Seat No.	

Set | P

M.Sc. (Electronics) (Semester - I) (New) (NEP CBCS)
Examination: March/April – 2026
Advanced Microcontroller (2313101)

Day & Date: Friday, 17-04-2026 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) _____ architecture does PIC16F877 follow.
   a) Von Neumann b) Harvard
   c) CISC d) DSP

2) The AVR instruction “RJMP” is used for _____.
   a) Relative jump within ±2K words
   b) Absolute jump
   c) Subroutine call
   d) Return from interrupt

3) The instruction word size of PIC16F877 is _____.
   a) 8 bits b) 14 bits
   c) 16 bits d) 32 bits

4) In AVR _____ instruction clears the Watchdog Timer.
   a) CLRWDT b) WDR
   c) RESET d) NOP

5) _____ instruction halts CPU until an interrupt occurs.
   a) NOP b) CLRWDT
   c) SLEEP d) RETFIE

6) USART in ATmega8L is _____.
   a) Only synchronous
   b) Only asynchronous
   c) Both synchronous and asynchronous
   d) Not supported

7) The instruction “BSF STATUS, RP0” in PIC16F877 does _____.
   a) Clear bit b) Sets register bank
   c) Jumps to subroutine d) Clears Watchdog

8) The reset vector of ATmega8L is at _____.
   a) 0x0000 b) 0x0004
   c) 0x0100 d) 0xFFFF

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

1) The PIC16F877 is an 8-bit microcontroller.
2) The ATmega8L supports only assembly language programming.
3) PIC16F877 does not support interrupts.
4) The ATmega8L provides a 10-bit ADC with 6 channels.

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

a) Explain ADC and ADD instructions.
b) Write the use of Compare capture mode.
c) Write the applications of watchdog timer.
d) List the applications of PIC microcontroller.
e) Compare WinAVR and Codevision IDE for AVR microcontroller.
f) Write note on types of the RESET of PIC microcontroller.
g) List the instructions used for SRAM direct addressing.
h) Write Salient features of AVR.

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

a) Explain Register bank of AVR microcontroller.
b) Write note on program constructs of AVR microcontroller.
c) Explain in detail watchdog timer of PIC microcontroller.
d) Write note on Downloadable Flash program memory.

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

a) Write program for relay interfacing with suitable diagram.
b) Write program for LED blinking with suitable diagram.
c) Explain Interfacing of on Chip DAC.

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

a) Write program for USART interfacing with suitable block diagram.
b) Explain Logical and bit wise instructions of AVR microcontroller.
c) Write the program Temperature controlling with suitable block diagram.

Seat No.	

Set P

M.Sc. (Electronics) (Semester - I) (New) (NEP CBCS) Examination: March/April – 2026
Industrial Power Electronics (2313102)

Day & Date: Monday, 20-04-2026 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 PWM technique the output voltage is controlled by changing the _____.
   a) firing angle b) width of pulses
   c) extinction angle d) All of these

2) For unidirectional AC voltage controller if α varies from o to π the V_{rms} varies from _____.
   a) Vs to $Vs/\sqrt{2}$ b) Vs to $Vs/2$
   c) Vs to $\sqrt{2}.Vs$ d) None of these

3) In cycloconverter output is controlled by controlling the ____ of the thyristors.
   a) conduction angle b) phase
   c) width d) delay angle

4) In choppers, for chopping period T, the output voltage can be controlled by varying _____.
   a) T keeping Ton constant
   b) Toff keeping T constant
   c) Ton keeping T constant
   d) all of these

5) For bidirectional controllers _____ must be greater than the pf angle of load.
   a) conduction angle of thyristor
   b) firing angle of thyristor
   c) extinction angle of thyristor
   d) All of these

6) The step down chopper feeds DC motor with no voltage drop. If the source voltage is 200 V and duty cycle is 0.5. The output voltage of this chopper is _____.
   a) 200 V b) 150 V
   c) 100 V d) 250 V

7) Single phase bidirectional controller delivers maximum power for α equal to _____.
   a) (π/2) radian b) 0
   c) π radian d) (π -α) radian

8) In single pulse modulation of PWM inverter gives the output in the form of _____.
   a) square wave b) quasi square wave
   c) both a) and b) d) none of these

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

1) The intergroup reactor in cycloconverter is used to prevent short circuiting.
2) Multiphase choppers has reduced ripple amplitude and reduced ripple frequency.
3) Thyristors of AC voltage controllers need no extra commutation circuitry.
4) Single phase half bridge inverter provides square wave output.

