Seat No.

**M.Sc. (Part – I) (Semester – I) (New) (CBCS) Examination, 2016**
**ELECTRONICS**
**Paper – I : Numerical Methods**

Day and Date : Tuesday, 29-3-2016                                           Total Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

**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.

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

   1) Absolute error is given by e = _____. Where, Va - theoretical Vo = Observer value

      a) Va-Vo          b) va/vo          c) Vo/va          d) All of these

   2) Newtons-Cotes integration formula for three points reduce to _____

      a) Simpson 1/3 rule                    b) Trapezoidal rule

      c) Simpson 3/8 rule                    d) All of these

   3) For set of points of equal interval _____ method of interpolation is suitable

      a) Cubic splines                       b) Newton's forward difference

      c) Lagrangian                          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 of $f(t) = t^n$ is given by F(s) =

      a) $1/S$          b) $(n!)/(S)$          c) $(n!)/S^n$          d) $(n!)/(S^{n+1})$

   6) Interpolation of set of four points results into the polynomial of the order _____

      a) One          b) Two          c) Zero          d) Three

7) For Newtons 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**.                         **6**

1) In Guass-Jordon elimination method, the coefficient matrix must be reduced to L matrix.

2) Absolute error is the difference between observed value and theoretical value.

3) Laplace transformation of $e^{\alpha t} = 1/(s+\alpha)$.

4) Lagrangian Interpolation formula gives second order polynomial.

5) RK-III order method of solution of ODE has 2 constants.

6) Laplace Transformation converts frequency domain function into time domain.

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

1) Derive expression for Laplace transformation of $f(t) = e^{\alpha t}$.

2) What do you mean by LU factorization ?

3) Solve

$$5x_1 - x_2 + x_3 = 10$$

$$2x_1 + 4x_2 = 12$$

$$x_1 + x_2 + 5x_3 = -1$$

B) Write a note on piecewise linear analysis.              **4**

3. A) Describe formation of system of linear equations ? Describe Gaussian elimination, method for solution of system of linear equations. **8**

   B) Evaluate by using Simpson one third method.

   $$I = \int_0^1 X\,dx.$$ **6**

4. A) Describe in detail the analysis of RC circuit by using Laplace Transformation. **8**

   B) Find y (6) by using Newtons forward interpolation method **6**

   | X = | 1 | 2 | 3 | 4 | 5 |
   |-----|-----|-----|-----|-----|-----|
   | Y = | 41.66 | 34.46 | 28.28 | 22.94 | 18.32 |

5. A) With suitable example describe least squares method of curve fitting. **8**

   B) Fit following data to the straight line **6**

   | X = | 0 | 2 | 4 | 6 | 8 | 10 |
   |-----|---|----|----|----|----|-----|
   | Y = | 0 | 20 | 40 | 60 | 80 | 100 |

6. A) What do you mean by quadrature ? Describe in detail the Newton Cote formal for numerical integration. **8**

   B) Using Newton's forward difference interpolate on method find y (27) for following data points. **6**

   | X = | 10 | 20 | 30 | 40 | 50 |
   |-----|------|-------|-------|-------|-------|
   | Y = | 9.21 | 17.54 | 31.82 | 55.32 | 92.51 |

7. A) Describe R-K method of finding solution of first order ordinary differential equation. **8**

   B) Using RK-II order method find value of y (0.8) Given that **6**

   $$\frac{dy}{dx} = 1 + xy \text{ and } y(1) = 3.$$

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### M.Sc. (Part – I) (Semester – I) Electronics Examination, 2016
### Paper – II : INSTRUMENTATION DESIGN (New CBCS)

Day and Date : Thursday, 31-3-2016                                Total Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

**Instructions** : 1) Q. **1** and Q. **2** are **compulsory**.
2) Attempt **any three** from Q. **3** to Q. **7**.
3) Q. **1** should be answered on the **question paper** itself.
4) Figures to the **right** indicate **full** marks.
5) **Use** of **nonprogrammable** calculator is **allowed**.

