Seat No.	

Set | P

M.Sc. (Electronics) (Semester - I) (New) (NEP CBCS)
Examination: October/November - 2025
Advanced Microcontroller (2313101)

Day & Date: Wednesday, 29-10-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) _____is the maximum clock frequency of the AVR ATmega8L.
   a) 16 MHz b) 8 MHz
   c) 32 MHz d) 4 MHz

2) PIC16F877 have_____ timers.
   a) 2 b) 3
   c) 4 d) 5

3) _____ is the purpose of the LDI instruction in AVR ATmega8L.
   a) Load data from the SRAM to a register
   b) Load data from Flash memory to a register
   c) Load immediate data into a register
   d) Load data from EEPROM to a register

4) In PIC16F877 the instruction word size is
   a) 8 bits b) 14 bits
   c) 16 bits d) 32 bits

5) In AVR ATmega8L the RJMP instruction do_____.
   a) Return from interrupt
   b) Jump to an absolute address
   c) Call a subroutine
   d) Jump to a relative address

6) _____ ADC channels are present in PIC16F877.
   a) 4 b) 8
   c) 10 d) 12

7) _____ is the stack pointer size in ATmega8L.
   a) 8-bit b) 16-bit
   c) 32-bit d) 64-bit

8) In PIC16F877_____instruction set architecture is used.
   a) ARM b) MIPS
   c) RISC d) CISC

B) State True or False. **04**

1) The AVR ATmega8L microcontroller supports up to 16 MHz clock frequency.
2) PIC16F877 supports both direct and indirect addressing modes.
3) ATmega8L supports SPI, USART, and I2C communication protocols.
4) PIC16F877 supports USB communication natively.

Q.2 Answer the following. (Any Six) **12**

a) Compare PIC and AVR microcontroller.
b) Write a note on Interrupts in PIC microcontrollers.
c) List the steps of ATMEL AVR Studio.
d) Write a note on Status register of PIC microcontroller.
e) Draw the pin structure of AVR ATMega8L.
f) Write a embedded C program for firing of thyristor.
g) List the Salient features AVR microcontrollers.
h) Explain bit oriented instructions of PIC microcontrollers.

Q.3 Answer the following. (Any Three) **12**

a) Write a note on Register banks PIC microcontrollers.
b) Write a note on Analog comparator AVR microcontroller.
c) Explain Jumps and calls instructions.
d) Explain the need of embedded C programming

Q.4 Answer the following. (Any Two) **12**

a) Explain Architecture of AVR ATMega8L.
b) Explain Register direct addressing with suitable example.
c) Write a program to blink the LED array connected at port D.

Q.5 Answer the following. (Any Two) **12**

a) Explain in detail Timers of PIC Microcontrollers.
b) Explain Temperature Measurement embedded system using PIC in details.
c) Write program and Draw LCD interfacing with AVR microcontroller.

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Set **P**

M.Sc. (Electronics) (Semester - I) (New) (NEP CBCS) Examination: October/November - 2025
Industrial Power Electronics (2313102)

Day & Date: Friday, 31-10-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) In SPWM technique modulation index is _____.
   a) 1 b) 0 to 1
   c) 0 to 10 d) 0

2) Input power factor for on- off control is _____.
   a) $\sqrt{k}$ b) k
   c) Vs. $\sqrt{k}$ d) Vs. k

3) Step down cycloconverter has output frequency _____.
   a) Equal to supply frequency
   b) Less than supply frequency
   c) Greater than supply frequency
   d) None of these

4) The output voltage of single phase bridge inverter is _____.
   a) square wave b) sine wave
   c) triangular wave d) both a) and b)

5) In AC voltage controller if the SCRs are switched on for 25 cycles and off for 75 cycles then the duty cycle would be _____.
   a) 4.0 b) 0.20
   c) 3.0 d) 0.25

6) _____ provide variable output voltage with fixed frequency.
   a) Inverter
   b) Cycloconverter
   c) AC voltage controllers
   d) Chopper

7) In EAC technique the average output voltage is controlled by varying _____.
   a) conduction angle b) extinction angle
   c) firing angle d) all of these

8) McMurray-Bedford inverter uses _____ technique of commutation.
   a) voltage commutation b) current commutation
   c) class B d) class A

B) State true or False. **04**

1) Dual converter has four quadrant operations.
2) The average load voltage for bidirectional ac voltage controller is non-zero.
3) In constant frequency system of TRC technique for choppers the output load voltage V_{Lav} can be varied by varying frequency f with t_{on} constant.
4) Cycloconverters provide output with fixed frequency.