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

a) Justify the name controlled rectifiers. Give its classification.
b) Compare unidirectional and bidirectional controllers.
c) Define the term firing angle of a thyristor. Give its notation.
d) Give the applications of inverter.
e) What is power factor of a controlled rectifier? Enlist the methods for improvement of power factor.
f) Draw the diagram of class B Chopper.
g) Discuss the working of single phase half wave controlled rectifier.
h) Enlist the advantages of cyclonverters.

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

a) Describe the working of single phase bidirectional controllers with R-L load.
b) Discuss the working of step down chopper.
c) Explain the operation of SAC technique.
d) Draw a neat labeled diagram for three phase to three phase cycloconveter.

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

a) With neat diagram describe the working of single phase dual converter.
b) Discuss the working of single phase bridge type cycloconverter.
c) Describe the working of Current Source inverter.

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

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

Seat No.	

Set P

M.Sc. (Electronics) (Semester - I) (New) (NEP CBCS) Examination: March/April – 2026
Numerical Methods (2313108)

Day & Date: Wednesday, 22-04-2026 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) For initial value problem, all the conditions are specified at the same value of _____.
   a) dependent variable b) independent variable
   c) both a and b d) none of the mentioned

2) Cramer's Rule fails for _____.
   a) Determinant = 0 b) Determinant < 0
   c) Determinant > 0 d) Determinant = non-real

3) The final corrector of the fourth-order Runge-Kutta method uses _____.
   a) Midpoint rule b) Backward Euler method
   c) Simpson's rule d) Trapezoidal rule

4) _____ approximates f(x) by straight line.
   a) Simpson's rule b) Trapezoidal rule
   c) Midpoint rule d) All of the mentioned

5) _____ is the example of the direct method.
   a) Gauss elimination b) Gauss Jordan
   c) Backward substitution d) all of the mentioned

6) True value $= 1 \times 10^{6}$, approximate value $= 0.5 \times 10^{-6}$ the relative error is _____.
   a) -0.5 b) 0.5
   c) 1 d) -1

7) In the least square method, we use _____ to find the value of unknowns
   a) normal equations b) regression equations
   c) general equations d) auxiliary equations

8) Consider an n^{th} order accurate Runge-Kutta method, _____ is the derivative evaluated at the fourth time-step.
   a) one time b) two times
   c) four times d) n times

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

1) Simpson's Rule used for solution of system of linear equations.
2) The inverse of a matrix exists if and only if it is non-singular matrix.
3) $\Delta f(x) = f(x+h) - f(x)$ is for backward differences.
4) The Elimination process in Gauss Elimination method is also known as Forward Elimination.

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

a) Define Interpolation and Extrapolation.
b) What is least square fitting?
c) Write a definition of absolute error?
d) Find determinant of following matrix:

$$A = \begin{matrix} 1 & 2 & 1 \\ 2 & 3 & 1 \\ 3 & 5 & 2 \end{matrix}$$

e) Define boundary value problems.
f) What is importance of numerical methods in electronics?
g) What is tridiagonal system?
h) Define LT.

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

a) Write a note Triangularization method.
b) State and prove that the Laplace transform of Derivatives function.
c) What is Matrix? Explain different types of the matrix.
d) Find $L^{-1}\{1/(s-2) + 2/(s+5) + 6/s^4$

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

a) What is truncation error in series approximation? Give example on it.
b) Write a note on pivoting.
c) Find $L\{e^{-t}(3\sin h\, 2t - 5cosh2t)\}$

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

a) Find out the emf observed at the temperature 25 °c by fitting the following data to straight line

t(°c)	0	10	20	30
emf(mv)	53.5	59.5	65.2	70.6

b) Solve the system of equation using forward substitution method
$5x - y + z = 10$
$2x + 4y = 12$
$X + y + 5z = -1$

c) Find the equation of the cubic curve that passes through the points (-1, -8), (0, 3), (2, 1) and (3, 2) using Lagrange's interpolation formula.

Seat No.	

