

Seat No.	
----------	--

**M.Sc. (Semester – I) (CBCS) Examination Oct/Nov-2019**  
**Electronics**  
**NUMERICAL METHODS**

Day & Date: Monday, 18-11-2019  
 Time: 11:30 AM To 02:00 PM

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.  
 2) Figures to the right indicate full marks.  
 3) Neat and labeled diagrams should be drawn wherever necessary.  
 4) Use of log table and calculators is allowed.

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) Laplace Transformation of the function  $f(t) = 2t^2 + 10t + 25$  is \_\_\_\_\_.  
 a)  $F(s) = (4/S^3) + (10/S^2) + 25/S$       b)  $F(s) = (4/S^3) + (10/S^2) + 25$   
 c)  $F(s) = (4/S^2) + (10/S) + 25S$       d)  $F(s) = (2/S^3) + (10/S^3) + 25S^2$
- 2) Transpose of co-factor matrix is \_\_\_\_\_.  
 a) adjoint matrix      b) inverse matrix  
 c) sparse matrix      d) co-factor matrix
- 3) Interpolation is the method of \_\_\_\_\_.  
 a) Numerical differentiation  
 b) finding empirical relation  
 c) finding solution of differential Equation  
 d) Numerical integration
- 4) To obtain solution of system of linear equations, the coefficient matrix should be \_\_\_\_\_.  
 a) Non singular      b) square and singular  
 c) Square      d) square and non-singular
- 5) If E is shift operator, then which of the following is correct?  
 a)  $\Delta^2 y_0 = (E-1)y_0$       b)  $\Delta^2 y_0 = E^2 y_0$   
 c)  $\Delta^2 y_0 = (E-1)^2 y_0$       d)  $E y_2 = y_2 - y_1$
- 6) Upon process of elimination, if matrix is reduced to U matrix, then which of following method is used to obtain solution?  
 a) backward substitution      b) forward substitution  
 c) power method      d) Iterative method
- 7) For R-K Method of third order the Taylors Series can be truncated from \_\_\_\_\_.  
 a)  $O h^5$       b)  $O h^3$   
 c)  $O h^4$       d)  $O h^2$
- 8) Eigen values of the matrix are \_\_\_\_\_.  
 a) poles of characteristic equation.  
 b) roots of characteristic equation.  
 c) its cofactor matrix.  
 d) always infinity

- 9) The Least squares method of curve fitting is developed by considering \_\_\_\_\_.
- minimization of data points
  - minimization of sum of squares of errors
  - maximization of data points
  - maximization of errors
- 10) Newton's - Cotes integration formula for the points reduce to \_\_\_\_\_.
- Simpson 1/3 rule
  - trapezoidal rule
  - Simpson 3/8 rule
  - All of these
- 11) For set of points of equal interval \_\_\_\_\_ method of interpolation is suitable.
- Cubic splines
  - Newton's forward difference
  - Lagrangian
  - All of these
- 12) Laplace Inverse Transform converts the function of \_\_\_\_\_.
- frequency domain into time domain.
  - time domain into frequency domain.
  - time domain into continuous time domain.
  - none of these
- 13) For Newton's forward difference interpolation formula the u is given \_\_\_\_\_.
- $u = (x + x_0)/h$
  - $u = (x - x_0)$
  - $u = (x_0 - x)/h$
  - $u = (x - x_0)/h$
- 14) R-K method of finding solution of first order differential equation is based on \_\_\_\_\_.
- Initial value theorem
  - Boundary value theorem
  - Mid-Value Theorem
  - Final value theorem

**Q.2 A) Answer the following questions. (Any Four) 08**

- Differentiate the Quadrature and Cubature.
- What do you mean by pivoting?
- Give Laplace Transformation  $\sin wt$  and  $\cos wt$ .
- From Taylor series, give formula for Euler's method.
- Give Newton's formula for  $dy/dx$  by using forward differences.

**B) Answer the following questions. (Any Two) 06**

- Describe in brief the LU- factorization method for solution of System of Equation.
- List various methods of interpolation from set of n data points.
- Derive expression for Laplace transformation of  $f(t) = \sin wt$

**Q.3 A) Answer the following questions. (Any Two) 08**

- Using Newton's forward interpolation formula derive the expression for first order and second order numerical differentiation.
- Using Gauss- Jordan elimination method solve.
 
$$5x_1 - x_2 + x_3 = 10$$

$$2x_1 + 4x_2 = 12$$

$$x_1 + x_2 + 5x_3 = -1$$
- Obtain interpolation polynomial for following data.
 

X =	1	2	3	-4
Y =	1	-1	1	-1

**B) Answer the following questions. (Any One) 06**

- 1) Write a note on Cubic Splines method for interpolation.
- 2) Derive expression for Laplace transformation of derivative of the function.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) What do you mean by Laplace transformation and Inverse transformation?  
Obtain Laplace inverse transformation

$$F(S) = \frac{1}{(s + 4)(s - 9)}$$

- 2) Find first order derivative for following data  $x = 1.5$   

X =	1.5	2.0	2.5	3.0	3.5	4.0
Y =	3.375	7.0	13.625	24.0	38.875	59.0
- 3) Evaluate by using Simpson's one mid-point rule.

$$I = \int_0^1 dx/(1 + x)$$

**B) Answer the following questions. (Any One) 04**

- 1) With suitable example explain divided difference method of interpolation.
- 2) Using Newton Cote formula obtain expression for Simpson mid-point rule for numerical integration.

**Q.5 Answer the following questions. (Any Two) 14**

- a) Describe formation of system of linear equations? Describe Gaussian Jordan elimination Method for solution of system of linear equations.
- b) Using RK-II order method find value of  $y(0.2)$  Given that  
 $\frac{dy}{dx} = x^2 - y$  and  $y(0) = 1$
- c) Using Laplace transformation, describe transient response of RL circuit for DC input.