Q.2 Answer the following. (Any Six) **12**

a) Define the term controlled rectifiers.
b) Bidirectional controllers must provide firing angle greater than pf angle. Justify.
c) Define the term extinction angle of a thyristor.
d) Give the classification of inverters.
e) Give the applications of rectifiers.
f) What do you mean by the harmonics in the cycloconverter circuit? Mention the methods used for its reduction.
g) Discuss the role of free wheeling diode in rectifiers.
h) What are the choppers? Classify them.

Q.3 Answer the following. (Any Three) **12**

a) Describe the working of single phase unidirectional controller with R-L load.
b) Discuss the working of step up chopper.
c) Explain the operation of EAC technique.
d) Compare between AC voltage controllers and cycloconverters.

Q.4 Answer the following. (Any Two) **12**

a) With neat diagram describe the working of three phase dual converter.
b) Discuss the working of step up cycloconverter.
c) Describe the working of single phase bridge inverter.

Q.5 Answer the following. (Any Two) **12**

a) Explain the detailed operation of Mc-Murray Bedford half bridge inverter.
b) Discuss the working of three phase half controlled rectifier.
c) Describe the operation of three phase half wave controllers.

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Set **P**

M.Sc. (Electronics) (Semester - I) (New) (NEP CBCS) Examination: October/November – 2025
Numerical Methods (2313108)

Day & Date: Monday, 03-11-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) The modified procedure of complete pivoting is called as_____
   a) Additional b) Partial
   c) Reduced d) Modified

2) Laplace transform of integral function is
   a) l/s[f(O)+f(s)] b) s[f(O)+f(s)]
   c) s[f(s)+f(O)J d) 1/s[f(s)+f(0)]

3) In the Taylor series remainder term includes all the terms from _____to____.
   a) 0 t n b) n to∞
   c) 0 to n+1 d) n+1 to∞

4) Round the given number to decimal places: 24.5431 the number is_____.
   a) 24.54 b) 24.543
   c) 24.55 d) 24.5431

5) $\Delta^2 y_0 = \Delta(\Delta y_0)$is _____.
   a) First order forward difference
   b) second order forward difference
   c) First order backward difference
   d) Second order backward difference

6) A matrix B and _____ will have the same determinant.
   a) Its adjoint b) Its inverse
   c) Its echelon matrix d) Its transpose
   .

7) If s^3f(s)-s^2F(0)-sF'(0)-F" (0) = _____.
   a) L{F"(t)} b) L{F'(t)}
   c) L{F"f(s)} d) None of the mentioned

8) The z parameters form a matrix of the form ____.
   a) [z_{11} z_{12};z_{21} z_{22}] b) [z_{11} z_{12};z_{22} z_{21}]
   c) [z_{12} z_{11};z_{21} z_{22}] d) [z_{11} z_{22};z_{12} z_{21}]

B) State true or False. **04**

1) Rounding errors are generated when only required significant digits are considered and remaining are discarded.
2) The voltage across the LC combination in a series RLC circuit is 0.
3) The inverse of a matrix exists if and only if it is a non-singular matrix.
4) Simpson's Rule used for solution of system of linear equations.

Q.2 Answer the following. (Any Six) **12**

a) What is forward substitution method?
b) Distinguish between interpolation and extrapolation.
c) Define symmetric matrix and determinant matrix.
d) Write newton's backward interpolation formula.
e) What is inverse Laplace transform?
f) Write a note on system of linear equation.
g) How to find out the divided differences table for unequal intervals.
h) What is error? Define absolute error.

Q.3 Answer the following. (Any Three) **12**

a) Write a note on T network.
b) Find the inverse Laplace transform of $f(s) = \frac{s+2}{s2-2s+5}$
c) Explain Taylor's series method.
d) If $F(t)=t^2$, $0<t<2$ and $F(t+2)=F(t)$, find L{t}

Q.4 Answer the following. (Any Two) **12**

a) Prove that the existence of the Laplace transform $\int_{t0}^{\infty} e^{-st} f(t).dt$ exists where s>a
b) Dividing interval into 5 points find the integration of a function $I= \int_0^2 x^2 dx$ by using Simpson's rule.
c) Prove that initial value theorem.

Q.5 Answer the following. (Any Two) **12**

a) Write a note on interpolation. Find out tan (17°) by using Newton's forward method.

x^0	0	4	8	12	16	20

b) Write a note on pivoting. Solve the system of equations using gauss Jordan method.

$2x_1 + x_2 + 2x_3 + x_4 = 6$
$6x_1 - 6x_2 + 6x_3 + 12x_4 = 36$
$4x_1 + 3x_2 + 3x_3 - 3x4 = -1$
$2x_1 + 2x_2 - x_3 + x_4 = 10$

c) Draw the RC circuit and Find the Laplace transform of RC circuit in numerical analysis.

