SLR-RI – 392

Seat No.	

M.Sc. (Electronics) (Semester – III) (New) (CBCS) Examination, 2017
NUMERICAL METHODS

Day & Date: Tuesday, 18-04-2017 Max. Marks: 70

Time: 10.30 AM to 01.00 PM

N.B. : *1) Q.**1** and Q.**2** are **compulsory.***
*2) Attempt **any three** questions from Q. **3** and **7**.*
*3) Figures to the **right** indicate **full** marks.*
*4) Answer **five** questions.*

Q.1 a) Choose correct answer: **08**

1) R-2R Ladder network results in to _____ matrix.
   a) Lower triangular b) Upper triangular
   c) Tridiagonal d) None of these

2) Laplace Transform of $f(t)= t^n$ is given by F(s)=
   a) 1/S b) (n!)/(S) c) $(n!)/S^n$ d) $(n!)/(S^{n+1})$

3) Newton`s –Cotes integration formula for four points reduce to _____.
   a) Simpson 1/3 rule b) Trapezoidal rule
   c) Simpson 3/8 rule d) All of these

4) For RK-4 order method Taylors Series can be truncated from ____.
   a) Oh^5 b) Oh^2 c) Oh^4 d) All of these

5) Laplace Transform converts the function of ____.
   a) Frequency domain into time domain
   b) Time domain into frequency domain
   c) Time domain into continuous time domain
   d) None of these

6) Interpolation of set of four points results into polynomial of the order ____.
   a) One b) Two c) Zero d) Three

7) For Newton's forward difference $\Delta^2 Y_0$ =_____.
   a) E^2 b) $(E-1)^2$ c) $(E+1)^2$ d) All of these

8) The least squares method of curve fitting is developed by considering _____
   a) Minimization of data points b) Minimization of error
   c) Maximization of data points d) Maximization of errors

b) State True or False: **06**

1) For triangular factorization method of solution of linear system of equations, the system may be expressed as LUX=B.
2) Numerical integration for two variable is called quadrature.
3) Laplace transformation of e^{4t}=1/(s+4)
4) Lagrangian method is used for interpolation of unequal spacing.
5) RK- III order method of solution of ODE has 3 constants.
6) For Newton's forward method of interpolation the u is given by $u=(x- x_n)/h$.

Q.2 a) Attempt any two: **10**

1) Derive expression for Laplace transformation of $f(t)= e^{at.}$
2) What do you mean by pivoting?
3) Solve

$4x_1 + x_2 + 2x_3 = 12$
$2x_1 - 3x_2 + 8x_3 = 20$
$-x_1 + 11x_2 + 4x_3 = 33$

b) Using least squares fitting process, fit following data to straight line. **04**

X=0	2	4	6
Y=0	8	16	24

Q.3 a) What do you mean by Newton's Cotes Integration formula? Derive expression for Simpson`s mid- point and one third rule for numerical integration. **08**

b) Evaluate by using Simpson one third method. **06**

$$I = \int_0^1 dx/(X)$$

Q.4 a) What do you mean by Laplace Transformation of the given function? Describe in detail the analysis of RL circuit by using Laplace Transformation. **08**

b) Find first and second order derivatives at x=1.0 for following data points. **06**

X=	1	1.1	1..2	1.3	1.4
Y=	43.1	47.7	52.1	56.4	60.8

Q.5 **a)** Describe formation of system of linear equations? Describe Gaussian elimination Method for solution of system of linear equations. **08**

b) Evaluate by using composite trapezoidal rule for 10 intervals. **06**

$$I = \int_0^1 e^X dX$$

Q.6 **a)** What do you mean by numerical differentiation? Derive expression for Newton's forward difference formula for numerical differentiation. **08**

b) Using Newton's forward difference interpolation method find y(15) for following data points. **06**

X=10	20	30	40	50
Y=12	16	20	25	35

Q.7 **a)** Describe Euler`s method of finding solution of first order ordinary differential equation. **08**

b) Using RK-II order method find value of y(0.2). Given that $\frac{dy}{dx} = x - y^2$ and $y(0) = 1$ **06**

Seat No.	

M.Sc.(Electronics) (Semester –II) (New) (CBCS) Examination, 2017
CONTROL THEORY

Day & Date: Wednesday, 19-04-2017 Max. Marks: 70

Time: 10.30 AM to 01.00 PM

N.B. : *1) Answer **Five** Questions.*
*2) Question **1** and **2** are **compulsory.***
*3) Figures to the **right** indicate full **marks***
*4) Attempt any Three from **Q.3** to **Q.7***

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

1) If G(S) is open loop transfer function, then closed loop transfer function is given by _____
   a) G(s)H(s) b) 1+G(s)H(s)
   c) G(s)/(1+G(s)H(s) d) 1/G(s)H(s)

2) The transfer function of the circuit containing R and C is given by G(s)=_____
   a) 1+Ts b) 1/(1+Ts) c) 1/Tsc d) Ts/(1+Ts)

3) The time that the system output takes to reach 50% of its final value is known as_____ time.
   a) Rise time b) Settling time c) Peak time d) Delay time

4) In case of second order system if ξ =1, then poles are _____.
   a) Real and equal b) Imaginary and equal
   c) Imaginary d) On positive real axis