- 10) IC 2B20 is used for \_\_\_\_\_.
  - a) V to I converter
  - b) Power supply
  - c) Signal conditioning
  - d) None of the mentioned
- 11) In case of 4 to 20mA current transmission the full scale current span is \_\_\_\_\_.
  - a) 0 to 20mA
  - b) 20mA
  - c) 16mA
  - d) 24mA
- 12) In T-type thermocouple \_\_\_\_\_ materials are used.
  - a) Chromel /Alumel
  - b) Chromel /Constantan
  - c) Iron/ Constantan
  - d) None of the mentioned
- 13) \_\_\_\_\_ is the operating range of PT100 sensor.
  - a)  $-100^{\circ}\text{C}$  to  $200^{\circ}\text{C}$
  - b)  $-200^{\circ}\text{C}$  to  $850^{\circ}\text{C}$
  - c)  $100^{\circ}\text{C}$  to  $340^{\circ}\text{C}$
  - d)  $-55^{\circ}\text{C}$  to  $150^{\circ}\text{C}$
- 14) In NLC type of Liquid Crystal Display molecules are \_\_\_\_\_ align.
  - a) Orderly
  - b) Randomly
  - c) Both a and b
  - d) None of the mentioned

**Q.2 A) Answer the following questions. (Any Four) 08**

- 1) Explain characteristics of 4-20mA current loop.
- 2) Write a short note on selection criteria for transducers.
- 3) Write a note on Load cell.
- 4) Explain the difference between X-T recorder and X-Y recorder?
- 5) What is the criterion for balance of a Wheaton's bridge?

**B) Write Notes. (Any Two) 06**

- 1) Write a note on chopper amplifier.
- 2) Explain different elements of data logger.
- 3) Explain static and dynamic characteristics of sensors.

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Write a note on Strain gauge. Explain types of strain gauge.
- 2) Write a note on compact data loggers.
- 3) What is a recorder? Explain strip chart recorder.

**B) Answer the following (Any One) 06**

- 1) Explain construction and working principle of thermocouple.
- 2) What is the need of display system in instrumentation? Explain LCD.

**Q.4 A) Answer the following (Any Two) 10**

- 1) What is DAS? Explain with a neat diagram the working of single DAS.
- 2) Write a note on interfacing of PIR sensor modules.
- 3) Explain Ac bridges.

**B) Answer the following (Any One) 04**

- 1) Explain the working of Isolation amplifier.
- 2) Write a note on Hall Effect.

**Q.5 Answer the following (Any Two) 14**

- a) Explain construction and working principle of LVDT.
- b) Explain the concept of grounding and write a note on A524.
- c) Explain briefly I to V and V to I converter.



- 11) The \_\_\_\_\_ is used to prevent short circuiting in cycloconverters.
  - a) free wheeling diode
  - b) intergroup reactor
  - c) switch
  - d) semiconductor switches
- 12) The McMurray-Bedford inverter uses \_\_\_\_\_ technique of communication.
  - a) voltage communication
  - b) current communication
  - c) natural communication
  - d) all of these
- 13) In bidirectional AC voltage controlling the firing angle must be greater than \_\_\_\_\_ angle.
  - a) load pf
  - b)  $\pi/6$
  - c) conduction
  - d)  $\pi/2$
- 14) In Current source inverter the input current is \_\_\_\_\_.
  - a) constant
  - b) constant but adjustable
  - c) adjustable
  - d) alternating

**Q.2 A) Answer any FOUR questions. 08**

- 1) Explain the roll of free wheeling diodes in rectifier.
- 2) Compare symmetrical and asymmetrical configurations of single phase bridge rectifier.
- 3) Give the Classification of Inverters.
- 4) Describe application of chopper.
- 5) Give the application of cycloconverter.

**B) Answer any TWO questions. 06**

- 1) Describe the class E chopper
- 2) Explain single phase unidirectional controller.
- 3) Explain current source inverter.

**Q.3 A) Answer any TWO questions. 08**

- 1) Explain single phase step up cycloconverter.
- 2) Explain single phase dual converter.
- 3) Explain SAC technique of power factor improvement.

**B) Answer any ONE question. 06**

- 1) Explain step up chopper.
- 2) Describe single phase half bridge inverter.

**Q.4 A) Answer any TWO questions. 10**

- 1) Explain chopper controlling strategies.
- 2) Explain working of single phase bidirectional controller with R-L load.
- 3) Explain three phase full wave controlled bridge rectifier.

**B) Answer any ONE question. 04**

- 1) Explain AC chopper chopper.
- 2) Explain three phase dual converter.

**Q.5 Answer any TWO questions. 14**

- 1) Explain McMurray half bridge inverter.
- 2) Explain three phase to single phase cycloconverter.
- 3) Explain single phase half controlled bridge rectifier.

Seat No.	
----------	--

**M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2019**  
**Electronics**  
**ADVANCED MICROCONTROLLERS**

Day & Date: Saturday, 09-11-2019  
 Time: 11:30 AM To 02:00 PM

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.  
 2) Figures to the right indicate full marks.  
 3) Use of Log table and calculator is allowed.  
 4) Draw neat and labeled diagram wherever necessary.

**Q.1 Fill in the blanks by choosing correct alternatives given below.**

**14**

- 1) The \_\_\_\_\_ is the data direction register.
  - a) DDRx
  - b) PORTx
  - c) PINx
  - d) All of these.
- 2) 16F877 support \_\_\_\_\_ interrupt source.
  - a) 15
  - b) 32
  - c) 14
  - d) 16
- 3) Timer 1 is 16 bit wide with \_\_\_\_\_.
  - a) Prescaler
  - b) Postscaler
  - c) Prescaler / postscaler
  - d) None of these.
- 4) FSR is the pointer used for \_\_\_\_\_ memory addressing in the whole register.
  - a) Direct memory
  - b) Indirect memory
  - c) Both a and b
  - d) None of these.
- 5) \_\_\_\_\_ register bit required and must be set or cleared in various application.
  - a) Status
  - b) FSR
  - c) Option
  - d) None of these.
- 6) PIC microcontroller is \_\_\_\_\_ bit.
  - a) 8
  - b) 16
  - c) 32
  - d) None of these.
- 7) Each bank in PIC microcontroller is \_\_\_\_\_.
  - a) 128
  - b) 256
  - c) 512
  - d) All of these.
- 8) The timer0 overflow from \_\_\_\_\_.
  - a) 00H to FFH
  - b) FFH to 00H
  - c) 0FFH to 00H
  - d) 000H to 0FFH
- 9) \_\_\_\_\_ instruction is reset the watchdog timer.
  - a) BCLR
  - b) SBRC
  - c) RESET
  - d) None of these.
- 10) The stack pointer is initializes to \_\_\_\_\_ at reset.
  - a) FF
  - b) 0F
  - c) F0
  - d) 00