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Set **P**

M.Sc. (Electronics) (Semester - I) (New) (NEP CBCS) Examination: October/November - 2025
Research Methodology (2313103)

Day & Date: Thursday, 06-11-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) A conceptual framework can be understood as a ____ that you require.
a) Research design b) Synopsis of Research
c) Research paradigm d) Research hypothesis

2) To test null hypothesis is, a researcher uses_____
a) T test b) ANOVA
c) X^2 d) Factorial analysis

3) The process not needed in experimental research is:
a) Controlling b) Manipulation and replication
c) Reference collection d) Observation

4) Bibliography given in a research report_____
a) helps those interested in further research
b) shows vast knowledge of the researcher
c) has no relevance to research
d) all the above

5) Action-research is_____
a) An applied research
b) A research carried out to solve immediate problems
c) A longitudinal research
d) All the above

6) A comprehensive layout of the research report should comprise
a) Preliminary pages b) main text
c) end matter d) all of the mentioned

7) Formulation of hypothesis may not be required in_____
a) Survey method b) Experimental studies
c) Historical studies d) Normative studies

8) _____is called non-probability sampling.

a) Cluster sampling b) Quota sampling
c) Systematic sampling d) Stratified random sampling

B) State true or False. **04**

1) Scientific methods consist of interpretation of data.
2) A null hypothesis is when there is no any difference between the variables.
3) Research concerning some natural phenomenon or relating to pure mathematics are examples of applied research.
4) Survey is not the method of Research.

Q.2 Answer the following. (Any Six) **12**

a) What is research proposal?
b) How to formulate research problem?
c) What are the legal aspects in research?
d) State problem solving strategies.
e) State 7 C's of effective research writing.
f) What is need of interpretation?
g) Explain classification in research.
h) Write difference between Hypothesis and Problem.

Q.3 Answer the following. (Any Three) **12**

a) Write a note on Chi-square test.
b) Explain the concepts relating to research design.
c) Explain types of hypotheses.
d) Explain the techniques involved in defining a problem.

Q.4 Answer the following. (Any Two) **12**

a) Distinguish between univariate, bivariate and multivariate analysis.
b) What is scientific method? Explain steps involved in scientific method.
c) Explain applied vs. fundamental research.

Q.5 Answer the following. (Any Two) **12**

a) What is research? Explain types of research.
b) Explain the steps involved in technique of interpretation.
c) Explain characteristics of hypothesis.

SLR-HJ-6

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Set P

M.Sc. (Electronics) (Semester - II) (New) (NEP CBCS) Examination: October/November - 2025
Modern Control Theory (2313201)

Day & Date: Tuesday, 28-10-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) The element of the system that controls the process is called as _____.
a) Controller b) Input
c) Processor d) Plant

2) For 2% tolerance, the settling is given by _____.
a) Ts = ξ wn b) Ts = ξ/wn
c) Ts = 4/ξ wn d) Ts = ξ/4 wn

3) _____ Applications software's is used to obtain an accurate root locus.
a) LISP b) MATLAB
c) dBase d) Oracle.

4) A block diagram cannot have a _____.
a) Signal flow graph b) Input signal
c) Forward path d) Feedback path

5) Input signal to control system is also called as _____ signal.
a) feed b) excitation
c) control d) forward

6) If a control system has one input and one output, it is termed as _____ system.
a) a single feedback b) SIMO
c) MIMO d) SISO

7) _____ is used to obtain transfer function.
a) Mason's gain formula b) Nyquist Criterion
c) Bode plot d) Functional analysis

8) If three gain blocks having gains G1, G2 and G3 are connected in series, then resulting gain of the system is _____.
a) G1/(G2+G3) b) G1+G2+G3
c) G1 x G2 x G3 d) G1/G2/G3

B) Write True or False. **04**

a) Root locus technique gives transient and stability response.
b) According to Routh-Hurwitz criteria if the roots of the characteristic equation lie on the right half of the ′S′ plane for the system to be stable.
c) A step function has value of zero for t<0.
d) Chain node of SFG has branches in both directions.

Q.2 Answer the following. (Any Six) **12**

a) Define the terms plant, input, output and disturbance in a control system.
b) State any two properties of Signal flow graph. Justify each with an example.
c) Write a note on Proportional control mode.
d) Write a note on closed loop control system.
e) Define Steady State Error with suitable diagram.
f) Compare the open loop and closed loop system.
g) Explain in detail the rules used for block diagram reduction.
h) Compare Pl and PID controller.

Q.3 Answer the following. (Any Three) **12**

a) Examine the stability of control system having characteristic equation S3+4S2 +S+6 = 0 by Routh's Criterion.
b) Derive an expression for steady state error for step and ramp input.
c) Give the advantages and features of transfer function.
d) Write a note polar plot.

Q.4 Answer the following. (Any Two) **12**

a) With suitable example describe the closed loop control system.
b) Define the term root locus. With suitable example discuss the angle condition and magnitude condition.
c) Describe in detail the Nyquist's criteria for the stability of the system.