5) If positional error constant is Kp then steady state error for step input is given by e_{ss} = _____.
   a) Kp b) 1+Kp c) A/(1+Kp) d) A/Kp

6) If poles of the system are s=-5$\pm$4j then system is _____.
   a) Stable b) Unstable c) Quasi stable d) None of these

7) Frequency response is the response of_____.
   a) Magnitude against log of frequency
   b) Log of magnitude against frequency
   c) Log of magnitude against log of frequency
   d) Log of magnitude and phase against frequency

8) According to Angle condition the phase of the function G(s)H(s) is given by _____
   a) $\angle$G(s)H(s)=$\pm$(2q+1)180° b) $\angle$G(s)H(s)=$\pm$(2q)180°
   c) $\angle$G(s)H(s)=+(2q+1) 90° d) $\angle$G(s)H(s)=+(2q+3) 180°

B) State weather true or false: **06**

1) Signal flow graph is applicable only to linear time invariant system.
2) The standard test signal of the type ramp results into positional error constant.
3) The transfer function is G(s) =1/(s^2 (1=s)).System is said to be type 0system
4) If damping factor ξ=0, then the roots are imaginary and complex conjugate.
5) According to Hurwitz`s criterion, for stable system all Hurwitz determinant should be positive..
6) Nyquist polar plots are not suitable to express the stability of the system.

Q.2 A) Attempt any two: **10**

1) With suitable examples describe closed loop control system.
2) Discuss in detail the standard test signals.
3) What is frequency response of a system?

B) Give in detail classification of the controllers. **04**

Q.3 A) What do you mean by feedback and feed forward control system? Discuss with help of suitable block diagram. **08**

Write a note on Poles and Zeros of the Transfer function of the system. **06**

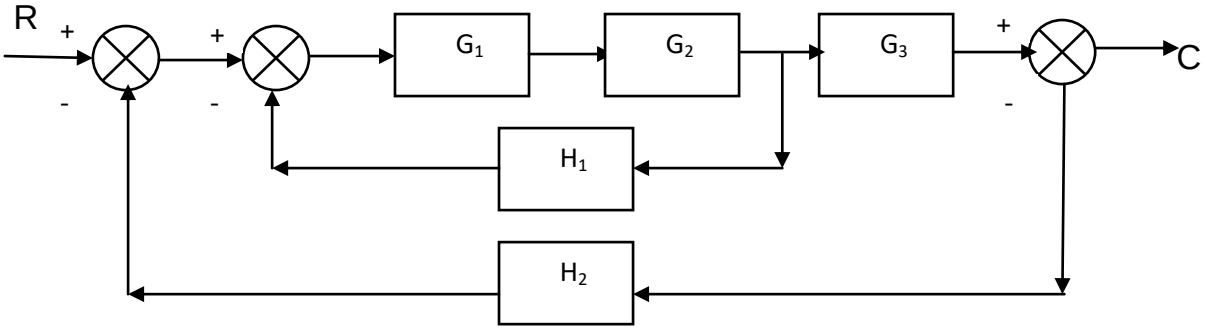
Q.4 A) Define the terms transient response and steady state response. **08**

B) Derive expression for stead state error for step, ramp and parabolic inputs. **06**

Q.5 A) Describe s-plane with respect to stability. How nature of the pole is related to the stability of the system? **08**

B) What do you mean by Routh-Hurwitz Criteria for stability? **06**

Q.6 A) What is need of block diagram reduction? Explain in detail the rules for block diagram reduction. **08**



B) Using standard rules reduce following block diagram. **06**

Q.7 A) What is characteristic equation of second order transfer function? **08**

Explain effect of damping factor ξ on the performance of the second order system.

B) What is concept of composite control mode? Discuss PI mode in detail. **06**

SLR-RI-402

Seat No.	

M.Sc. (Electronics) (Semester – II) (New) (CBCS) Examination, 2017
REAL TIME OPERATING SYSTEM

Day & Date: Friday, 21-04-2017 Max. Marks: 70

Time: 10.30 AM to 01.00 PM

Instruction : *1) Answer **five** questions*
*2) Question **1** and **2** are **compulsory***
*3) **Attempt** any Three from **Q.3 to Q.7***
*4) Figures to the **right** indicate f**ull** marks.*

Q.1 A) Choose correct answer: **8**

1) Hard real time operating system has _____ jitter than a soft real Time operating system.
a) less b) more c) equal b) none of these

2) Which one of the following is a real time operating system?
a) RTLinux b) VxWorks c) WindowsCE b) all of these

3) The _____ multitasking is also called cooperating multitasking
a) Preemptive multitasking b) Non-preemptive multitasking
c) both a & b d) none of these

4) The priorities of low priority task and high priority task are Effectively inversed is called _____
a) Priority inheritance b) Priority inversion
c) Both a and b d) none of these

5) Embedded system in which some specific work has to be done in a specific time period are called _____
a) Real-time system b) Stand-alone system
c) both a and b d) none of these

6) 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

7) _____ specifies the task waiting order and enables task deletion safety.
a) Mutex b) zero c) either zero or one d) None of these

8) Binary semaphore will take the value of _____
a) One b) zero c) either zero or one b) None of these

B) State True or False: **06**

1) Time duration required for scheduling dispatcher to stop one process and start another is known as process latency.
2) A task is said to be in running state if it is being executed by the CPU.
3) Counting semaphore will have an integer value greater than zero.
4) Time required for CPU to return to the interrupted code or highest priority task is called interrupted response time.
5) The module within the scheduler that performs context switching is called dispatcher
6) Event register is a Kernel object to indicate the occurrence of an event to a task.