1. Objective type questions :                                                 **8**

   A) Choose a correct alternative :

   1) Which of the following forms of temperature sensor produces a large change
      in its resistance with temperature, but is very non-linear ?
      a) Thermocouple
      b) Thermistor
      c) RTD
      d) All of these

   2) Which of the following is a digital transducer ?
      a) Strain gauge
      b) Encoder
      c) Thermistor
      d) LVDT

   3) Strain gauge, LVDT and thermocouple are examples of
      a) Active transducers
      b) Passive transducers
      c) Analog transducers
      d) Primary transducers

**P.T.O.**

4) Self generating type transducers are _____ transducers.

a) Active                      b) Passive

c) Secondary             d) Inverse

5) The degree of damping most desirable for an analog-indicating instrument is

a) Zero

b) Critical

c) Somewhat less than critical

d) Slightly more than critical

6) During interface LCD to a microcontroller _____ line will instruct the LCD that microcontroller is sending data.

a) DB0                      b) RW

c) EN                       d) RS

7) Effective way to reduce stray capacitance is

a) To enclose the elements by shield and to ground the shield

b) To use Wagner's ground connection

c) Both a) and b)

d) None of these

8) The sample and hold is particularly required with _____ type A/D converters for higher speed.

a) Single slope            b) Dual slope

c) Flash                 d) Successive approximation

B) State **true** or **false** :                                             **6**

1) In a Wheatstone bridge, if two adjacent arms have strains of opposite nature, the bridge output is increased.

2) For dynamic measurements using resistance strain gauges, temperature compensation is not necessary.

3) A variable capacitance type transducer gives an output proportional to acceleration.

4) Compensating elements are used to improve dynamic characteristics.

5) The most desirable characteristics of an amplifier is low input impedance.

6) Data loggers are usually of digital types.

2. A) Attempt **any two** :                                                              (2×5=10)

    1) Write a note on dynamic characteristics.

    2) Explain the working principle of Electromagnetic relay.

    3) Explain the concept of multiple earth.

  B) Explain the Hall effect.                                                     **4**

3. A) Draw and explain the simple interfacing circuit for LM335.            **8**

  B) Write a note on proximity sensor.                                       **6**

4. A) Explain the Wheatstone's bridge circuit. What are its limitations ?    **8**

  B) Write a note on excitation.                                             **6**

5. A) Draw and explain the internal block diagram of LCD(16×2).             **8**

  B) Classify different types of recorder used in instrumentation. Explain the

    magnetic tape recorder.                                               **6**

6. A) Discuss the design of 2 wire and 4 wire transmitter with 4-20 mA output.  **8**

  B) Explain the design of Instrumentation Amplifier.                     **6**

7. A) Explain the interfacing of Ultrasonic Sensor module.                   **8**

  B) Why is it necessary to use preamplification and filtering before data processing ?  **6**

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# M.Sc. (Part – I) (Semester – I) Examination, 2016
## ELECTRONICS (New) (CBCS)
### Paper – IV : Advanced Microcontrollers

Day and Date : Tuesday, 5-4-2016                                      Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

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

1. A) Choose correct alternative of the following :                                      **8**

   1) Microcontroller PIC 16F877 has _____ flash program memory.

      a) $8K \times 14$      b) $14K \times 8$      c) $8K \times 16$      d) $16K \times 8$

   2) _____ of PIC has post scalar and pre scalar.

      a) Timer 0      b) Timer 1      c) Timer 2      d) None of these

   3) AVR AT mega 8L has 32 General purpose register

      a) Allocated in two banks          b) Grouped in two group

      c) Are in one bank                 d) None of these

   4) AVR A T mega8L has _____ bit 6 channel ADC.

      a) 9             b) 8             c) 11             d) 10

   5) DDR register is used to change port data direction as I/P or O/P in _____ Microcontroller.

      a) AVR                          b) PIC

      c) Both PIC and AVR             d) None of these

   6) Reset of PIC is

      a) Active Low  b) Active high   c) Tristated    d) None of these

7) In case of AVR microcontroller _____ register is used as X register.

   a) r0 and r1   b) r15 and r16   c) r26 and r27   d) None of these

8) In AVR AT mega 8L while configuration of ADC _____ bit is used to select ADC free running mode.

   a) ADFR     b) ADFM     c) ADSC     d) ADEN

B) State **true** or **false** :    **6**

1) In Microcontroller PIC program bus size is 14 bit.

2) In AVR ATmega 8L WDTCR is 8 bit resister.

3) Watch dog timer is used to reset controller when power is below 4.5 volt.