Set | P

M.Sc. (Electronics) (Semester - I) (New) (NEP CBCS) Examination: March/April – 2026
Research Methodology (2313103)

Day & Date: Friday, 24-04-2026 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 answer. 08

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

2) In _____ researcher has to use facts or information already available, and analyze these to make a critical evaluation of the material.
   a) analytical research b) fundamental research
   c) applied research d) empirical research

3) A research problem does exist if _____.
   a) There must be an individual
   b) There must be at least two courses of action
   c) both a) and b)
   d) none of the mentioned

4) The first step of research is _____.
   a) Selecting a problem b) Searching a problem
   c) Finding a problem d) Identifying a problem

5) Data-based research is also known as _____ research.
   a) Experimental b) field-setting
   c) Laboratory d) simulation

6) To test null hypothesis, a researcher uses _____.
   a) t test b) ANOVA
   c) X^2 d) factorial analysis

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

8) Scientific methods consist of _____.
   a) systematic observation b) classification
   b) interpretation of data d) all of the mentioned

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

1) Desire to get a research degree along with its consequential benefits is the motivation in research.
2) Deductive approach is also called as bottom-up approach.
3) The idea of breaking big problem into smaller problems is called the top-down strategy.
4) Research concerning some natural phenomenon or relating to pure mathematics are examples of applied research.

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

a) What is Research methodology?
b) Define hypothesis.
c) What are the different steps in writing report?
d) State qualitative and quantitative research.
e) What is data collection in RM?
f) Define two different types of problem-solving procedures.
g) What is sample design?
h) What is interpretation?

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

a) What is research? Explain types of the research.
b) Explain features of good research design.
c) How does one go about developing working hypotheses?
d) Explain need of interpretation.

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

a) Explain problem solving cycle with flow diagram.
b) Explain characteristics of hypothesis.
c) State and explain 7 Cs of effective research writing.

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

a) Explain research process with flow diagram.
b) State importance of literature review in research problem.
c) Describe the precautions that the researcher should take while Interpreting his findings.

Seat No.	

Set **P**

M.Sc. (Electronics) (Semester - II) (New) (NEP CBCS) Examination: March/April - 2026
Modern Control Theory (2313201)

Day & Date: Thursday, 16-04-2026 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) _____ is the best method for determining the stability and transient response.
   a) Bode plot b) Nyquist plot
   c) Mason's formula d) Root locus

2) A parabolic function has a value of _____ for $t > 0$.
   a) $At^2/2$ b) 0
   c) At^2 d) t^2

3) Positive feedback signal improves _____ of automatic control system.
   a) Delay b) Performance
   c) Input d) Error

4) A ramp function has value of zero for t _____.
   a) < 0 b) $= 0$
   c) ≤ 0 d) $= 1$

5) Transfer function of closed loop control system is given by _____.
   a) $T.F. = 1/G(s)H(s)$
   b) $TF = 1 + G(s)H(s)$
   c) $TF = 1/(1 + G(s)H(s))$
   d) $TF = G(s)/(1 + G(s)H(s))$

6) If roots are on positive real axis of the S plane, then the system said to be _____.
   a) Stable b) Unstable
   c) Marginally stable d) None of these

7) The node having only incoming branch is called _____ node.
   a) Source b) Sink
   c) Chain d) Feedback

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) $G1+G2+G3$ d) $G1 \times G2 \times G3$

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

1) An electric switch is an example of closed loop system.
2) 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.
3) The graph of log magnitude against frequency is called Bode Plot.
4) Positive feedback signal improves delay of automatic control system.

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

a) Enlist the classification of control system.
b) Explain Root locus concept.
c) Write a note on Time response.
d) Enlist the methods of Frequency Domain.
e) Define Error signal and Feedback signal.
f) Compare the Block diagram and Signal flow graph.
g) Write a note on properties of Signal flow graph.
h) Compare PI and PD controller.

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

a) Input $R(t)$ to the system is given by $r(t) = e^{-5t}$ and output $c(t) = \sin wt$. Determine the function.
b) Generating frequency response data where R = 10,000 ohm and C = 10uf.
c) Write a note on Hurwitz Criterion on the stability.
d) Define the terms Poles and Zeros of transfer function.

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

a) Analysis of Type 0, Type 1 and Type 2 of the system.
b) With suitable example describe the closed loop control system.
c) Write a note polar plot.

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

a) Discuss characteristics and application of Proportional control mode.
b) Define Steady State Error. Derive the derivation of the steady state error for a simple closed loop system.
c) Derive an expression for steady state error for step and ramp input.