- 11) The flash program memory of 16F877 is \_\_\_\_\_.
  - a) 8K
  - b) 128 byte
  - c) 256 byte
  - d) 4K
- 12) Which of the following instruction is data transfer instruction \_\_\_\_\_?
  - a) TST
  - b) MUL
  - c) SJAMP
  - d) LDS
- 13) 16F877 support \_\_\_\_\_ interrupt source.
  - a) 15
  - b) 32
  - c) 14
  - d) 16
- 14) SWAP instruction is \_\_\_\_\_.
  - a) Data transfer instruction
  - b) Program control instruction
  - c) Logical instruction
  - d) Bit and Bit test instruction

**Q.2 A) Answer the following questions. (Any Four) 08**

- 1) Write a logical instruction with example.
- 2) Explain the features of PIC microcontroller.
- 3) Draw the clock and reset circuit of AVR microcontroller.
- 4) Draw the circuit diagram of interfacing thyristor to the PIC microcontroller.
- 5) Write a series of AVR controller.

**B) Write Notes. (Any Two) 06**

- 1) Write a note on I2C Bus.
- 2) Write a note on Register bank in PIC microcontroller.
- 3) Write a note on PWM mode in PIC microcontroller.

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Write difference between PIC and AVR microcontroller.
- 2) Explain the addressing mode AVR microcontroller.
- 3) Explain the timer 1 in PIC microcontroller.

**B) Answer the following questions. (Any One) 06**

- 1) Interfacing the ADC to the PIC 16F877 with software.
- 2) Explain the memory in AVR microcontroller.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Explain the universal synchronous asynchronous transmitter and receiver.
- 2) Explain the Serial communication in PIC microcontroller.
- 3) Explain timer / counter in AVR microcontroller.

**B) Answer the following questions. (Any One) 04**

- 1) Explain the clock and reset circuit of PIC microcontroller.
- 2) Explain the IO ports in 16F877.

**Q.5 Answer the following questions. (Any Two) 14**

- a) Describe the Architecture of AVR microcontroller.
- b) Explain the working register, status register and option register.
- c) Describe interfacing LCD to the microcontroller PIC 18F877.



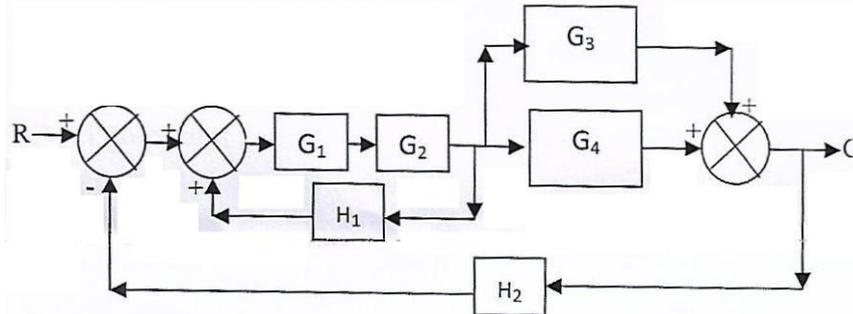


**B) Attempt any one of the following question. 04**

- 1) With suitable example describe frequency domain analysis of control system.
- 2) Describe in detail Hurwitz Criteria for stability of the system.

**Q.5 Attempt any one of the following question. 14**

**a) Reduce following block diagram and generate transfer function.**



- b) Discuss with suitable example, the effect of Poles and Zeros at origin on Bode Plots of a control system.
- c) With suitable examples describe polar plots of control system in detail.

Seat No.	
----------	--

Set	P
-----	---

**M.Sc. (Semester - II) (CBCS) Examination Oct/Nov-2019**  
**Electronics**  
**REAL TIME OPERATING SYSTEM**

Day & Date: Wednesday, 06-11-2019  
 Time: 11:30 AM To 02:00 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) The \_\_\_\_multitasking is also called cooperative multitasking.
  - a) Preemptive multitasking
  - b) Non-preemptive multitasking
  - c) Both a and b
  - d) none of these
- 2) The two kinds of semaphores are \_\_\_\_\_.
  - a) mutex & counting
  - b) binary & counting
  - c) counting & decimal
  - d) decimal & binary
- 3) A task post the message queue and another tasks will read the message \_\_\_\_kernel object is used.
  - a) Mailbox
  - b) Message queue
  - c) Mutex
  - d) All of these
- 4) The RTLinux command is used to \_\_\_\_\_.
  - a) add a module
  - b) remove a module
  - c) find the status of module
  - d) all of these
- 5) Binary semaphore will take the value of \_\_\_\_\_.
  - a) one
  - b) zero
  - c) either zero or one
  - d) none of these
- 6) A mutex \_\_\_\_\_.
  - a) is a binary mutex
  - b) must be accessed from only one process
  - c) can be accessed from multiple processes
  - d) None of the mentioned
- 7) What is the temperature for LM35 sensor if the digital output is 0011 1001?
  - a) 39
  - b) 30
  - c) 57
  - d) 41
- 8) \_\_\_\_specifies the task waiting order and enables task deletion safety.
  - a) mutex
  - b) zero
  - c) either zero or one
  - d) none of these
- 9) A task is said to in \_\_\_\_state, if it is waiting for another event.
  - a) Waiting
  - b) Running
  - c) Ready to Run
  - d) None of these
- 10) Embedded systems in which some specific work has to be done in a specific time period are called \_\_\_\_\_.
  - a) Real-time systems
  - b) Stand-alone systems
  - c) Both a and b
  - d) Application Specific Integrated Circuit