Q.2 A) Answer any two of the following: **10**

1) Compare Hard and Soft Real Time Systems.
2) Write note on Counting semaphore.
3) Explain Characteristics of Real-Time operation system.

B) Write note on Round Robin scheduling algorithm. **04**

Q.3 A) Write a note on Minimum requirement of Microcontroller based embedded. **08**

B) Write note on Resources, Sharing of resources. **06**

Q.4 A) Explain in detail structure of RTOS. **08**

B) Write a note on concept of Synchronization of Task. **06**

Q.5 A) Explain Intertask Communication. **08**

B) Write note on binary semaphore. **06**

Q.6 A) Write note on POSIX Pthreads. **08**

B) Discuss RTLinux Kernel in detail. **06**

Q.7 A) Design AVR ATmega8L microcontroller based embedded system for Measurement of wind velocity. **08**

B) Write note on Kernel Objects. **06**

SLR-RI - 403

Seat No.	

M.Sc. Electronics (Semester – II) (New) (CBCS) Examination, 2017
OPTO ELECTRONICS

Day & Date: Monday, 24-04-2017 Max. Marks: 70

Time: 10.30 AM to 01.00 PM

Instruction : *1) Answer five questions*
2) Question 1 and 2 are compulsory
3) Attempt any Three from Q.3 to Q.7
4) Figures to the right indicate full marks.

Q.1 A) Choose correct answer: **08**

1) In step fiber _____ light source is used.
   a) LASER LED Photodiode b) Both a and b

2) In_____ fibers RI of the core is uniform throughout.
   a) Single mode step index b) Multimode step index
   c) Graded index d) None of these

3) Total internal reflection occurs when _____.
   a) Angel of incidence > critical angel
   b) Critical angel > angel of incidence
   c) Angel incidence = critical angel
   d) Both a and c

4) _____ gives the change in refractive index linearly proportional to the square of the electric field.
   a) Pockel's effect a) Faraday's effect
   b) Kerr's effect c) None of these

5) _____ use an electric arc to weld two fiber-optic cables together.
   a) Mechanical splicing b) Fusion splices
   c) Both a and b d) None of these

6) LASER is _____ source of light
   a) Coherent b) Natural
   c) Incoherent d) Both a and b

7) _____ material exhibits linear electro-optic effect
   a) Crystalline silica b) Non- centro symmetric
   c) Centro symmetric d) Both a and b

8) _____ shifts the polarization direction of linearly of polarized light.
   a) Half wave plate b) Quarter wave plate
   c) Both a and b d) None of these.

B) State True or False: **06**

1) Optical fibers use visible spectral band.
2) Modal dispersion is reduced in multimode step index fiber.
3) For glass fabrication silicon dioxide is basic material.
4) Optically isotropic materials have the identical properties in all directions.
5) The mechanical splices are used when splices need to be made quickly and easily.
6) In surface emitting LED the active light emitting region oriented parallel to the axis of the fiber.

Q.2 A) Attempt two (short questions): **10**

1) What is direct intensity modulation?
2) Give the difference between step index and graded index fiber.
3) Write a note on couplers.

B) What is electro optic modulator? **04**

Q.3 A) What is Quarter waveplate? Explain its application for polarization of light. **08**

B) Write a note P-I-N photodiode. **06**

Q.4 A) Explain with necessary diagram, construction and working principle of He-Ne laser. **08**

B) Write a note on population inversion. **06**

Q.5 A) What are the connectors? Explain with examples types of connectors. **08**

B) Write a note on splicing. **06**

Q.6 A) Describe in detail Magneto optic effect. **08**

B) Write a note Edge emitting LED. **06**

Q.7 A) Explain the types of fiber measurements. **08**

B) Write a note on Acoustic optic modulator. **06**

Seat No.	

M. Sc- Electronics (Semester – III) (Old) (CGPA) Examination, 2017
ADVANCED DIGITAL SYSTEMS DESIGN WITH VHDL

Day & Date: Thursday, 20-04-2017 Max. Marks: 70

Time: 02.30 PM to 05.00 PM

Instructions: *1) Answer **five** questions.*
*2) **Q. 1 and Q.2 are compulsory.***
*3) Attempt **any Three** from Q.3 to Q.7.*

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

1) What is the symbol used for signal assignment?
a) := b) = c) = = d) None of these

2) The statements defined within process unit executes.
a) Sequentially b) Concurrently
c) Both a and b d) None of these

3) The VHDL editor is.
a) A graphic editor b) A C program editor
c) A text editor d) An I/O editor

4) How many states will there be in a 4-bit ring counter?
a) 4 b) 8 c) 16 d) 32

5) How many flip-flops are required to make a MOD-27 binary counter?
a) 3 b) 4 c) 5 d) 32