4) Microcontroller AVR ATmega 8L has two 16 bit timers.

5) Microcontroller PIC 16F877 has two 8 bit timers and one 16 bit WDT.

6) MPLAB is use to program AVR microcontroller.

2. A) Solve **any two** :    **10**

1) Write note on clock and reset circuit of PIC.

2) Explain in detail LPM, LD and ST instructions of AVR.

3) Write note on interrupts of AVR.

B) Write note on PORTS of AVR.    **4**

3. A) Describe in detail the Timers of PIC.    **8**

B) Write note on interfacing of the relay.    **6**

4. A) Explain with suitable diagram the configuration on_chip ADC of AVR.    **8**

B) Describe architecture of PIC.    **6**

5. A) With suitable circuit diagram explain the interfacing of LCD to PIC microcontroller.    **8**

B) Write note on 32 × 8 general purpose resisters of AVR.    **6**

6. A) Describe in detail USART of PIC.    **8**

B) Write note on memory structure of AVR.    **6**

7. A) What do you mean by resets of AVR microcontroller ? Explain Watch-Dog timer of AVR with control register.    **8**

B) Write note on addressing modes of AVR.    **6**

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## M.Sc. (Part – I) (Semester – II) Examination, 2016
### (New CBCS – Pattern)
### ELECTRONICS
### Paper – V : Control Theory

Day and Date : Wednesday, 30-3-2016        Total Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

**Instructions :** 1) Attempt **five** questions.
                 2) Q. **1** and Q. **2** are **compulsory**.
                 3) Attempt **any three** from the Q. **3** to **7**.
                 4) Figures to the **right** indicate **full** marks.
                 5) Use of log tables and calculators is **allowed**.

1. A) Select correct alternative :      **8**

   1) Which of the following signal is used to study time domain response of controlled system ?

     a) unit ramp input             b) sine wave input

     c) exponential input          d) none of these

   2) If damping factor $\zeta$ is greater than one the response of the system is

     a) damped                   b) over damped

     c) under damped           d) none of these

   3) Transfer function G(s) of a first-order system is

     a) $1/(Ts + 1)$             b) $(1/s)\,(1 – Ts)$

     c) $1/(Ts – 1)$             d) none of these

   4) Settling time is the time required for the response to reach

     a) 50% of final value        b) 100% of final value

     c) 63% of final value        d) at overshoot value

5) Transfer function of the _____ system is defined as the ratio of Laplace transform of output variable to the input variables.

   a) time variant              b) time invariant

   c) frequency variant         d) frequency invariant

6) _____ would be the best method to determine stability and transient response.

   a) Root locus               b) Bode plots

   c) Nyquist plot             d) Block diagram

7) If transfer function of the system is $G(s) = 1/s(s + 4)$, then the which of the following is true ?

   a) the zero of the system is $s = -4$

   b) the pole of the system is $s = -4$

   c) the poles of the system is $s = 0$ and $s = -4$

   d) the zeros of the system is $s = 0$ and $s = -4$

8) The velocity error for type 0 system is given by

   a) $e_{ss} = 1/K_p$             b) $e_{ss} = 1/(1 + K_p)$

   c) $e_{ss} = K_p$                d) $e_{ss} = 1/(1 - K_p)$

B) State **true** or **false** :                                        **6**

1) Overall gain of the block connected in series is the product of individual block gains.

2) Rise time is the time required for the output to reach at 50% of the final value in first attempt.

3) The on-off system shows residual in output response.

4) Root locus is symmetrical about the real and imaginary axis.

5) Loop is a path which originates and terminates at the same node.

6) A system is said to be stable if the poles lie on left half of the s plane.

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

   1) Write a note on polar plots.

   2) Give classification of the system.