Q.5 Answer the following. (Any Two) **12**

a) Describe the effect of damping factor ξ the transient response of the second order system.
b) Define the terms node, branch, source node, sink node, chain node, and forward path.
c) Explain the concept of poles and zeroes with suitable example.

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M.Sc. (Electronics) (Semester - II) (New) (NEP CBCS) Examination: October/November - 2025
Real Time Operating System (2313202)

Day & Date: Thursday, 30-10-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) Flash memory is used to store _____ in AVR microcontrollers.
   a) Variables b) Programs
   c) Temporary data d) Stack

2) The kernel is responsible for _____
   a) Data entry b) File storage
   c) Task scheduling d) Display output

3) The _____ occurs when two tasks wait for each other forever.
   a) Deadlock b) Starvation
   c) Jitter d) Preemption

4) MicroC/OS-II follows _____ kernel design.
   a) Hybrid b) Monolithic
   c) Layered d) Modular

5) In RTLinux, real-time tasks run in _____ space.
   a) User b) Cloud
   c) Kernel d) Cache

6) In AVR, the internal EEPROM is primarily used for _____
   a) Temporary storage b) Code execution
   c) Clock synchronization d) Permanent data storage

7) A real-time operating system guarantees:4 _____
   a) Timely task completion
   b) High throughput
   c) User-friendly interface
   d) Maximum memory usage

8) The _____ are used for task-to-task communication.
   a) Delay loops b) Timers
   c) Message queues d) Stacks

B) State True or False. **04**

a) The ATmega328P has 24 many GPIO pins.
b) RTLinux can interface with Linux using RT-FIFO devices.
c) MicroC/OS-II supports Round robin scheduling only.
d) The function 'OSInit()' initializes the RTOS.

Q.2 Answer the following. (Any Six) **12**

a) Draw the structure of RTOS.
b) Explain the use of Sharing of resources.
c) Draw the Clock circuit and Reset circuit of AVR microcontroller base embedded system.
d) Write note on Priority Inversion.
e) What is Race condition?
f) Define Soft Real Time Systems.
g) Write note on Kernel Objects.
h) Draw the flowchart of creation of task.

Q.3 Answer the following. (Any Three) **12**

a) Write any four characteristics of Real-Time operation system.
b) Write note on concept of semaphore.
c) Explain creation of task with suitable example.
d) Write note on Binary semaphore with suitable example.

Q.4 Answer the following. (Any Two) **12**

a) Explain Mutexes, Write concept of mutex and mutex management.
b) What do you understand the RTOS Kernel MicroC/OS-II, explain in detail.
c) Explain Mailboxes in intertask communication.

Q.5 Answer the following. (Any Two) **12**

a) Explain in detail designing of AVR ATmega8L microcontroller based embedded systems for measurement of pH.
b) Explain in detail POSIX Pthreads.
c) Write LED interfacing program based on Tiny RTOS kernel with suitable block diagram.

SLR-HJ-8

Seat No.		Set	P

M.Sc. (Electronics) (Semester - II) (New) (NEP CBCS)
Examination: October/November – 2025
Signals and Systems (2313207)

Day & Date: Saturday, 01-11-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) The amplitude spectrum of a signal refers to: ____.
   a) Frequency vs power
   b) Frequency vs energy
   c) Frequency vs magnitude of Fourier coefficients
   d) Time vs amplitude

2) Which of the following is not a component of the MATLAB desktop environment?
   a) Command Window b) Editor
   c) Terminal d) Workspace

3) A system is said to be memoryless if: ____.
   a) Its output depends only on past inputs
   b) Its output depends only on the present input
   c) It stores previous inputs
   d) It operates on future inputs

4) Toolboxes in MATLAB are: ____.
   a) GUI editors
   b) Pre-installed data files
   c) Customizable toolbars
   d) Collections of specialized functions

5) The Fourier series representation exists if the signal satisfies: ____.
   a) Newton's law b) Dirichlet conditions
   c) Nyquist theorem d) Euler's equations

6) Which operation is used to find the output of an LTI system?
   a) Multiplication b) Convolution
   c) Differentiation d) Integration only

7) The fourier series coefficient of the shifted signal $x(t-t_0)$ are_____
   a) $e^{-jnwt}\, c_n$ b) $e^{jnwt}\, c_n$
   c) $e^{wt}\, c_n$ d) $e^{-wt}\, c_n$

8) $X(n) = a^{|n|}, |a| < 1$ is _____.
   a) An energy signal
   b) Neither an energy signal nor a power signal
   c) A power signal
   d) An energy as well as a power signal

B) State true or False. **04**

a) Impulse response fully characterizes an LTI system.
b) Signal addition is a non-linear operation.
c) Parseval's theorem helps calculate average power in periodic signals.
d) Ramp signal is the integral of a unit step signal

Q.2 Answer the following. (Any Six) **12**

a) Write a Matlab Program to plot a continuous time cosine signal.
b) What is a system in signal processing?
c) What are Dirichlet conditions for the existence of a Fourier series?
d) State the condition for BIBO stability of continuous-time systems.
e) Give examples of deterministic and non-deterministic signals.
f) What is the significance of Fourier coefficients?
g) State types of signals.
h) What is MATLAB?