6) On *J-K* flip-flop, when is the flip-flop in a race condition?
a) *J*= 0, *K*=4 b) *J*= 0, *K*=1 c) *J*= 1, *K*=0 d) *J*= 1, *K*=1

7) Which VHDL data type has a value of '1' or '0'?
a) Signal b) bit c) Std_ logic d) Integer

8) The following VHDL ENTITY declaration code is incorrect because:

```
ENTITY booly 2 IS
      PORT ( A,B,C,D,E: IN bit ; X;OUT bit )
```

a) Missing semicolon b) Missing "PORT END"
c) Mismatch in ENTITY name d) Incorrect ENTITY name

B) State Truth of False: **06**

1) In a priority encoder, the input with the highest priority is represented on the output.
2) The gated *S-R* flip-flop is synchronous.
3) Vectors are a useful way to group like signals together.
4) CPLDs can be used only to implement exclusive-OR and exclusive-NOR gates.
5) In a Gray code, two consecutive number differ by 1 bit.
6) PLDs can meet all the possible requirements of complex digital circuitry.

Q.2 1) Write a note on attributes. **05**
2) Draw and explain VHDL design flow. **05**
3) Draw and Explain block diagram of PAL. **04**

Q.3 a) Write VHDL code for 4-bit up down counter. **08**
b) Write VHDL code for JK flip flop. **06**

Q.4 a) Write VHDL code for 4-bit binary adder using 1-bit adder as a component. **08**
b) Explain serial input serial output right shift register. **06**

Q.5 a) Implement the function using PLA. **08**

$$f\ 1 = \sum m\ (1,5,7),\ \sum m(5,6,7)$$

b) Design 1-bit magnitude comparator. **06**

Q.6 a) Design 4 bit binary to gray cod convertor. **08**
b) Explain behavioral modeling **06**

Q.7 a) Write a VHDL code for 4:16 decoder. **08**
b) Write VHDL code for 4:1 multiplexer. **06**

SLR-RI – 417

Seat No.	

M.Sc. (Electronics) (Semester – III) (New) (CBCS) Examination, 2017
ADVANCED DIGITAL SYSTEMS DESIGN WITH VHDL

Day & Date: Thursday, 20-04-2017 Max. Marks: 70

Time: 02.30 PM to 05.00 PM

Instructions: *1) Attempt **five** questions.*
*2) Question **1 and 2 are compulsory.***
*3) Attempt **any Three** from Q.3 to Q.7.*
4) Figures to the right indicate full marks.

Q.1 A) Choose the correct answer: **08**

1) The VHDL is utilized for _____ design.
   a) Analog b) Digital c) Both a & b d) None of these

2) The meaning of 'L' is _____ in Data Types STD_LOGIC_ 1164.
   a) Low b) 0 c) Weak 0 d) All of these

3) The place and route is included in _____ endlevel design.
   a) Back b) Front c) Both a & b d) Mixed

4) The exit and next statements are used only _____ loop statement.
   a) Outside b) Inside c) Both a & b d) None of these

5) The package std_logic_1164 is accessed by _____ clause.
   a) Library b) Use c) Type d) Both a & b

6) The Generate statement is _____ statement.
   a) Sequential b) Concurrent c) Process d) All of these

7) The _____ value is assigned by <= assignment used operator.
   a) Signal b) Variable c) Constant d) All of these

8) The _____ are the programming technologies used for PLD.
   a) SRAM b) EPROM c) Flash d) All of these

B) State Truth or False: **06**

1) The data attributes return data information regarding a data vector.
2) The & operator is addition operator used in VHDL code.
3) The wait statement is a concurrent statement.
4) The PLD devices are utilized for analog logic circuit design.
5) The operator NAND and NOR are not associative.

6) The process statement is itself concurrent statement.

Q.2 A) Attempt two (Short Questions): **10**

1) Explain basic terminology of VHDL.
2) Discuss advantages of VHDL.
3) Explain the syntax of process statement.

B) Explain the architecture of FPGA. **04**

Q.3 A) Explain the various language element of VHDL and Explain operator in detail. **09**

B) Write VHDL code for 8:1 demux using behavioral modeling. **05**

Q.4 A) State and explain the role of various types of architecture bodies in VHDL using suitable example. **09**

B) Write VHDL code for serial out shift register. **05**

Q.5 A) What do you mean Attributes and Generic? Explain it with suitable example. **09**

B) Write VHDL code for 8-bit input comparator. **05**

Q.6 A) Explain the LOOP statement in detail with suitable example. **09**

B) Write VHDL code for 3:8 decoder. **05**

Q.7 A) Explain the EDA tools. Write a note on Macrocell. **09**

B) Write VHDL code for one digit counter. **05**

Seat No.	