   3) Obtain the transfer function of following circuit.
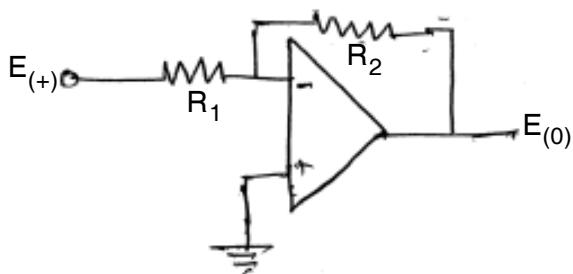


   B) What do you mean by signal flow graphs ? Explain with suitable example.      4

3. A) Define the term transfer function of the control systems. Derive the expression
   for transfer function of standard first order control system.                 8

   B) Reduce following block diagram and obtain transfer function of the same.     6
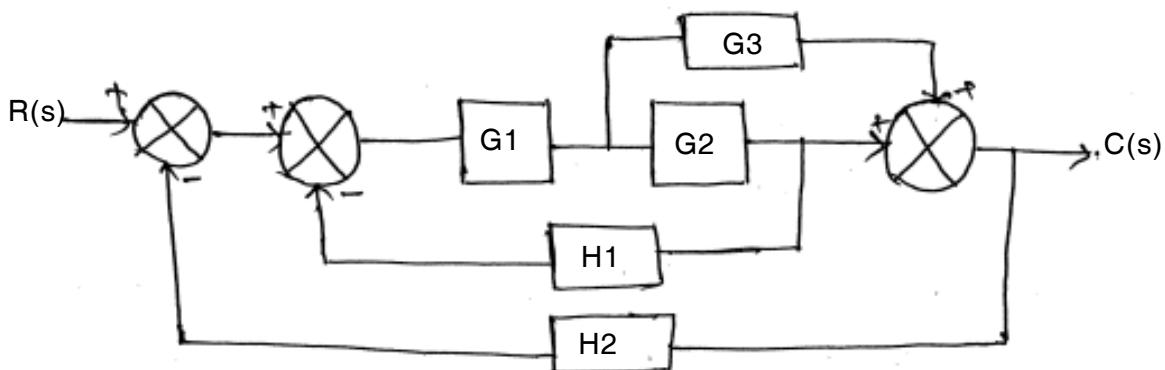


4. A) Describe the standard test signals used for analysis of time domain
   performance of the control system.                                            8

   B) Describe steady state errors of first order system.                        6

5. A) Describe the time domain response of second order control system. Discuss the effect of damping factor on performance. **8**

   B) Discuss the effect of addition of zero on the performance of the system. **6**

6. A) What do you mean by frequency response of control system ? Explain in detail the Nyquist criteria of stability. **8**

   B) What do you mean by poles and zeros ? Describe necessary conditions for Routh stability criteria. **6**

7. A) What is the concept of root locus ? Explain with suitable example describe the rules to obtain loci of the given system. **8**

   B) Compare the characteristics of PI, PD and PID controller. **6**

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## M.Sc. – I (Semester – II) Examination, 2016
### (New CBCS Pattern)
### ELECTRONICS
### Paper – VI : Real Time Operating System

Day and Date : Friday, 1-4-2016        Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

**Instructions** : 1) Q. **1** and Q. **2** are **compulsory**.
           2) Solve **any three** from Q. **3** to Q. **7**.
           3) Figures to the **right** indicate marks.
           4) **Draw** necessary diagram and scientific calculator is
           **allowed**.

1. A) Choose the correct alternate of the following :       **8**

   1) A function that can be used by more than one task without data corruption
      is called _____ function.
      a) Mutual                    b) Reentrant
      c) Both a) and b)          d) None of these

   2) A binary semaphores have a value of _____
      a) 0           b) 1           c) 2           d) either 0 or 1

   3) _____ task is running, when no other activity is present with
      CPU.
      a) Idle                      b) Middle Priority
      c) High Priority           d) None of these

   4) The time between receipt of interrupt signal and starting the code that
      handles the interrupt is called interrupt _____ time.
      a) Recovery               b) Response
      c) Latency                d) None of these

5) The scheduler is _____ of every kernel.
   a) Heart
   b) Brain
   c) Both a) and b)
   d) None of these

6) A task is said to be in _____ state if it is being executed by the CPU.
   a) Ready to run
   b) Running
   c) Waiting
   d) None of these

7) A _____ occurs when the scheduler switches from one task to another.
   a) semaphore
   b) deadlock
   c) context switching
   d) none of these

8) AVR Atmega8 Microcontrollers have _____ × 8 general purpose registers.
   a) 64
   b) 128
   c) 8
   d) 32

B) State **true** or **false** : **6**

1) Scalability is not a characteristic of RTOS.

2) TRIS register used to change port direction either input or output in AVR.

3) Round Robin scheduling provides each task an equal share of the CPU time.