SLR-PJ-7

Seat No.	

Set P

M.Sc. (Electronics) (Semester - II) (New) (NEP CBCS) Examination: March/April – 2026
Real Time Operating System (2313202)

Day & Date: Saturday, 18-04-2026 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) AVR microcontrollers are classified under _____ category of microcontrollers.
   a) 4-bit b) 8-bit
   c) 16-bit d) 32-bit

2) In a preemptive RTOS, the CPU is: ____.
   a) Dedicated to one task
   b) Switched manually
   c) Allocated to the highest-priority ready task
   d) Time-shared equally

3) A _____ RTOS must always meet deadlines.
   a) Hard b) Soft
   c) Firm d) Hybrid

4) The _____ manages task switching and resource allocation.
   a) Scheduler b) Timer
   c) Clock d) UART

5) Mailboxes are used to: ____.
   a) Store interrupts b) Store semaphores
   c) Pass data between tasks d) Save stack frames

6) MicroC/OS-II supports _____.
   a) Round robin scheduling only
   b) Preemptive scheduling only
   c) Cooperative scheduling only
   d) Preemptive and cooperative

7) Task switching is done through _____ in MicroC/OS-II.
   a) Context switch b) Reset
   c) Bootloader d) Jump table

8) In RTLinux, Linux itself runs as a _____ task.
   a) Top-priority b) Low-priority
   c) Kernel d) Hard real-time

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

1) FIFO scheduling is commonly used in RTLinux.
2) MicroC/OS-II can be used in Desktop systems.
3) The Mutex allows mutual exclusion to avoid conflicts.
4) The UART is used to generate Pulse Width Modulation in AVR.

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

a) Define embedded system.
b) Write types of semaphore.
c) Define Real Time Operating System.
d) Write note on In System Programming (ISP) of AVR.
e) Define Task in RTOS.
f) List the types of embedded system.
g) Write note on Critical condition.
h) Draw the structure of embedded system.

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

a) Write note on priority based preemptive scheduling.
b) Write note on Concept of Sharing of resources.
c) Write note on task management in MicroC/OS-II kernel.
d) Explain Static and dynamic priority of task.

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

a) Explain in detail Structure of RTOS.
b) Explain Concept of semaphore and Counting semaphore with suitable example.
c) Write simple program based on Tiny RTOS kernel with suitable block diagram for LED blinking.

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

a) Write LED array interfacing program based on FIFO scheduling algorithm.
b) Explain in detail RTLinux Kernel.
c) Explain in detail designing of AVR ATmega8L microcontroller based embedded systems for Measurement of wind velocity.

Seat No.	

Set P

M.Sc. (Electronics) (Semester - II) (New) (NEP CBCS) Examination: March/April – 2026
Signals and Systems (2313207)

Day & Date: Tuesday, 21-04-2026 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 a _____ system there will not be any energy storage elements, signal delays.
   a) stable b) dynamic
   c) causal d) static

2) Which of the following statements are true?
   i) An LTI system is always stable
   ii) On LTI system is stable only if the integral of its impulse response is finite
   iii) In a system if the input is bounded then the output is always bounded
   iv) In a system even if the I/P is unbounded the O/P can be bounded
   a) ii only b) iii only
   c) i and iii only d) i and iv

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

4) If $x(t)$ is even, then its Fourier series coefficients must be _____.
   a) real and even b) real and odd
   c) imaginary and odd d) imaginary and even

5) To obtain $x(4-2n)$ From the given signal $x(n)$, the following precedence rule is used for operations on the independent variable n: _____.
   a) Time scaling → Time shifting → Reflection
   b) Reflection → Time scaling → Time shifting
   c) Time scaling → Reflection → Time shifting
   d) Time shifting → Time scaling → Reflection

6) What is the correct syntax for a for loop in MATLAB?
   a) for i = 1 to 10 b) for (i = 1; i < 10; i++)
   c) for i = 1:10 d) for i in 1..10

7) Continuous-Time Fourier Series (CTFS) applies to _____.
   a) Aperiodic signals
   b) Discrete signals
   c) Periodic continuous-time signals
   d) Random signals

8) If $x(t)$ is even, then its fourier series coefficients must be _____.
   a) real and even b) real and odd
   c) imaginary and odd d) imaginary and even

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

a) For power signal the energy is infinity.
b) An alternating waveform will always have even harmonic only.
c) The sinc signal is non-periodic.
d) The symbol \ is used for right division.