Seat No.	
----------	--

**M.Sc. (Semester - II) (CBCS) Examination Oct/Nov-2019**  
**Electronics**  
**OPTO ELECTRONICS**

Day & Date: Friday, 08-11-2019  
 Time: 11:30 AM To 02:00 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) The fiber \_\_\_\_\_ is a permanent or semi permanent joint between two fiber.
  - a) Connector
  - b) coupler
  - c) Splice
  - d) all of these
- 2) An optical device used for detection of optical signal is \_\_\_\_\_.
  - a) IR sensor
  - b) zener diode
  - c) Photodiode
  - d) transistor
- 3) \_\_\_\_\_ by atomic defect in the glass composition of optical fiber.
  - a) Absorption
  - b) Extrinsic absorption
  - c) Intrinsic absorption
  - d) None of these
- 4) In Lambertian output pattern of LED, the source is \_\_\_\_\_ bright from all direction.
  - a) Less
  - b) equally
  - c) More
  - d) Unpredictably
- 5) The \_\_\_\_\_ is known as second order effect.
  - a) pocket effect
  - b) magnetic effect
  - c) acoustic effect
  - d) Kerr effect
- 6) Which of the following does not support the soot formation process?
  - a) OVPO
  - b) MCVD
  - c) PCVD
  - d) all of these
- 7) The \_\_\_\_\_ consist of two adjoining semiconductor material with different band gap energies.
  - a) n-region
  - b) heterojunction
  - c) p-region
  - d) diffusion region
- 8) The optical fiber \_\_\_\_\_ device that distribute light from a main fiber into one or more branch fiber.
  - a) Splice
  - b) connector
  - c) Isolator
  - d) coupler
- 9) The \_\_\_\_\_ is created by hetero-junction at collector -base junction.
  - a) potential barrier
  - b) depletion region
  - c) Inductance
  - d) capacitance
- 10) In optical fiber, the attenuation coefficient is measured in units of \_\_\_\_\_.
  - a) dB/km
  - b) dB/μm
  - c) dB/mm
  - d) dB/nm
- 11) The light source used in fiber optics communication are \_\_\_\_\_.
  - a) LED
  - b) LASER
  - c) Transistor
  - d) Both a and b







- 2) Determine all possible sequences  $x(n)$  associated with z-transform

$$X(Z) = \frac{5z^{-1}}{(1-2z^{-1})(3-z^{-1})}$$

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Design a linear phase FIR low pass filter of length seven with cut-off frequency 1 rad/sev using rectangular window.
- 2) Find the fourier transform of rectangular pulse 2 seconds long with a magnitude of 10 volts.
- 3) An LTI system is represented by differential equation  $y(n) = y(n-1) + y(n-2) + x(n-1)$ . Using Z- transform find the system function  $H(z)$  and obtain pole-zero plot.

**B) Answer the following questions. (Any One) 04**

- 1) State and prove time shifting property of Fourier transform.
- 2) State and prove final value theorem of z-transform.

**Q.5 Answer the following questions. (Any Two) 14**

- a) Given  $x(n) = \{0, 1, 2, 3, 4, 5, 6, 7\}$ , find  $X(K)$  using DIT FFT algorithm.
- b) What is Kaiser Window? Explain the procedure for designing an FIR filter using the Kasier window.
- c) Find the linear convolution of  $X_1(n)$  and  $X_2(n)$  using Z-transform  
 $X_1(n) = \{1, 2, 3, 4\}$  and  $x_2(n) = \{1, 2, 0, 2, 1\}$   
 $\quad \quad \quad \uparrow \quad \quad \quad \quad \quad \quad \uparrow$

Seat No.	
----------	--

**M.Sc. (Semester - III) (CBCS) Examination Oct/Nov-2019**  
**Electronics**  
**ADVANCED DIGITAL DESIGN WITH VHDL**

Day & Date: Tuesday, 05-11-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) The CPLD is based on \_\_\_\_\_ architecture.
  - a) sum-of-product
  - b) product-of-sum
  - c) both a & b
  - d) logic block
- 2) The operator NAND and NOR are not \_\_\_\_\_.
  - a) cumulative
  - b) associative
  - c) distributive
  - d) all of these
- 3) The package std\_logic\_1164 is accessed by \_\_\_\_\_ clause.
  - a) library
  - b) use
  - c) type
  - d) both a & b
- 4) The VHDL is utilized for \_\_\_\_\_ design.
  - a) analog
  - b) digital
  - c) combinational
  - d) digital+analog
- 5) The meaning of 'L' is \_\_\_\_\_ in Data Types STD\_LOGIC\_1164.
  - a) high
  - b) 1
  - c) weak 0
  - d) all Of these
- 6) The mode of parts in \_\_\_\_\_ declaration are five types.
  - a) architecture
  - b) identity
  - c) entity
  - d) operators
- 7) The PLD devices are utilized for \_\_\_\_\_ circuit design.
  - a) analog
  - b) digital
  - c) combinational
  - d) digital+analog
- 8) The component declaration declares the \_\_\_\_\_ of the component.
  - a) name
  - b) interface
  - c) use
  - d) both a & b
- 9) The '&' operator is \_\_\_\_\_ operator used in VHDL code.
  - a) adding
  - b) relational
  - c) attaching
  - d) miscellaneous
- 10) The VHDL is \_\_\_\_\_ description language.
  - a) software
  - b) hardware
  - c) both a & b
  - d) logic
- 11) The LOOP statement is used to iterate through the set of \_\_\_\_\_ statement.
  - a) sequential
  - b) concurrent
  - c) both a & b
  - d) mixed
- 12) The WAIT statement is a \_\_\_\_\_ statement.
  - a) sequential
  - b) concurrent
  - c) both a & b
  - d) mixed