M.Sc.(Electronics) (Semester –IV) (New) (CBCS) Examination, 2017
MICROWAVE DEVICES, ANTENNAS AND MEASUREMENTS

Day & Date: Wednesday, 19-04-2017 Max. Marks: 70

Time: 02.30 PM to 05.30 PM

N.B. : *1) Answer **Five** Questions.*
*2) Question **1** and **2** are **compulsory.***
*3) Figures to the **right** indicate full **marks.***
*4) Attempt any Three from **Q.3** to **Q.7.***

Q.1 a) Choose correct answer: **08**

1) The reflection coefficient on a line is $0.2\angle 45°$.The SWR is_____
   a) 0.8 b) 1.1 c) 1.2 d) 1.5

2) Because of its axial symmetry, the conical horn can handle any polarization of the dominant _____ mode.
   a) TM_{10} b) TM_{01} c) TE_{11} d) TM_{11}

3) For fixed antenna size, the focusing ability improves as the wavelength_____
   a) Constant b) Decreases
   c) Increase d) None of above

4) The dominant mode in a particular guide is the mode having_____
   a) Lowest cutoff frequency
   b) Highest cutoff frequency
   c) Highest cutoff wavelength
   d) Lowest or Highest cutoff frequency

5) A frequency at which microwave ovens operate is ____
   a) 50μHz b) 4.5 GHz
   c) 3.3 GHz d) 2.45 GHz

6) A circularly polarized wave has _____ dB ellipticity since Emax = Emin
   a) 5 b) 30 c) 0 d) 20

7) Velocity factor of transmission line depends on_____
   a) Temperature b) Relative Permittivity of dielectric
   c) Skin effect d) None of the above

8) The _____ horn is usually used as a standard gain antenna.

a) Pyramidal b) Sectoral E-plane
c) Sectoral H-plane d) Sectoral H-plane or sectoral E-plane

b) State weather true or false **06**

1) The electronic efficiency of the klystron amplifier is defined as the ratio of the output power to the input power.
2) For a fixed antenna size, the focusing ability improves as the wavelength Decreases
3) GaAs exhibits transferred electron effect.
4) The current sensitivity of the detector is the ratio of rectified current to the absorbed r-f-power.
5) A flat line is resonant.
6) 1 watt equals +30dbm

Q.2 A) Write short answers (Any Two) **10**

a) Describe Reflections at Conducting Boundaries.
b) What is impedance matching? Explain various methods of achieving impedance matching.
c) Write a detail note on Rat-Race Circuits.

B) What are the major differences between the TWT and the klystron?

Q.3 a) Explain the process of velocity modulation and bunching a reflex klystron oscillator with the help of applegate diagram. **08**

b) Write a note on Gunn effect diodes for microwave generators and amplifications **06**

Q.4 a) Derive the expression for the characteristics equation of two wire transmission line. **08**

b) A transmission line has the following parameters **06**
R=2Ω/m G=0.5 m$\mho$ f=1GHz L=8nH/m c=0.23pF

Q.5 a) Show that TEM wave cannot propagate in waveguide by making use of Maxwell's equation. **08**

b) Explain operation of E-H plane Tee junction and derive the scattering matrix of it. **06**

Q.6 a) Explain Wave propagation in Imperfect Insulators. **08**

b) With schematic diagrams explain Wave Polarization. **06**

Q.7 a) Obtain the equations for **08**
i. Attenuation constant
ii. Phase constant
iii. Characteristic impedance and
iv. Phase velocity for a transmission line at microwave frequencies

b) Discuss the use of crystals as low-level detectors. **06**

SLR-RI-431

Seat No.	

M.Sc. Electronics (Semester – IV) (New) (CBCS) Examination, 2017
NETWORKING AND DATA COMMUNICATIONS

Day & Date: Friday, 21-04-2017 Max. Marks: 70

Time: 02.30 PM to 05.00 PM

Instruction : *1) Answer five questions*
2) Question 1 and 2 are compulsory
3) Attempt any Three from Q.3 to Q.7
4) Figures to the right indicates full marks.

Q.1 A) Choose correct answer **8**

1) In IPv4 addressing , x. y. z. t/n, the/n is defined for _____
   a) Masking b) addressing c) encoding b) decoding

2) The reply of the Address Resolution Protocol is _____
   a) broadcast b) unicast c) multicast b) all of these

3) IP is an unreliable and _____ data gram protocol.
   a) connection oriented b) connectionless
   c) both a & b d) none of these

4) The Bootstrap Protocol (BOOTP) is _____ protocol.
   a) client b) server b) client/server c) none of these

5) The address space of IPv6 is _____ address.
   a) 2^{32} b) 2^{64} c) 2^{16} d) 2^{128}

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

7) A proxy firewall filters works at the _____ layer.
   a) Transport b) Application c) network b) physical

8) The encoding technique, Differential Manchester, has the idea of _____
   a) RZ & NRZ-I b) RZ & NRZ-L
   c) NRZ & NRZ-I d) NRZ & NRZ-L

B) State True or False **6**

1) The HDB3 substitutes eight consecutive zeros with 000VB0VB.
2) In ADSL the Channel -0 is reserved for voice communication.
3) The ADM in the network performs insertion and extraction of Signals.
4) The BSS without an AP is called an infrastructure network.

5) The repeater has filtering capabilities.
6) In Manchester and Differential Manchester line encoding technique the transaction at the middle of the bit is used for synchronization.