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

a) Compare continuous time signal with discrete time signal.
b) What is half-wave symmetry in a signal?
c) State whether the given system is Static or dynamic $y(n) = x(n)\cos\omega_0 n$
d) Write a MATLAB Program to plot a discrete unit step signal.
e) Draw and define a unit impulse signal.
f) State advantage of using exponential Fourier series.
g) State file types in MATLAB.
h) What is signal? Explain signal with one example.

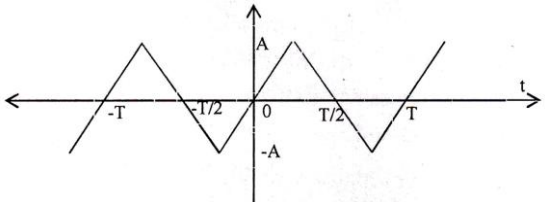
Q.3 Answer the following. (Any Three) **12**

a) Determine the even & odd components of $x(t) = e^{jt}$
b) Write a note amplitude spectrum of Fourier series.
c) Check whether the following system is linear or not $y(n) = x(n) + nx(n-1)$
d) Name any four commonly used MATLAB commands.

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

a) Explain $y(n) = sgn[x(n)]$ system with respect to following properties.
   i) Time invariance
   ii) Linearity
   iii) Causality
   iv) Stability

b) Obtain the trigonometric Fourier series of the triangular waveform shown in figure.



c) Prove that LTI system is stable if its impulse response is absolutely summable.

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

a) Sketch the continuous and discrete time signal $x(t) = 2\sin \pi t$ for an interval $0 \leq t \leq 2$ sample. The signal with sampling period T = 0.2 sec.

b) State the necessary and sufficient conditions for the existence of the Fourier series representation for a signal.

c) Obtain liner convolution of given sequence $x(n) = \{1, 2, 1, 2\}$ and $h(n) = \{1, 3, 4, 5, 3, 2\}$

Seat No.	

Set **P**

M.Sc. (Electronics) (Semester - III) (New) (NEP CBCS) Examination: March/April – 2026
Digital Signal Processing (23131301)

Day & Date: Friday, 17-04-2026 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) If $x(n) = (0,0,1,2,3,4,0,0)$ then $x(n-2)$ is _____.
   a) $(0,0,2,4,6,8,0,0)$ b) $(0,0,0,0,1,2,3,4)$
   c) $(1,2,3,4,0,0,0,0)$ d) $(0,0,1,2,3,4,0,0)$

2) Inverse z-transform of the system can be calculated using _____.
   a) Partial fraction method
   b) Long division method
   c) Basic formula of the z-transform
   d) All of the mentioned

3) The direct evaluation DFT requires _____ complex multiplications.
   a) $N(N-1)$ b) N^2
   c) $N(N+1)$ d) $N(N-1)/2$

4) The FT of a conjugate symmetric function is always _____.
   a) imaginary b) real
   c) conjugate symmetric d) conjugate anti-symmetric

5) _____ are the values of z for which the value of $X(z) = \infty$
   a) Poles b) Zeros
   c) Solutions d) None of the mentioned

6) For an expanded power series method, the coefficients represent ___.
   a) Original sequence values b) Inverse sequence values
   c) Negative values only d) Positive values only

7) The width of the main lobe of the frequency response of a rectangular window of length $M-1$ is _____.
   a) π/M b) $8\pi/M$
   c) $2\pi/M$ d) $4\pi/M$

8) If the discrete time LTI system is BIBO stable the ROC of the system function H(z) is _____.
   a) Entire z-plane, except at $z = 0$
   b) Entire z-plane, except at $z = \infty$
   c) Contain unit circle
   d) None of the mentioned

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

1) Fourier series coefficients which are discrete for a periodic signal becomes continuous and is known as FT.
2) Continuous time periodic signal have aperiodic continuous spectra.
3) For the computation of linear convolution tabulation method is used.
4) The FT of real valued time signal has no symmetry.

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

a) Find the FT of $x(t) = \delta(t)$.

b) Define IFT.

c) What is Nyquist rate?

d) Find the z-transform of the following finite duration signal
$$x(n) = \{2,1,5,7,0\}$$

e) Write Z-transform pair for the signal $x(n)$

f) Draw the simple block diagram of ADC.

g) Find the Z-transform of $\delta(n+3)$.

h) State properties of Fourier transform.