- 8) Which of the following instructions are called Program Status Register transfer instructions?
  - a) LDR,STR
  - b) LDM,STM
  - c) MCR,MRC
  - d) MSR,MRS
- 9) In case of ARM LPC2148, I2C bus is \_\_\_\_\_.
  - a) bidirectional
  - b) unidirectional
  - c) omnidirectional
  - d) all of these
- 10) The ARM processor executes \_\_\_\_\_ Instruction set when T bit is set in CPSR register.
  - a) ARM state
  - b) Jazzel state
  - c) thumb state
  - d) none of these
- 11) The \_\_\_\_\_ register is accessible in all processor mode.
  - a) link
  - b) banked
  - c) unbanked
  - d) current program
- 12) In case of ARM LPC 2148, user mode is \_\_\_\_\_ mode.
  - a) privileged
  - b) non-privileged
  - c) both a & b
  - d) none of these
- 13) When processor cannot decode an instruction \_\_\_\_\_ is used.
  - a) Reset vector
  - b) Undefined instruction vector
  - c) Data abort vector
  - d) Interrupt request vector
- 14) To move from an ARM register to a status register \_\_\_\_\_ instruction is used.
  - a) MOV
  - b) MRC
  - c) MRS
  - d) MSR

**Q.2 A) Answer the following questions. (Any Four) 08**

- 1) What are different addressing modes for stack operation?
- 2) Write the exception priorities in ARM.
- 3) Draw the interfacing diagram of opto-coupler to ARM.
- 4) Differentiate between RISC and CISC processor.
- 5) Write the syntax for load and store instructions.

**B) Write notes. (Any Two) 06**

- 1) I/O ports of ARM LPC2148
- 2) Watchdog timer
- 3) Load Store Architecture

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Describe power control modes of ARM LPC 2148.
- 2) Explain structure of CPSR.
- 3) Explain the operation modes of ARM processor.

**B) Answer the following questions. (Any One) 06**

- 1) Draw DAC interfacing diagram with LPC2148. Also write program for square waveform generation.
- 2) Describe register structure of ARM in detail.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) List features of UART0. Compare is with UART1
- 2) Explain multiply and accumulate instructions.

- 3) Explain with example.
  - i) LSL
  - ii) EOR
  - iii) SWP
  - iv) ROR
  - v) ADC

**B) Answer the following questions. (Any One) 04**

- 1) List the important features that make ARM ideal for embedded applications.
- 2) Explain 3-stage and 5-stage pipelining in detail.

**Q.5 Answer the following questions. (Any Two) 14**

- a) Explain the architecture of ARM microcontroller instruction set. Give the classification of instruction set.
- b) Draw ARM processor core and explain ARM as SOC.
- c) Describe the design of ARM LPC 2148 microcontroller based system for temperature measurement with interfacing diagram.

Seat No.	
-------------	--

Set **P**

**M.Sc. (Semester - III) (CBCS) Examination Oct/Nov-2019**  
**Electronics**  
**CMOS DESIGN TECHNOLOGIES**

Day & Date: Thursday, 07-11-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.  
 2) Figures to the right indicate full marks.  
 3) Use of Logtable and calculator is allowed.  
 4) Draw neat and labeled diagram wherever necessary.

**Q.1 Fill in the blanks by choosing correct alternatives given below.****14**

- 1) As temperature increases carrier mobility \_\_\_\_\_.  
 a) remains constant                      b) increases  
 c) decreases                                  d) none of these
- 2) In polysilicon interconnect \_\_\_\_\_ is used as gate material.  
 a) silicon                                      b) silicide  
 c) Tantalum                                  d) All of these
- 3) Fall time is the time for a waveform to fall from \_\_\_\_\_ of its steady state value.  
 a) 90% to 10%                              b) 100% to 10%  
 c) 100% to 50%                              d) 50% to 10%
- 4) The most popular algorithm level environment is \_\_\_\_\_.  
 a) PMS    b) Pseudo-layout  
 c) Flowcharting                              d) schematic
- 5) Absolute value of threshold voltage decreases with an \_\_\_\_\_ in temperature.  
 a) Decrease                                  b) increase  
 c) Constant                                    d) None of these
- 6) In PMS design environment P stands for \_\_\_\_\_.  
 a) Parameter                                  b) progress  
 c) process                                      d) processor
- 7) The cell at the bottom of the hierarchy is called as \_\_\_\_\_.  
 a) root cell                                    b) leaf cell  
 c) composition cell                          d) all of these
- 8) The basic raw material used in CMOS fabrication is \_\_\_\_\_.  
 a) disk of silicon                              b) wafer of silicon  
 c) both a) and b)                              d) ingots of silicon
- 9) In standard cell based design \_\_\_\_\_ process connects the modules with wires.  
 a) placement                                  b) floor planning  
 c) routing                                      d) none of these
- 10) Latchup result in \_\_\_\_\_.  
 a) power down of circuit                      b) failure of circuit  
 c) parasitic effect                              d) all of these

- 11) Material used for local interconnect layer is \_\_\_\_\_.
  - a) polysilicon
  - b) single crystal silicon
  - c) sapphire
  - d) silicide
- 12) N-well CMOS process start with lightly dopped \_\_\_\_\_.
  - a) n-type substrate
  - b) p-type substrate
  - c) sapphire layer
  - d) polysilicon layer
- 13) In VLSI design components of design are commonly called as \_\_\_\_\_.
  - a) cells
  - b) tools
  - c) footprints
  - d) constraints
- 14) Which of the following does affect the circuit's behavior?
  - a) temperature
  - b) supply voltage
  - c) both a) and b)
  - d) design tools

**Q.2 A) Answer the following questions. (Any Four) 08**

- 1) Draw physical structure of pMOS transistor.
- 2) Explain  $I_d$ - $V_{ds}$  relation.
- 3) Explain  $\beta_n / \beta_p$  ratio.
- 4) Explain threshold voltage of MOS device.
- 5) Explain dynamic power dissipation.

**B) Write notes. (Any Two) 06**

- 1) Write a brief note on placement and routing.
- 2) Explain parasitic components in CMOS process.
- 3) Write a note on transmission gate.

**Q.3 A) Answer the following questions. (Any Two) 08**

- 1) Obtain MOS device design equation.
- 2) Explain SOI process of fabrication.
- 3) Explain n-Well process of fabrication.