Q.2 A) Attempt two (short questions)0 **10**

1) Explain congestion control
2) Explain the Bluetooth technology
3) Explain the massage authentication

B) Discuss virtual switched network. **4**

Q.3 A) Discuss the TCP/IP model **9**
B) Discuss PPP **5**

Q.4 A) Explain the DSL technology. **9**
B) Explain the Dual Stacking and Tunneling of IP. **5**

Q.5 A) Explain in detail IPv4 addressing **9**
B) Explain the frequency hopping spread spectrum technique. **5**

Q.6 A) Explain the different multiplexing techniques to improve the efficiency of the channel. **9**
B) Discuss electronic mail. **5**

Q.7 A) Explain WWW and HTTp. **9**
B) Discuss the firewall. **5**

SLR-RI-432

Seat No.	

M.Sc. (Electronics) (Semester-IV) New (CBCS) Examination, 2017
NANOELECTRONICS

Day & Date: Monday, 24-04-2017 Max. Marks: 70

Time: 02.30 PM to 05.00 PM

Instructions : *1) Answer five Questions.*
2) Question 1 and 2 are compulsory.
3) Attempt any Three from Q.3 to Q.7.
4) Figures to the right indicate full marks.

Q.1 Choose correct answer: **08**

1) The Coulomb Blockade voltage is……
   a) In between-e/2C and +e/2C b) Greater than –e/2C
   c) Less than –e/2C d) Equal to –e/2C

2) The DOS for 2DEG System exhibits…. Shaped energy dependence.
   a) Triangular b) Parabolic
   c) Staircase d) Line

3) The transistor having 100nm dimensions obeys…… principle
   a) Quantum b) Classical physics
   c) Both a & b d) None of these

4) The OLED's are an electroluminescent organic material between two….. of different work functions.
   a) Semiconductors b) Nonconductors
   c) Insulator d) Conductors

5) The hetero-junctions are based on….. row compounds.
   a) III-IV b) IV-V
   c) III-V d) IV-III

6) The split gate technique is used to ….. the electron gas dimentionality.
   a) Increase b) Decrease
   c) Equal d) Non of these

7) The transistor based on hot electron is called….. transistor.
   a) Hot hole b) Hot
   c) Hot electron d) Electron

8) The barrier height of the potential square well for holes is …. And electrons is…..

a) 0.4eV, 0.2eV
b) 0.2eV, 0.4eV
c) 1.4eV, 0.2eV
d) P.4eV, 1.2eV

B) State True of False: **06**

1) The immersion lithography is currently considered for 32nm chip.
2) The multiple quantum wells (MQW) are formed by single quantum well.
3) The OLED does not requires a backlight a well as filter.
4) If$\lambda > Lx, Ly\ and\ Lx, Ly \ll Lz$ then it stands for quantum well.
5) The organic semiconductor has Van-der-wall bonds.
6) The modulation doped hetero-junctions gives high frequency transistors, MODFET.

Q2 A) Attempt two (Short Questions): **10**

1) Explain the advantages of nanoelectronics over microelectronics.
2) Discuss in short the quantum well, wire ad dots considering the lengths.
3) Discuss the concept of superlattice.

B) Explain the modulation doped quantum wells. **04**

Q3 A) Explain in detail basic properties of two-dimensional semiconductor nanostructures. **09**

B) Write a note on quantum wire. **05**

Q4 A) Explain the fabrication methods of nanomaterials. **09**

B) Explain any three characteristics length in nanostructures **05**

Q5 A) Explain in detail Heterojunctions. **09**
B) Write a note on resonant tunneling effect. **05**

Q6 A) What do you mean by tunneling effect and tunneling elements. **09**
B) Write a note on organic semiconductor. **05**

Q7 A) Explain details Single Electron Transistor. **09**
B) Write a note on OLED **05**

SLR-RI – 433

Seat No.	

M.Sc. (Electronics) (Semester–IV)(New) (CBCS) Examination, 2017
OPTICAL FIBER COMMUNICATION

Day & Date: Monday, 24-04-2017 Max. Marks: 70

Time: 02.30 PM to 05.00 PM

Instructions : *1) Answer five question.*
2) Question 1 and 2 are compulsory.
3) Attempt any Three from Q.3 to Q.7.
4) Figures to the right indicate full marks.

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

1) …….. has high speed detection capability.
   a) LED b) LASER
   c) Photodiode d) Phototransistor

2) In standard optical fibers the core materials is……..
   a) Pure silica glass b) Pure plastic
   c) Abrasion-resistant plastic material d) All of these

3) In every communication system, internal noise is due to ……
   a) Switch and power supply transient
   b) Spontaneous fluctuation of current
   c) Power drift
   d) None of these

4) …….. material is normally used of DFAs.
   a) Cu b) SiO2
   c) Er d) Non of these

5) Bit error rate is given by ……
   a) Ne/Nt b) Ne/Bt
   c) Ne/Tb d) Both a and b

6) Best error rate is given by ……..
   a) Charge amplifier b) Trans impedance amplifier
   c) Current amplifier d) Voltage amplifier

7) WDM …… the capacity of optical fiber link.
   a) Looses b) Increases
   c) Decreases d) None of these

8) Optical fiber works with ……
   a) Principle of electro mechanism
   b) Principle of total internal refraction

c) Electro optic principle
d) None of these

B) State True or False: **06**

1) Raman optical amplifier is based on simulated scattering.
2) For optical communication to occur R1 of core must be greater than R1 of cladding.
3) In DWDM the operation is in O and C band.
4) NA = nsin θ.
5) In WDM, active devices are having limited flexibility.
6) Pumping means external current injection.