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

a) Find the Fourier transform of $x(t) = e^{-3t}[u(t+2) - u(t-3)]$ with signal flow diagram.

b) Draw flow diagram of DITFFT for N=8.

c) Explain circular convolution using matrix method.

d) What is DSP? Explain applications of DSP.

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

a) Write a note on Partial Fraction Expansion (PFE) method.

b) Find the FT of $x(t) = e^{-at}u(t)$ sketch the magnitude and phase spectrum.

c) Determine the ZT and sketch the ROC of
$x(n) = (1/3)^n$ where $n > 0$
$(1/2)^{-n}$ for $n < 0$

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

a) Determine 2-point and 4-point DFT of a sequence $x(n) = u(n) - u(n-2)$ sketch the magnitude of DFT in both cases.

b) Find inverse $Z\ of\ X(Z) = \frac{1-\frac{1}{2}z-1}{1-\frac{1}{4}z-2}$ $|Z| > 1/2$ using long division method.

c) Find the Fourier transform of complex and real functions.

Seat No.	

Set P

M.Sc. (Electronics) (Semester - III) (New) (NEP CBCS) Examination: March/April - 2026
ARM Microcontroller and System Design (23131303)

Day & Date: Monday, 20-04-2026 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) ARM stands for _____.
   a) Advanced Reduced Microcontroller
   b) Advanced RISC Machine
   c) Applied RISC Model
   d) Automatic Register Mapping

2) The instruction “MOV R0, #0xFF” is an example of _____.
   a) Immediate addressing b) Register addressing
   c) Indexed addressing d) Post-indexed

3) ARM processors use a pipeline mainly to _____.
   a) Increase power consumption
   b) Reduce memory
   c) Improve instruction throughput
   d) Reduce clock speed

4) In ARM, banked registers are used to _____.
   a) Reduce the number of instructions
   b) Provide fast context switching between modes
   c) Increase cache size
   d) Store pipeline instructions

5) ARM cores are most widely used in _____.
   a) Supercomputers
   b) Smartphones and embedded devices
   c) Desktop servers
   d) Only DSP processors

6) The ARM instruction set is classified as _____.
   a) Load-store b) Accumulator-based
   c) Stack-based d) Memory-to-memory

7) The barrel shifter in ARM is used for _____.
   a) Multiplication only
   b) Division only
   c) Fast shifting and rotating operations
   d) Instruction decoding

8) _____ instruction clears bits by ANDing with complement.
   a) BIC b) TST
   c) TEQ d) MVN

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

1) The watchdog timer in LPC2148 can be used to reset the system in case of software failure.
2) LPC2148 belongs to the ARM Cortex-M family.
3) The system can be programmed through UART0 bootloader in ISP mode.
4) LPC2148 is an 8-bit microcontroller.

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

a) Explain the use of Stack pointer.
b) What is the DMA controller?
c) List the different exceptions in ARM processor.
d) Explain the APB bus in AMBA bus architecture.
e) Draw the three stage pipeline in ARM processor.
f) What are the peripherals of LPC2148?
g) What is data processing?
h) List the types of temperature sensors.

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

a) Write note on Thumb Instruction set.
b) Explain On-Chip memory.
c) Write note on Barrel shifter.
d) Draw the block diagram for displacement measurements.

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

a) Write program for interfacing of on chip DAC.
b) Explain in details about clock circuit and reset circuit.
c) Write note on I2C mode.

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

a) Write program for interfacing of on chip UART.
b) Write program for measurement of pH.
c) Write note on Arithmetic instructions.

Seat No.	