**B) Answer the following questions. (Any One) 06**

- 1) Explain n-MOS enhancement transistor in detail.
- 2) Write a note on views.

**Q.4 A) Answer the following questions. (Any Two) 10**

- 1) Draw stick diagram for NOR gate.
- 2) Explain power dissipation in detail.
- 3) Explain design representation issues.

**B) Answer the following questions. (Any One) 04**

- 1) What do you mean by Y-chart?
- 2) Describe switching characteristics of MOS device.

**Q.5 Answer the following questions. (Any Two) 14**

- a) Explain DC characteristics of CMOS inverter.
- b) Explain CMOS layout design rules.
- c) Explain seven second order effects.

Seat No.	
----------	--

Set	P
-----	---

**M.Sc.(Semester - IV) (CBCS) Examination Oct/Nov-2019  
Electronics**

**MICROWAVE DEVICES, ANTENNAS AND MEASUREMENT**

Day & Date: Monday, 04-11-2019  
Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Multiple Choice Questions.**

**14**

- 1) \_\_\_\_\_ band is the IEEE microwave frequency band designation for frequency range 2.0 GHz to 4.0 GHz.
  - a) L
  - b) S
  - c) C
  - d) K
- 2) For microwave frequency generation GaAs diodes exhibit \_\_\_\_\_.
  - a) low field domain
  - b) higher drift velocity
  - c) higher conduction current density
  - d) negative resistance
- 3) \_\_\_\_\_ of the parabolic reflector antenna is more than the horn antenna.
  - a) Directivity
  - b) Permissible phase angle
  - c) Axial length
  - d) Half of the flaring angle
- 4) Which microwave tube uses buncher and catcher cavities?
  - a) Magnetron
  - b) Klystron
  - c) Reflex klystron
  - d) Travelling wave tube
- 5) GaAs is used in fabricating Gunn diode. Gunn diode is \_\_\_\_\_.
  - a) sliced device
  - b) hollow device
  - c) made of different type of semiconductor layers
  - d) bulk devices
- 6) \_\_\_\_\_ is a device that converts electrons to photons or vice-versa.
  - a) Antenna
  - b) Electron gun
  - c) Photon amplifier
  - d) Microwave tube
- 7) In transverse magnetic waves \_\_\_\_\_.
  - a) E is parallel to H
  - b) H is parallel to wave direction
  - c) H is transverse to wave direction
  - d) E is transverse to H
- 8) When a load  $Z_L$  is matched to a line, the value of standing wave ratio is \_\_\_\_\_.
  - a) 0
  - b) 1
  - c) infinity
  - d) insufficient data to calculate SWR
- 9) The Gauss law employs \_\_\_\_\_ theorem for the calculation of charge density?
  - a) Green theorem
  - b) Stokes theorem
  - c) Maxwell equation
  - d) Gauss theorem
- 10) Smith chart is based on the polar plot of \_\_\_\_\_.
  - a) Reactance
  - b) Voltage
  - c) Current
  - d) Voltage reflection co- efficient



Seat No.	
-------------	--

Set	P
-----	---

**M.Sc. (Semester - IV) (CBCS) Examination Oct/Nov-2019**  
**Electronics**  
**NETWORKING AND DATA COMMUNICATIONS**

Day & Date: Wednesday, 06-11-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) In byte stuffing process \_\_\_\_\_ is added if a flag like structure appears in the data.
 

a) Flag	b) ESC
c) 0 bit	d) 1 bit
- 2) The \_\_\_\_\_ address uniquely defines a host on the Internet.
 

a) IP	b) port
c) specific	d) physical
- 3) In IEEE 802.11, a BSS without an AP is called as \_\_\_\_\_ architecture.
 

a) BSS	b) ad hoc
c) ESS	d) BSS transition
- 4) The Address field of a PPP frame is \_\_\_\_\_ for broadcast address.
 

a) 10101010	b) 11111111
c) 01010101	d) 01111110
- 5) In OSI model Trailer bit is added at \_\_\_\_\_ layer.
 

a) Physical	b) Network
c) Data link	d) Application
- 6) Network Interface Card provides \_\_\_\_\_ address of the device.
 

a) Logical	b) Port
c) Specific	d) Physical
- 7) Circuit switched networks use \_\_\_\_\_ technique to divide each link into 'n' channels.
 

a) FDM	b) WDM
c) PCM	d) DM
- 8) Network security services uses \_\_\_\_\_ for message authentication.
 

a) Encryption	b) Decryption
c) Digital signature	d) Symmetric key
- 9) Transmission Control Protocol is a \_\_\_\_\_ protocol.
 

a) stream oriented	b) bit oriented
c) connectionless	d) byte oriented
- 10) Photonic layer corresponds to \_\_\_\_\_ layer of the OSI model.
 

a) Data link	b) Network
c) Transport	d) Physical

- 11) A composite signal is a combination of \_\_\_\_\_.  
 a) Simple sine waves of different phases  
 b) Simple cosine waves of different amplitudes  
 c) Sine waves of different frequency  
 d) Sine waves of different wavelength
- 12) The PPP does not provide services for \_\_\_\_\_.  
 a) multiple link connections                      b) error control  
 c) flow control    d) negotiation
- 13) Channel 0 of DMT technique is reserved for \_\_\_\_\_.  
 a) Voice communication                              b) Downstream bits  
 c) Idle use    d) Upstream bits
- 14) In NRZ-L \_\_\_\_\_ can determine the value of the bit.  
 a) Voltage level inversion                              b) lack of Voltage level inversion  
 c) Signal frequency                                      d) Only voltage level

- Q.2 A) Answer the following. (Any Four) 08**  
 1) Explain passive hub as a connecting device.  
 2) Define the terms Data rate and Signal rate.  
 3) State any two responsibilities of data link layer in OSI model.  
 4) Give the need of signal multiplexing and enlist different multiplexing techniques.  
 5) Explain baseband transmission of digital signals.
- B) Write Notes. (Any Two) 06**  
 1) Explain Tunneling in the networking.  
 2) Explain polar NRZ technique of line coding used for digital to digital conversion.  
 3) Describe guided transmission media.
- Q.3 A) Answer the following. (Any Two) 08**  
 1) Explain IEEE 802.11 wireless LAN architecture.  
 2) Describe virtual switched network.  
 3) Explain stop and wait ARQ protocol.
- B) Answer the following. (Any One) 06**  
 1) Explain framing in the data link layer.  
 2) Explain message authentication.
- Q.4 A) Answer the following. (Any Two) 10**  
 1) Explain HDLC protocol.  
 2) Explain SONET.  
 3) Explain Standard Ethernet implementation.
- B) Answer the following. (Any One) 04**  
 1) Explain Architecture of WWW.  
 2) Explain congestion control in the networking.
- Q.5 Answer the following. (Any two) 14**  
 1) Explain OSI model in detail.  
 2) Explain internetworking protocol version 4.  
 3) Explain data delivery and forwarding in detail.

