

9.   Explain :

   (a)   Intel 86 family of advanced microprocessor   10

   (b)   Programming model for 86 family   10

M. Tech. 1ˢᵗ Semester (EEE)

Examination, December 2025

ADVANCED DIGITAL SIGNAL PROCESSING

Paper : MTEEE-505

Time allowed : 3 Hours]   *[Maximum marks : 100*

Note: *Attempt any five questions. All question carry*
equal marks.

1.   (a)   Discuss the classification of systems with the
            help of suitable examples.   10

     (b)   Explain the concept of causality and stability.
            Find whether the following digital systems
            are BIBO stable?

           (i) $y(n) = ax^2(n)$ 10

           (ii) $y(n) = ax(n) + n$

2.   Find the Fourier transform of following signals :

     (i) $x(n) = \begin{cases} 1, 0 \le n \le 6 \\ 0, \text{ otherwise} \end{cases}$ 10

     (ii) $x(n) = \left(\frac{1}{2}\right)^n u(n-5)$ 10

23678-P-3-Q-8 (25)   [P.T.O.

3. Explain the design of IIR filters by bilinear transformation. Also explain the frequency warping effect on it. 20

4. What is Gibbs Phenomenon? How is it overcome? Derive the equation for rectangular window. 20

5. (a) What is the effect of finite word length in filters? 10

   (b) Discuss the effects of finite precision arithmetic on digital filters. 10

6. Draw the structures of Direct farm-I, Direct farm-2, Cascade and Parallel realization of : 20

$$H(Z) = \frac{\left(1-Z^{-1}\right)^2}{\left(1-\frac{1}{2}Z^{-1}\right)\left(1-\frac{1}{8}Z^{-1}\right)}$$

7. (a) Give the properties of DFT. 10

   (b) Using long division, find inverse z-transform of :

   $$X(Z) = \frac{1+2Z^{-1}}{1-2Z^{-1}+Z^{-2}}$$
   10

8. Write technical notes on : 2×10=20

   (a) Properties of FFT

   (b) Circular Convolution

M.Tech. 1st Semester (EEE)

Examination, December-2025

ADVANCED COMPUTER POWER SYSTEM

ANALYSIS

Paper : MTEEE-507

Time allowed : 3 Hours]   *[Maximum marks : 100*

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*Note : Attempt **five** questions in all,. All questions carry*

equal marks.

1.   (a)   Explain the Priority List Scheme method for

         Unit Commitment Problem (UCP).

   (b)   Solve a UCP using Priority List Scheme for

         any three thermal units. Assume appropriate

         road demands and constraints.

2.   Discuss the Backward and Forward Dynamic

     programming approaches for solving UCP.

3.   Draw a detailed flowchart for solving UCP using

     Dynamic Programming.

4.   (a)   Derive the Load Flow equations for a simple 3-bus system.

       (b)   Solve the load flow using Gauss-Seidel method for the given system with specified power and admittance matrix (Y-bus). Perform two iterations. Base MVA=100MVA

Bus No	Bus Type	P (pu)	Q (pu)	V (initial)
1	Slack	–	–	$1.05 \angle 0°$
2	PQ	0.5	0.2	$1.0 \angle 0°$
3	PQ	0.6	0.25	$1.0 \angle 0°$

5.   (a)   Discuss the Newton-Raphson method in polar coordinates for load flow analysis.

       (b)   Write the algorithm and draw the flowchart for Newton-Raphson method used in computer applications.

6.   (a)   Explain the necessity of keeping system frequency constant in power systems.

       (b)   For a single area control system, derive the expression for frequency deviation following a step load disturbance. Show steady-state and dynamic responses.

7.   (a)   Derive the tie-line power flow equation for a 2-area system.

       (b)   Discuss the working of Load Frequency Control with tie-line bias control in interconnected systems. Include block diagrams.

8.   (a)   Explain the concept of symmetrical components.

       (b)   A balanced three-phase fault occurs at the terminals of a generator rated 100 MVA, 13.8 kV with sub-transient reactance of 0.2 p.u. Find the fault current.

       (c)   Explain the sequence network connections for a Double Line to Ground (DLG) fault.

M.Tech. 1ˢᵗ Semester (EEE)

Examination, December-2025

COMPUTER CONTROL SYSTEM

Paper : MTEEE-513

Time allowed : 3 Hours]   [Maximum marks : 100

Note: Attempt *five* questions, **Question No. 1 is compulsory.**

1. (i) Write brief about the silicon transducer.   20

    (ii) Describe the centralized digital control system.

    (iii) Write down the architecture of PLC.

    (iv) What do you mean by programmed I/O operations?

2. Write short note on :   20

    (a) Real-time operating system

    (b) Bio-transducer

3. Explain the concept of serial and parallel interfaces.   20

4. Write short note on :   20

    (a) PLC programming

    (b) Configuration of PLC

5. What are the hardware requirement for interfacing
    SCADA system with PLC.   20

6. Write short note on :   20

    (a) Parallel database

    (b) LAN

7. Write short note on :   20

    (a) Fiber optic transducer

    (b) Intelligent sensor

8. Explain Digital to Analog Converter.   20