Q.3 Answer the following. (Any Three) **12**

a) What are the basic operations that can be performed on signals?
b) What is Parseval's theorem? What does it state for power signals?
c) What are toolboxes in MATLAB? Give two examples.
d) What does it mean for a system to be time-invariant? Give an example.

Q.4 Answer the following. (Any Two) **12**

a) Obtain liner convolution of following sequence using graphical method x(n) = {1,2,1,2} and h(n) = {1,3,4, 5, 3, 2}
b) Determine whether the following system is linear or not
$y(n) = \frac{1}{3}[x(n) + x(n-1) + x(n-2)]$
c) Explain how symmetry properties (even, odd) reduce the effort in computing Fourier coefficients. Give examples.

Q.5 Answer the following. (Any Two) **12**

a) Obtain the fourier components of the periodic square wave which is symmetrical with respect to the

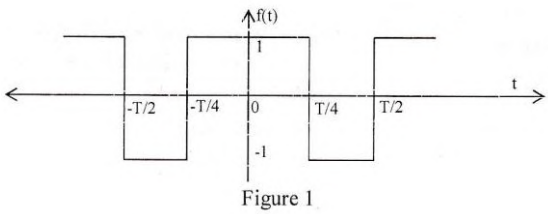

Figure 1

b) Explain the basic structure of MATLAB including its environment.
c) Prove that LTI system is completely characterized by unit impulse function.

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M.Sc. (Electronics) (Semester - III) (New) (NEP CBCS)
Examination: October/November - 2025
Digital Signal Processing (23131301)

Day & Date: Wednesday, 29-10-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) The sampling frequency of a signal is F_s = 2000 samples per second then its Nyquist interval is _____.
   a) 0.5 sec b) 5 msec
   c) 5 sec d) 0.5 msec

2) _____ has to be performed in sampling rate conversion by rational factor.
   a) Decimation b) Interpolation
   c) Sampling d) None of Mentioned

3) The FT of _____ valued time signal has no symmetry.
   a) Odd b) Even
   c) Real d) Even and odd

4) The direct evaluation DFT requires _____ complex multiplications.
   a) $\mathrm{N}^2 - 1$ b) N^2
   c) N d) None of Mentioned

5) The property of twiddle factor is called as _____ property.
   a) Linearity b) Periodicity
   c) Causality d) None of Mentioned

6) Inverse Z transform by power series expansion is also called as _____ division method.
   a) Direct b) Long
   c) Both a and b d) Indirect

7) _____ is the linearity property of z-transform. $x(n) \leftrightarrow X(z)$
   a) $x(n) + y(n) \leftrightarrow X(z)Y(z)$
   b) $x(n) + y(n) \leftrightarrow X(z) + Y(z)$
   c) $x(n)y(n) \leftrightarrow X(z) + Y(z)$
   d) $x(n)y(n) \leftrightarrow X(z)Y(z)$

8) If we reverse the directions of all branch transmittances and interchange the input and output in the flow graph, then the resulting structure is called as _____.
   a) Direct form-I b) Direct form-II
   c) Transposed form d) None of the mentioned

B) State true or False. **04**

1) If the discrete time LTI system is BIBO stable Entire z-plane, except at z=∞ is the ROC of the system function H (z).
2) FFT stands for Fast Fourier Transform.
3) The ROC of z-transform of any signal can contain poles.
4) Long division method is called as direct division method.

Q.2 Answer the following. (Any Six) **12**

a) Write a note on quantization with A/D conversion.
b) List the properties of Fourier transform.
c) Write a note on auto-correlation.
d) List the different methods of IZT.
e) Explain region of convergence of z transform.
f) Define ideal filter.
g) Differentiate between Z transform and DFT.
h) State Initial Value Theorem.

Q.3 Answer the following. (Any Three) **12**

a) Explain FT of some standard signals.
b) What are the advantages and disadvantages of window method?
c) Find the FT of the signal x (t) = cos(ω_0t).
d) Explain Aliasing & Anti-aliasing problem.

Q.4 Answer the following. (Any Two) **12**

a) Prove that multiplication of two DFTs is equivalent to the circular convolution of their sequences in time domain.
b) What is Kaiser Window? Explain the procedure for designing an FIR filter using the Kaiser window.
c) State and prove Parseval's theorem.