Seat No.	
----------	--

Set	P
-----	---

**M.Sc. (Semester - IV) (CBCS) Examination Oct/Nov-2019**  
**Electronics**  
**NANOELECTRONICS**

Day & Date: Friday, 08-11-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing correct alternatives given below. 14**

- 1) In \_\_\_\_ lithography, a film of water or another dielectric medium is inserted in between the lens and wafer.
  - a) optical
  - b) electron beam
  - c) immersion
  - d) ultraviolet
- 2) If characteristics  $\lambda \geq L_x$  and  $L_x \ll L_z, L_y$  then it stands for quantum \_\_\_\_\_.
  - a) dot
  - b) wire
  - c) well
  - d) Artificial
- 3) For a \_\_\_\_ photoresist, the resist material is initially insoluble and through a chemical reaction when exposed to light it become soluble.
  - a) positive
  - b) Negative
  - c) lithography
  - d) IC
- 4) For triangular well, the energy levels ( $E_n$ ) are proportional to \_\_\_\_\_.
  - a)  $n^{2/3}$
  - b)  $n$
  - c)  $n^2$
  - d)  $n^{1/3}$
- 5) The transistor having 100nm dimensions obeys \_\_\_\_ principle.
  - a) quantum
  - b) classical physics
  - c) both a & b
  - d) none of these
- 6) The parabolic as well as square well wave functions solutions are \_\_\_\_\_ due to the symmetry of the potential well.
  - a) symmetric or antisymmetric
  - b) sine functions
  - c) neither asymmetric or antisymmetric
  - d) cosine functions
- 7) The immersion lithography is currently considered for \_\_\_\_\_ chip.
  - a) 32 nm
  - b) 193 nm
  - c) 134 nm
  - d) 90 nm
- 8) The energy spectrum in case of 0DEG system is totally \_\_\_\_\_.
  - a) diverges
  - b) discrete
  - c) parabolic
  - d) staircase
- 9) The synonym of MODFET is \_\_\_\_\_.
  - a) modulation doped FET
  - b) modulation oxide doped FET
  - c) modulation oxide FET
  - d) modulated oxide doped FET

- 10) The SiGe heterojunctions have \_\_\_\_\_ lattice constant difference between Si and Ge, which is about 4%.
  - a) small
  - b) large
  - c) equal
  - d) none of these
- 11) The OLED's are an electroluminescent organic material between two \_\_\_\_\_ of different work functions.
  - a) semiconductors
  - b) nonconductors
  - c) insulator
  - d) conductors
- 12) In case of Type I multiple quantum well (MQW) the wells for hole and electron are located in the \_\_\_\_\_ space location.
  - a) alternate
  - b) same
  - c) different
  - d) triangular
- 13) The split gate technique is used to \_\_\_\_\_ the electron gas dimensionality.
  - a) increase
  - b) decrease
  - c) equal
  - d) none of these
- 14) For a \_\_\_\_\_ photoresist, the resist material is initially soluble and through a chemical reaction when exposed to light it become insoluble.
  - a) positive
  - b) negative
  - c) lithography
  - d) IC

- Q.2 A) Answer the following questions. (Any Four) 08**
- 1) State the advantages of nanoelectronics.
  - 2) State the characteristic lengths of nanostructures.
  - 3) Sketch the DOS function of the quantum dot.
  - 4) Sketch the band diagram of the MOSFET showing triangular inversion layer.
  - 5) Explain the concept of superlattice.
- B) Answer the following questions. (Any Two) 06**
- 1) Explain the characteristics lengths relation for quantum well, wire and dot.
  - 2) Explain the problems in nanoscale devices.
  - 3) Explain the tunnelling diode.
- Q.3 A) Answer the following questions. (Any Two) 08**
- 1) Explain the triangular quantum well.
  - 2) Write a note on supelattice.
  - 3) Write a note on OLED.
- B) Answer the following questions. (Any One) 06**
- 1) Write a note on multiple quantum well.
  - 2) Explain modulation doped quantum well.
- Q.4 A) Answer the following questions. (Any Two) 10**
- 1) Explain the quantum mechanical coherence.
  - 2) Write a note on square quantum well of finite depth.
  - 3) Discuss resonant tunneling effect.
- B) Answer the following questions. (Any One) 04**
- 1) Explain Nanoimprint lithography (NIL) technique.
  - 2) Describe organic semiconductor.
- Q.5 Answer the following questions. (Any Two) 14**
- a) Explain in detail basic properties of two-dimensional semiconductor nanostructures.
  - b) Explain the lithography process for fabrication of nanostructures.
  - c) Explain in detail Single Electron Transistor (SET).