Set P

M.Sc. (Electronics) (Semester - III) (New) (NEP CBCS) Examination: March/April – 2026
Advanced Digital Design with VHDL (23131306)

Day & Date: Wednesday, 22-04-2026 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) _____ is allows programming of both AND and OR arrays.
   a) PAL b) PLA
   c) CPLD d) FPGA

2) In VHDL, the basic structure of a module starts with _____.
   a) Architecture b) Process
   c) Entity d) Begin

3) To program an FPGA _____ file is typically used.
   a) .exe b) .vhd
   c) .bit d) .hex

4) A case statement in VHDL is used to _____.
   a) Create loops
   b) Replace an if statement for multiple conditions
   c) Assign arrays
   d) Load components

5) Generics are declared in the _____ declaration part of a VHDL design.
   a) Port declaration b) Configuration
   c) Component d) Entity

6) A 4-bit binary counter will count from _____.
   a) 0 to 3 b) 0 to 15
   c) 0 to 4 d) 0 to 8

7) If a and b are two STD_LOGIC_VECTOR input signals, then legal assignment for a and b is _____.
   a) $x <= a.b$ b) $x <= a\&\&b$
   c) $x <= a + b$ d) $x \leq a\ OR\ b$

8) _____ device can implement larger and more complex logic circuits than PALs and PLAs.
   a) ROM b) CPLD
   b) Diode matrix d) ALU

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

1) In VHDL there are six types of shift operators.
2) In FPGAs, CLB stands for: Core Logic Block.
3) CPLDs are most suitable for high-speed, low logic density applications.
4) Structural style use processes.

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

a) State modeling styles of VHDL.
b) What is statement?
c) Write syntax of Entity Declaration.
d) What is FPGA?
e) Write the syntax of Process statement.
f) What is the full form of EDA in terms of VHDL?
g) State the advantages of PLD devices.
h) Give the types of libraries in VHDL

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

a) Write the difference between Sequential & Concurrent statement.
b) Explain EDA Tools.
c) Draw general block diagrams Xilinx Spartan III
d) Write VHDL code for ALU.

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

a) What is basic language element of VHDL? Describe any two.
b) Write VHDL code for D flip flop using wait statement.
c) Write a note on macrocell.

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

a) Explain the various types of architecture bodies for VHDL with suitable example.
b) Draw and Explain block diagram of PAL.
c) Write VHDL code for decade counter.

Seat No.	

Set **P**

M.Sc. (Electronics) (Semester - IV) (New) (NEP CBCS) Examination: March/April - 2026
Networking and Data Communication (23131401)

Day & Date: Thursday, 16-04-2026 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) Process to process delivery of the data packet is done by _____ layer.
   a) session b) presentation
   c) application d) transport

2) _____ is not a multiplexing technique.
   a) AM b) TDM
   c) FDM d) WDM

3) The security at network layer is provided by _____.
   a) TCP b) IPsec
   c) SCTP d) UDP

4) A data packet in TCP is called as _____.
   a) datagram b) data stream
   c) data frame d) segment

5) NRZ-L technique uses _____ to determine the value of the bit.
   a) signal inversion b) signal frequency
   c) lack of inversion d) voltage level

6) Flag field of an HDLC frame is _____.
   a) 01111110 b) 10101010
   c) 01010101 d) 11111111

7) The _____ uses 2.4 GHz ISM band.
   a) Bluetooth b) Wi-Fi
   c) I^2C d) None of these

8) _____ layer of OSI provides the interface to the user to use the e-mail service.
   a) transport b) session
   c) application d) presentation

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

a) A BSS with AP is referred to as infrastructure network.
b) Star topology has Point-to-point dedicated link with all devices in the network.
c) DSL modulation technique is used for ADSL.
d) Free space is not a guided transmission medium.

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

a) Describe IPv6 Address.
b) Explain the Categories of topology.
c) Write a note on LAN network.
d) Enlist the layer of OSI model.
e) Write a note on Bluetooth technology.
f) Explain HDLC Protocol.
g) Give any four differences in between IPv4 address and IPv6 address.
h) Write a note on Digital Signature.

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

a) What is the difference between switch and router?
b) Explain File Transfer.
c) Write a note on Hubs & Repeater.
d) Explain guided transmission media.

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

a) Explain OSI model.
b) Describe DNS in the internet.
c) Explain data delivery and forwarding in detail.

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

a) Explain physical and logical addresses in TCP/IP protocol.
b) What is mean by Network? Explain categories of Network.
c) Explain ATM technology.

Seat No.	