Q.5 Answer the following. (Any Two) **12**

a) Determine direct form-II realization for each of the following LTI system.
   i) $2y(n) + y(n-1) - 4y(n-3) = x(n) + 3x(n-1)$
   ii) $y(n) = x(n) - x(n-1) + 2x(n-2) - 3x(n-4)$
b) State and prove scaling property of Fourier transform.
c) Draw flow diagram of DITFFT for N=16.

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Set **P**

M.Sc. (Electronics) (Semester - III) (New) (NEP CBCS) Examination: October/November - 2025
ARM Microcontroller and System Design (23131303)

Day & Date: Friday, 31-10-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) In LPC 2148 PLL setting time is _____.
   a) 100 µs b) 50 µs
   c) 20 µs d) 10 µs

2) In LPC 2148, ADC0 has _____ channels.
   a) 3 b) 6
   c) 7 d) 8

3) To increase the code density ARM uses _____.
   a) 64 bit instruction set
   b) Jazzale 32 bit instruction set
   c) Thumb 16 bit instruction set
   d) None of these

4) In LPC 2148, when internal reset is removed the processor begins executing at _____.
   a) address 0 b) address 1
   c) address 5 d) address 7

5) The Cache is placed between _____.
   a) Flash memory and registers
   b) Main memory and core
   c) Peripherals
   d) None of these

6) In LPC 2148 on chip static RAM is _____.
   a) 1-8KB b) 1-16KB
   c) 4-20KB d) 8-40KB

7) _____ instructions use the ALU to generate an address to be held in the address register and broadcast on the Address bus.
   a) CMP b) Load and store
   c) Both a and b d) MOV

8) What are the values of the I and F bits in the Program Status Register on reset?
   a) $\mathrm{I} = 0, \mathrm{F} = 0$ b) $\mathrm{I} = 1, \mathrm{F} = 1$
   c) $\mathrm{I} = 0, \mathrm{F} = 1$ d) $\mathrm{I} = 1, \mathrm{F} = 0$

B) State True or False. **04**

1) In LPC 2148 $\mathrm{I}^2\mathrm{C}$ bus is bidirectional.
2) Supervisor mode is non- privileged mode.
3) The VIC is more powerful than the standard interrupt controller.
4) In LPC 2148, the maximum DAC output voltage is Vref voltage.

Q.2 Answer the following. (Any Six) **12**

a) What do you mean by embedded system? Write its application.
b) Compare between CISC and RICS.
c) Draw interfacing diagram of Optocoupler to ARM processor.
d) What are the types of CORTTEX-M series.
e) Why ARM is used in Mobile?
f) Write advanced features of ARM processor.
g) Discuss reset circuit in ARM.
h) State the data types supported by ARM processors.

Q.3 Answer the following. (Any Three) **12**

a) Explain program counter.
b) Write a note on pipelining in ARM processor.
c) Explain $\mathrm{I}^2\mathrm{C}$ bus controllers of LPC 2148.
d) Explain the operating modes of ARM Processor with suitable examples.

Q.4 Answer the following. (Any Two) **12**

a) State an explain the nomenclature used for ARM processor with example.
b) Explain UART used for LPC 2148.
c) Explain the embedded system design using ARM LPC 2148 microcontroller for temperature measurement.

Q.5 Answer the following. (Any Two) **12**

a) Write a note on Thumb and Jazzele instruction set.
b) Explain architecture of ARM.
c) What is ARM exception? How ARM goes in exception mode? How ARM core come out of exception mode.

Seat No.	

Set **P**

M.Sc. (Electronics) (Semester - III) (New) (NEP CBCS) Examination: October/November - 2025
Advanced Digital Design with VHDL (23131306)

Day & Date: Monday, 03-11-2025 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct answer. 08

1) In case of Data Types STD_LOGIC_1164 the meaning of 'L' is_____
   a) Low b) 0
   c) Weak 0 d) High impedance

2) In case of VHDL, GENERIC clause or statement is declared in_____
   a) Architecture b) entity
   c) Process d) All of these

3) Which of the following adding operator used in VHDL circuit design?
   a) '+' b) '-'
   c) '&' d) All of these

4) In which type of category, the GENERATE statement fall?
   a) Sequential b) Concurrent
   c) Process d) analog

5) In case of VHDL, ':=' assignment operator defines_____ value.
   a) Generic b) variable
   c) Constant d) All of these

6) Which of the following technology is used for PLD programming?
   a) SRAM b) EPROM
   c) Flash d) All of these
   .