Q2 A) Attempt any two: **10**

1) Write a note on analog and digital signal.
2) Write a note on analog receivers.
3) What is acceptance angle? Derive the expression for it

B) Write a note on Raman amplifier. **04**

Q3 A) Describe the elements of optical fiber communication system and compare it with conventional electrical communication system. **08**

B) Write a note on graded index fiber. **06**

Q4 A) Explain different loss mechanisms in optical fiber communication. **08**

B) Write a note on receiver performance and receiver sensitivity. **06**

Q5 A) Describe the basic principle of optical amplification and write a note on Fabry Parot amplifier. **08**

B) Write a note on power amplifier. **06**

Q6 A) Describe in detail architecture of EDFA. **08**

B) Write a note on intermodal dispersion **06**

Q7 A) With necessary block diagram describe receiver section of the optical fiber communication. **08**

B) Write a note on optical spectrum analyzer. **06**

SLR-RI-434

Seat No.	

M.Sc. Electronics (Semester-IV) (New) (CBCS) Examination, 2017
MECHATRONICS AND INDUSTRIAL AUTOMATION

Day & Date: Wednesday, 26-04-2017 Max. Marks: 70

Time: 02.30 PM to 05.00 PM

Instructions : 1) *Answer five questions.*
2) Q. No. 1 and Q.No.2 are Compulsory.
3) Attempt any three questions from Q.NO.3 to Q.No.7
4) Figures to the right indicate full marks.

Q.1 A Choose the alternatives **8**

1) 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

2) The number of input resisters in PLCs is normally one tenth of …….. Rrgister.
   a) Holding b) Working
   c) Output d) Input

3) In PLC ……. Is used as a bit file delimiter
   a) / b) :
   c) \ d) None of these

4) A …… timer is called a nonretentive timer.
   a) Single input b) Double input
   c) Both a and b d) None of these

5) In PLC arithmetic…… operation, if result is negative the result resister, it turns on coil.
   a) Multiplication b) Addition
   c) Subtraction d) None of these

6) In PLC the up counter count start at 0 and increments by ….. Each time at pulse on.
   a) 1 b) FF
   c) 0 d) None of these

7) …….. determines which rack the module sits in.

a) Rack number
b) Terminal number
c) Both a and b
d) None of these

8) ……. Is advantage of PLC
a) Flexibility
b) Low cost
c) Security
d) All of these

B State true or false **6**

1) The PLC sequential function is often called the cube function.
2) In PLC the racks, on which PLC part are mounted and the enclosures on which the CPU, PM and I/O modules are mounted.
3) LVDT is input device of PLC
4) Third Generation SCADA system known as networked SCADA system.
5) Modbus is the industrial communication protocol.
6) OG stands for Output Group register.

Q2 **A** Answer any two of the following **10**

A) Write note standard symbols in PLC.
B) Explain in detail Graphic display of DCS with suitable diagram.
C) What do you mean by industrial automation?

B Write note on DCS Communication. **4**

Q3 **A** Write note on IO modules of PLC and its characteristics. **8**

B Write note on advantages and disadvantages of mechatronics systems. **6**

Q4 **A** Explain Registers of Programmable Logic Controller. **8**

B Write note on Timer Function of PLC. **6**

Q5 **A** Explain Master Control relay and Sequencer functions. **8**

B Discuss basic architecture of DCS system. **6**

Q6 **A** Write on types of SCADA system. **8**

B Explain Modbus in detail. **6**

Q7 **A** Explain in brief Modeling of system and measurement system. **8**

B Draw PLC Ladder diagram programming for ON-OFF inputs and Outputs. **6**

SLR-RI - 435

Seat No.	

M.Sc. (Electronics) (Semester-IV) (New) (CBCS) Examination, 2017
WIRELESS SENSOR NETWORK

Day & Date: Wednesday, 26-04-2017 Max. Marks: 70

Time: 02.30 PM to 05.00 PM

N.B. : *1) Attempt **five** questions.*
*2) Q.No.1 and Q. No. 2 are **compulsory**.*
*3) Attempt any **three** questions from **Q. No. 3 to Q. No. 7**.*
*4) Figures to the right indicate **full** marks.*

Q.1 A) Choose the alternatives: **08**

1) The Zigbee device is operating at _____.
   a) 2.4GHz and 250 KBps b) 933MHz and 40KBps
   c) 833MHz and 30 KBps d) None of these

2) By default, ZiGbee operate in ____ Mode.
   a) Command b) API
   c) Transmission d) Transparent

3) According to IEEE standard, ____ is the working group for Wireless PAN.
   a) 802.3.2 b) 802.2.8 c) 802.15.4 d) 802.16.2

4) In ISM band, the frequency band from 902MHz to 928 MHz having _____ channels.
   a) 1 b) 10 c) 16 d) 27