Set P

M.Sc. (Electronics) (Semester - IV) (New) (NEP CBCS) Examination: March/April - 2026
Mechatronics and Industrial Automation (23131403)

Day & Date: Saturday, 18-04-2026 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) The mechatronic design process consists of _____ phases.
   a) One b) Three
   c) Two d) Four

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

3) The role of the output module is to send ____ signals to external devices.
   a) Control b) Input
   c) Safety d) Error

4) PLCs and RTUs in a SCADA system act as _____ devices.
   a) Display b) Alarm
   c) Field d) Mainframe

5) Data collected by SCADA systems is often stored in a centralized __.
   a) Relay b) Database
   c) Cabinet d) Router

6) Inputs are connected to the PLC's input terminals and interpreted by the _____.
   a) RAM b) CPU
   c) Actuator d) Power supply

7) PLCs are commonly used in _____ control systems.
   a) Household b) Industrial
   c) Military d) Agricultural

8) Mechatronic systems improve system performance through _____ control.
   a) Automated b) Open-loop
   b) Periodic d) Manual

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

1) The graphic display of the whole plant provides a graphical and logical representation of the process.
2) An open system is a collection of components that is designed to drive a given system with a given input to a desired output.
3) Normally open contacts are open when Input is not energized.
4) For PLC programming PICPGM is used.

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

a) Write note on PLC's instructions.
b) Draw structure of RTU.
c) Write note on Profibus.
d) Define Centralized Control system (CCS).
e) Explain Components of the PLC.
f) Draw Basic architecture of DCS.
g) Write note on Switches.
h) Explain PLC IO Blocks.

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

a) Explain Distributed Control System (DCS).
b) Write note on Timers functions.
c) Write note on Boolean algebra programming.
d) Write note on PLC Devices.

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

a) Explain Master Control relay with suitable example.
b) Design of Ladder diagrams for process control with suitable example.
c) Explain Concept of industrial automation.

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

a) Explain SCADA Architecture in detail.
b) Write Ladder program to turn on Coil after 10 minute.
c) Compare Open and closed loop systems.

Seat No.	

Set P

M.Sc. (Electronics) (Semester - IV) (New) (NEP CBCS) Examination: March/April – 2026
Microwave Devices, Antennas and Measurements (23131406)

Day & Date: Tuesday, 21-04-2026 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 dominant mode in waveguide is the mode which has _____.
   a) Highest frequency b) Highest wavelength
   c) Lowest phase constant d) Highest attenuation

2) The capacitance per unit length of broadside parallel lines with width W and separation d is _____.
   a) $\in W/d$ b) $\in d/W$
   c) $dW/\in$ d) none of the mentioned

3) The width of depletion region of a varactor diode _____ with increase in reverse bias voltage.
   a) Increases b) Decreases
   c) Remains constant d) None of the mentioned

4) For a parallel waveguide, the dominant mode for TM propagation is: ____.
   a) TM0 mode
   b) TM1 mode
   c) TM2 mode
   d) Dominant mode does not exist

5) A PIN diode consists of_____ number of semiconductor layers.
   a) Four b) Two
   c) Three d) One

6) Smith chart is based on the polar plot of _____.
   a) Reactance b) Voltage
   c) Current d) Voltage reflection co-efficient

7) The expression for a phase velocity of a transmission line is _____.
   a) $\sqrt{LC}$ b) $1/\sqrt{LC}$
   c) $X_L + X_c$ d) X_L/X_c

8) The correct sequence to find H, when D is given is ____.
   a) D-E-B-H
   b) D-B-E-H
   c) It cannot be computed from the data given
   d) D-H

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

1) Strip lines are not a type TEM line used in microwave networks.
2) The parameters S_{11} and S_{22} indicate the transmission coefficients.
3) The electrodes of a Gunn diode are made of molybdenum.
4) A major disadvantage of klystron amplifier is Low bandwidth.

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

a) Write a note on impedance matching.
b) What is resonator?
c) Explain waveguide.
d) Define lossless line.
e) What is reflection coefficient?
f) State Maxwell's equations.
g) Define wave propagation.
h) What is Scattering matrix?

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

a) Write a note on VSWR.
b) Explain Circulators and Isolators.
c) What is Microwave? What are the applications of Microwave?
d) What is SWR? Explain SWR of impedance and admittance.

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

a) Explain Reflex Klystrons tube and RWH theory.
b) What are the methods for impedance matching? Explain any one of them.
c) Explain Crystal rectifiers.

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

a) Explain Waveguide Microwave Junction. And calculate the Scattering matrix.
b) Explain IMPATT diodes.
c) Write a note on Cavity Resonator. Calculate Expression for f_0 in rectangular cavity resonator.