7) The Very High-Speed Integrated Circuit HDL is _____description language.
   a) Software b) Hardware
   c) Digital d) Analog

8) In case of VHDL. by which clause the package std_logic_1164 is accessed?
   a) Library b) Use
   b) Type d) Both a & b

B) State true or False. **04**

1) The extended identifier is a sequence of character written between two forward slashes.
2) The NAND operator and NOR operator are not associative operators.
3) The configuration of CPLD type of design is based on a Sum-Of-Products (SOP) architecture.
4) The wait statement is a concurrent statement.

Q.2 Answer the following. (Any Six) **12**

a) Give the difference between CPLD and FPGA.
b) Write entity for NAND gate.
c) What is an EDA tools?
d) Give the advantages of VHDL.
e) Write entity for 1:8 MUX.
f) Give the syntax of Process statement.
g) Write the names of sequential statement for VHDL.
h) Explain the role of Library in VHDL

Q.3 Answer the following. (Any Three) **12**

a) Write a note on Microcell.
b) What are the capabilities and features of VHDL?
c) In case of PLD discuss architecture of CPLD.
d) Explain the Attributes and Generic

Q.4 Answer the following. (Any Two) **12**

a) State and explain the different types of architecture bodies for full adder.
b) Discuss ‘LOOP’ statement in detail with suitable example.
c) Give VHDL code for ALU using concurrent code

Q.5 Answer the following. (Any Two) **12**

a) Explain the various language element of VHDL and Explain two operators in detail.
b) Give classification of PLD devices. Discuss architecture of FPGA
c) Give VHDL code for 4-bit binary to gray code.

Seat No.	

Set **P**

M.Sc. (Electronics) (Semester - IV) (New) (NEP CBCS) Examination: October/November - 2025
Networking and Data Communication (23131401)

Day & Date: Tuesday, 28-10-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) ATM uses _____
a) Asynchronous frequency division multiplexing
b) Asynchronous time division multiplexing
c) Asynchronous space division multiplexing
d) Asynchronous amplitude division multiplexing

2) The size of an IP address in IPV6 is _____
a) 4-Bytes b) 128-bits
c) 8-bytes d) 100-bits

3) In OSI network architecture, the routing is performed by _____
a) Data link layer b) Session layer
c) Network Layer d) Transport Layer

4) In ring topology, the computer in possession of the _____ can transmit data.
a) Data b) Packet
c) Access Method d) Token

5) We use Cryptography term to transforming messages to make them secure and immune to _____
a) Change b) Idle
c) Attacks d) Defend

6) Hyper Text Transfer Protocol (HTTP) support _____
a) Proxy Domain b) Proxy Documents
c) Proxy IP d) Proxy Server

7) SONET defines _____ layers.
a) 3 b) 2
c) 4 d) 6

8) Which of the following represents the fastest data transmission speed?

a) Gbps b) Kbps
c) bps d) Bandwidth

B) Write True or False. **04**

a) Repeater is the only connecting device that operates at data link layer.
b) A piconet can have 2 number of primary devices.
c) Flag field of an HDLC frame is 11111111.
d) Use of guard band prevents signal overlapping in FDM.

Q.2 Answer the following. (Any Six) **12**

a) What is network? What are the benefits of network?
b) What are major differences between LAN and WAN?
c) Explain logical addressing.
d) Explain unipolar NRZ technique of coding.
e) What are the advantages of IPV6 over IPV4?
f) Explain data representation in networking.
g) Explain Routers.
h) Enlist network security services.

Q.3 Answer the following. (Any Three) **12**

a) Explain wireless LAN IEEE 802.11.
b) Explain IPV4 addressing.
c) Explain SMTP.
d) Explain dual stacking.

Q.4 Answer the following. (Any Two) **12**

a) Explain OSI model.
b) Explain circuit switched network.
c) Explain services provided by user agent in electronic mail.

Q.5 Answer the following. (Any Two) **12**

a) Explain ATM technology.
b) Explain in detail PPP.
c) What do you mean by analog-to-analog data conversion? Explain in detail frequency modulation.

Seat No.	

Set **P**

M.Sc. (Electronics) (Semester - IV) (New) (NEP CBCS) Examination: October/November - 2025
Mechatronics and Industrial Automation (23131403)

Day & Date: Thursday, 30-10-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) An OR function implemented in ladder logic uses: _____
   a) Normally-closed contacts in series
   b) Normally-open contacts in series
   c) Normally-closed contacts in parallel
   d) A single normally-closed contact

2) A PLC program must be downloaded from the PC to the PLC using a _____ interface.
   a) Mechanical b) Network
   c) Communication d) Binary

3) Which of the following cannot be an input that is given to the PLC?
   a) Coil b) Manual switches
   c) Relays d) Sensors

4) SCADA systems are primarily used for ____ control.
   a) Closed-loop b) Supervisory
   c) Manual d) Mechanical

5) The primary goal of mechatronic is to improve product _____.
   a) Size b) Packaging
   c) Performance d) Color

6) The main advantage of a PLC over hardwired relay systems is ____.
   a) Higher cost b) Slower response
   c) Bigger size d) Flexibility

7) The _____ is the part of the PLC where programs are written and stored.
   a) Input module
   b) Output module
   c) Central Processing Unit (CPU)
   d) Power supply

8) A normally open contact in ladder logic closes when the input is _____.

a) False b) Active
b) Off d) Low

B) State True or False. **04**

a) In PROFIBUS DP the DP stands for Decentralized Periphery.
b) RTU stands for Remote Transfer Unit.
c) The Ladder diagram is most popular language for PLCs.
d) The Boolean expression is not used for PLC programming.