5) _____ is the chain based protocol.
   a) LEACH b) SPIN c) PEGASIS d) TEEN

6) When Zigbee is not receiving or transmitting data, then it is in _____.
   a) Transmit Mode b) Sleep Mode
   c) Command Mode d) Idle Mode

7) _____ layer in WSN protocol stack helps to control the modulation type.
   a) Application b) Transportation
   c) Physical d) Presentation

8) Network establishment and control is the function of _____.

a) Router b) Coordinator c) End device d) Switch

B) State true or false: **06**

1) Category 1, C1WSN, of Wireless Sensor Network is typically confined to the short range applications.
2) Low Energy Adaptive Clustering Hierarchy, LEACH is based on data cluster formation.
3) In ring topology there is a central controller or hub.
4) The single 868.3 MHz channel in ISM band is used strictly in the European Union.
5) In beaconing mode, Wireless Sensor Nodes are always active.
6) The IEEE designation for Zigbee is 802.11.a.

Q.2 A) Attempt any two **10**

i) Describe the function of coordinator, router and end device.
ii) Write a note on ISM band.
iii) Write a note on security issues in the Wireless Sensor Network.

B) Mention the typical applications of WSN in detail **04**

Q.3 A) What do you mean by Wireless Sensor Network? With suitable diagram describe architecture of WSN. **08**

B Explain the standard IEEE 802.15.4 **06**

Q.4 A) Explain Energy management issues in Wireless Sensor Network. **08**

B) Explain the function of SPIN protocol in detail. **06**

Q.5 A) What do you mean by hierarchical architecture of Wireless Sensor Network? Describe in detail the function of the PEGASIS protocol. **08**

B) Explain the pin description of Zigbee module. **06**

Q.6 A) Design the Wireless Senior Node for measurement of temperature using Zigbee module and AVR microcontroller. **08**

B) With suitable block diagram explain the architecture of Wireless sensor Node. **06**

Q.7 A) Describe in detail with network layers recommended for WSN. Explain MAC layer in detail **08**

B) Write a note on unicast and broadcast modes of Zigbee. **06**

SLR-RI-436

Seat No.	

M.Sc. Electronics (Semester-IV) New (CBCS) Examination, 2017
MIXED SIGNAL BASED SOC DESIGN

Day & Date: Wednesday, 26-04-2017 Max. Marks: 70

Time: 02.30 PM to 05.00 PM

Instructions : 1) *Answer five questions*
2) Question 1 and 2 are compulsory
3) Attempt any Three from Q.3 to Q.7
4) Figures to the right indicate full marks.

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

1) VC1 is derived from …..
   a) VC2 b) PLL
   c) VC3 d) Sysclk

2) The Internal main oscillator of PSoC1 device has …… frequency.
   a) 32.768 KHz b) 732KHz
   c) 48MHz d) 24MHz

3) In $\Delta\Sigma$ ADC the ……. Criteria is used for sampling of the analog signal.
   a) Simpson b) Nerst
   c) Nyquist d) None of these

4) The global IO ports can be configured in ……. Modes.
   a) 2 b) 4 c) 6 d) 8

5) In continuous time analog block of PSoC devices the gain can be configured up to…..
   a) 2 b) 256 c) 48 d) 18

6) In case of switched capacitor programmable analog blocks the clocks should be…….
   a) 90o Out of phase with same frequency
   b) In phase with different frequency
   c) Out of phase with same frequency
   d) All of these

7) In switched capacitor inverting amplifier, the gain is given by A = ……..

a) C_A/C_F b) C_F/C_A c) R_F/F_A d) $C_A \times C_F$

8) If programmable digital block is configured timer, then the register DR0 decides for …….
   a) Pulse width b) Frequency
   c) Pulse period d) Terminal Count

B) State True of False **06**

1) The delta sigma ADC is not suitable for digitization of analog signal of high frequency.
2) In programmable digital block external is synchronized with internal clock.
3) Continuous time analog block cannot be configured as instrumentation amplifier.
4) For delta sigma ADC the decimator block is not required.
5) Type C SC bock has only one analog input.
6) In case of Cypress PSoC 1, the 8051 core is used for processing.

Q2 A) Attempt any Two **10**

1) With block diagram, describe the general architecture of M8C
2) Write a note on configuration of digital block as a timer.
3) Write a note on system clock.

B) With block diagram describe an array of programmable analog block **04**

Q3 A) What is Nyquist theorem for sampling? Describe with suitable block diagram general architecture of $\Delta \sum$ ADC **14**

B) Describe in details an architecture of system bus of PSoC1 devices **06**

Q4 A) With the suitable block diagram describe an array of programmable digital blocks. Discuss fundamental architecture of programmable digital block **08**

B) Write a note on memory subsystem **06**

Q5 A) What do you mean by mixed signal based SoC design? Discuss the salient features of Cypress programmable System on Chip. **08**

B) With suitable block diagram describe the design of mixed signal based system on chip for measurement of relative humidity **06**

Q6 A) With suitable diagram describe architecture of continuous time analog block **08**

B) Describe use of continuous time analog block as a instrumentation amplifier. **06**

Q7 A) What is principle of Switched Capacitor? Describe is detail the architecture of Type C SC block.

B) Write a note on interrupt subsystem.