Seat No.	
----------	--

Set **P**

**M.Sc. (Semester - IV) (CBCS) Examination Oct/Nov-2019**  
**Electronics**  
**MECHATRONICS AND INDUSTRIAL AUTOMATION**

Day & Date: Monday, 11-11-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

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

**Q.1 Fill in the blanks by choosing the correct alternatives given below. 14**

- 1) LVDT is \_\_\_\_\_ device of PLC.
  - a) Output
  - b) Input
  - c) Both Input and Output
  - d) None of these
- 2) In PLC ladder diagram Output instructions are entered on the \_\_\_\_\_ side of the ladder.
  - a) Left
  - b) Right
  - c) Either right or left
  - d) None of these
- 3) In general PLC have \_\_\_\_\_ number of input and output pins.
  - a) Same
  - b) Different
  - c) 25
  - d) 20
- 4) The number of input registers in PLCs is normally \_\_\_\_\_ of holding registers.
  - a) One tenth
  - b) One fourth
  - c) Equal
  - d) None of these
- 5) The terminal number is the bit address for particular terminal \_\_\_\_\_.
  - a) Input
  - b) Output
  - c) Both a and b
  - d) None of these
- 6) In normally \_\_\_\_\_ contact, when this contact open, the function carries out some kind of action.
  - a) Open
  - b) Close
  - c) Latch
  - d) None of these
- 7) In PLC \_\_\_\_\_ is used as a bit file delimiter.
  - a) /
  - b) :
  - c) \
  - d) None of these
- 8) A single input timer is called a \_\_\_\_\_ timer.
  - a) Retentive
  - b) Nonretentive
  - c) Both a and b
  - d) None of these
- 9) In PLC ladder diagram, the \_\_\_\_\_ turns the following specified number of lines to the OFF state.
  - a) SK
  - b) MC
  - c) MCR
  - d) All of these
- 10) The number of input registers in PLCs is normally one tenth of \_\_\_\_\_ register.
  - a) Holding
  - b) Working
  - c) Output
  - d) Input

- 11) A \_\_\_\_\_ is called output device of PLC.
  - a) Sensor
  - b) Switch
  - c) Motor
  - d) None of these
- 12) In PLC arithmetic subtraction operation, if result is \_\_\_\_\_ in the result register, then it turns coil ON.
  - a) Negative
  - b) Positive
  - c) Zero
  - d) None of these
- 13) The \_\_\_\_\_ determines which rack the module sits in.
  - a) Rack number
  - b) Terminal number
  - c) Both a and b
  - d) None of these
- 14) The \_\_\_\_\_ is advantage of PLC.
  - a) Flexibility
  - b) low cost
  - c) Security
  - d) All of these

- Q.2 A) Answer the following questions. (Any Four) 08**
- 1) Write the list of arithmetic functions used in PLC.
  - 2) Draw the block diagram of RTU architecture.
  - 3) Write note on Centralized Control Systems.
  - 4) Draw different standard Symbols used in PLC.
  - 5) Write note on output devices of PLC.
- B) Answer the following questions. (Any Two) 06**
- 1) Write the advantages of mechatronics systems.
  - 2) Write note on Serial Communication of PLC.
  - 3) Write Applications of mechatronics systems.
- Q.3 A) Answer the following questions. (Any Two) 08**
- 1) Write Note on IO modules and their characteristics.
  - 2) Compare open and close loop system.
  - 3) Write note on Sequencer functions used in PLC.
- B) Answer the following questions. (Any One) 06**
- 1) Explain in detail Basic architecture of DCS.
  - 2) Explain in details registers of PLC.
- Q.4 A) Answer the following questions. (Any Two) 10**
- 1) Explain in detail Real Time Mechatronics systems.
  - 2) Write note on modeling of the system measurement.
  - 3) Explain Boolean algebra programming of PLC.
- B) Answer the following questions. (Any One) 04**
- 1) Write note on Power supply of PLC.
  - 2) Explain Master Control Relay Function of PLC.
- Q.5 Answer the following questions. (Any Two) 14**
- a) Define system, Explain in detail design Process of system in mechatronics.
  - b) Explain SCADA Architecture with its types.
  - c) Write note on PLC ladder programming with suitable example for ON-OFF outputs.

Seat No.	
----------	--

Set	P
-----	---

**M.Sc. (Semester – IV) (CBCS) Examination Oct/Nov-2019**  
**Electronics**  
**MIXED SIGNAL BASED SoC DESIGN**

Day & Date: Monday, 11-11-2019  
 Time: 03:00 PM To 05:30 PM

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.  
 2) Figures to the right indicate full marks.  
 3) Use of log-table and calculators are allowed.  
 4) Draw neat and labeled diagram wherever necessary.

**Q.1 Fill in the blanks by choosing the correct alternatives given below: 14**

- 1) PSoC1 consists of \_\_\_\_\_ as processing core.
  - a) ARM
  - b) ARM Cortex
  - c) 8051
  - d) M8C
- 2) The Internal main oscillator of PSoC1 device has \_\_\_\_\_ frequency
  - a) 32.768 KHz
  - b) 732KHz
  - c) 24MHz
  - d) 12 MHz
- 3) The PSoC1 the SROM is used to store \_\_\_\_\_.
  - a) SFR address
  - b) Boot program
  - c) API of devices
  - d) data and variables
- 4) The PSoC devices are having \_\_\_\_\_ mA current sourcing capacity per pin.
  - a) 25 mA
  - b) 10mA
  - c) 20mA
  - d) 15mA
- 5) The PSoC1 device from Cypress comprises an array of \_\_\_\_\_ programmable analog blocks.
  - a) 12
  - b) 16
  - c) 24
  - d) 4
- 6) The PSoC1 has global I/O pins which can be configured \_\_\_\_\_ different modes.
  - a) 2
  - b) 4
  - c) 6
  - d) 8
- 7) In programmable digital blocks Auxiliary Input is used for \_\_\_\_\_ communication.
  - a) Parallel
  - b) SPI
  - c) RS232
  - d) None of these
- 8) Upon configuration of programmable digital block in Timer mode, which of the following is used to hold count number?
  - a) DR0
  - b) DR1
  - c) DR2
  - d) DR3
- 9) Upon configuration of programmable digital block as compare mode \_\_\_\_\_ can be produced at output pin.
  - a) ramp wave
  - b) sine wave
  - c) square wave
  - d) triangular wave



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

- a)** With suitable block diagram describe development of system on chip for measurement of humidity of the environment.
- b)** With suitable diagram, describe internal architecture of type CSC configurable analog blocks.
- c)** With internal architecture describe continuous time analog block of PSoC device.