Q.2 Answer the following. (Any Six) **12**

a) Explain Relay in detail.
b) Write note on Registers.
c) List the examples on mechatronics systems.
d) List the Advantages of Distributed Control System (DCS).
e) Write Applications of mechatronics systems.
f) Define Coils.
g) Write note on IO modules characteristics.
h) List the types of SCADA system.

Q.3 Answer the following. (Any Three) **12**

a) Write note on design Process.
b) Explain Sequencer functions.
c) Write note on Ladder Diagram.
d) Write note on DCS communication.

Q.4 Answer the following. (Any Two) **12**

a) Explain Architecture of programmable controller.
b) Explain Arithmetic functions of PLC with suitable example.
c) Compare Centralized Control system (CCS) and Distributed Control System (DCS).

Q.5 Answer the following. (Any Two) **12**

a) Explain SCADA Protocols Modbus and Profibus.
b) Design Ladder diagrams for process control description with suitable example.
c) Write advantages and disadvantages of mechatronics systems.

Seat No.	

Set **P**

M.Sc. (Electronics) (Semester - IV) (New) (NEP CBCS) Examination: October/November – 2025
Microwave Devices, Antennas and Measurements (23131406)

Day & Date: Saturday, 01-11-2025 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) Attenuation of a propagating wave is due to _____.
   a) Conductor loss
   b) Di-electric loss
   c) Sum of both conductor loss and di electric loss
   d) Attenuation is different from the losses

2) The TEDs are used_____
   a) transit time
   b) dielectric relaxation time
   c) domain growth time constant
   d) all of the mentioned

3) In transverse magnetic waves, ____.
   a) E is parallel to H
   b) H is parallel to wave direction
   c) E is transverse to H
   d) H is transverse to wave direction

4) When either a voltage or current is applied to the terminals of bulk solid-state compound GaAs, a differential _____ is developed in that bulk device.
   a) negative voltage b) positive resistance
   c) negative resistance d) None of the mentioned

5) If a device is passive and contains no anisotropic elements, then the device is _____ network.
   a) Reciprocal b) Non reciprocal
   c) Lossless d) Lossy

6) For a lossless network, the impedance and admittance matrices are _____
   a) Real b) Purely imaginary
   c) Complex d) Rational

7) The _____ microwave tube uses buncher and catcher cavities.
   a) Magnetron b) Klystron
   c) Reflex klystron d) Travelling wave tube

8) Polarization of EM wave is in_____
   a) the direction of electric field
   b) the direction of magnetic field
   c) the directions of electric and magnetic field
   d) None of the mentioned

B) State true or False. **04**

1) TWT is a slow-wave structure.
2) The Frequency range of Ku band is 4 to 8GHz.
3) Microwaves are travel in straight line and reflected by the conducting surface.
4) In a magnetron oscillator, the RF wave travels along the helix from the collector towards the electron gun.

Q.2 Answer the following. (Any Six) **12**

a) State applications of microwave.
b) What is antenna?
c) Write full form of VSWR.
d) Define Q factor.
e) What is microwave?
f) Distinguish between Transmission Line and Waveguide.
g) Define twists and bends.
h) What is TEM wave?

Q.3 Answer the following. (Any Three) **12**

a) Explain E-plane Tee in detail.
b) Write a note on Gunn Effect. Explain InP Diodes.
c) Derive the transmission line equation. Explanation and equation.
d) Write a note on impedance matching.

Q.4 Answer the following. (Any Two) **12**

a) Explain Klystron and Multicavity Klystron Amplifiers.
b) A certain transmission line has characteristics impedance is $[75 + j0.01\Omega]$ and is terminated in load impedance of $[75 + j0.01\Omega]$ compute.
   a) Reflection coefficient(Γ)
   b) Transmission coefficient (Γ)
c) What are the Maxwell's equations? Explain with its boundary conditions.

Q.5 Answer the following. (Any Two) **12**

a) Derive the wave equation in good conductor.
b) Discuss Slot antenna and Microstrip Antennas.
c) Write a note on Rat Race Junction. Explain Directional Couplers.