4) In binary semaphore, when a binary semaphore value is 0, then semaphore is said to be acquired.

5) In priority based pre-emptive scheduling the task of highest priority is preempted.

6) ISR stands for In System Resources.

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

   1) What do you mean by preemptive multi tasking ?

   2) Explain in detail kernel object 'mailbox'.

   3) Write note on characteristics of Real-Time operation system.

   B) Write note on round-robin scheduling algorithm **4**

3. A) Explain in detail concept inter task communication. **8**

   B) Write a note on concept of sharing of resources. **6**

4. A) What do you mean by thread ? Differentiate the task and thread. **8**

   B) With the suitable diagram, describe the components of embedded system with AVR microcontroller. **6**

5. A) Describe designing of an embedded system to measure temperature. **8**

   B) Write note on context switching. **6**

6. A) Write a program in RTOS for Intertask communication. **8**

   B) Write note on kernel objects, Messages and Queues. **6**

7. A) What do you mean by synchronization of task ? Explain in detail. **8**

   B) Describe the structure of task. **6**

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## M.Sc. (Semester – II) Examination, 2016
## (New) (CBCS)
## ELECTRONICS
## Optoelectronics (Paper – VII)

Day and Date : Monday, 4-4-2016                      Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

**Instructions :** 1) Question **1** and **2** are **compulsory**.
2) Solve **any three** from Q. **3** to Q. **7**.
3) Figures to the **right** indicate **full** marks.
4) **All** questions carry **equal** marks.

1. A) Choose correct alternative.                                          **8**

   1) The LASER is _____ source of light.
      a) synchronous                    b) asynchronous
      c) coherent                       d) incoherent

   2) In step index fiber _____ light source is used.
      a) Photo diode                    b) LED
      c) LASER                          d) Both a) and c)

   3) The _____ is called optical fiber dispersion.
      a) square broadening              b) triangular broadening
      c) pulse broadening               d) all of these

   4) The _____ is acts as buffer gas in He-Ne laser source.
      a) helium                         b) neon
      c) helium-neon                    d) all of these

   5) The Faraday's effect is employed in _____ devices.
      a) magneto electronic             b) magneto optic
      c) magneto electric               d) none of these

   6) The _____ shifts the polarization direction of linearly polarized light.
      a) retarder                       b) quarter waveplate
      c) half waveplate                 d) full waveplate

7) The fiber optical communication has _____ rejecting capability.
   a) cross talk
   b) electromagnetic interference
   c) radio frequency interference
   d) all of these

8) The silica fiber has highest data rate at _____ wavelength.
   a) 1550 mm
   b) 1550 $\mu$m
   c) 1550 pm
   d) 1550 nm

B) State **True** or **False** :                                          **6**

1) The Pockel's cell works with the non-linear electro optic effect.

2) The NA = $Sin^{-1}\theta_a$.

3) The optical fiber communication use invisible spectral band.

4) The Kerr's effect changes the index of refraction in electro optic crystal.

5) The silico dioxide is the basic material for glass fiber fabrication.

6) The core and cladding of the optical fiber have same optical characteristics.

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

   1) Explain direct intensity modulation.

   2) Explain any two couplers.

   3) Describe the numerical aperture.

   B) Compare the LASER and LED.                                          **4**

3. A) Explain magneto optic effect in detail and explain AO modulator.    **9**

   B) Explain the cable design parameters.                                **5**

4. A) What do you mean by optical detector ? Explain APD and RAPD without gain.  **9**

   B) Explain scattering and absorption loss mechanism.                   **5**

5. A) Describe the methods of optical fiber fabrication.                  **9**

   B) Explain the working of avalanche photo diode.                       **5**

6. A) Describe He-Ne laser source with its spectral and spatial characteristics.  **9**

   B) Explain the term half wave plate and quarter waveplate.             **5**

7. A) Explain in detail construction and working principle of optical fiber. Explain the various types of optical fiber.  **9**

   B) Explain various types of connectors.                                **5**

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## M.Sc. I (Semester – II) (New – CBCS) Examination, 2016
## ELECTRONICS
### Signals and Systems (Paper – VIII)

Day and Date : Wednesday, 6-4-2016          Max. Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

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

1. A) Select correct alternative :          **8**

    1) Which of the following is a periodic signal ?
      a) $x(t) = A\,u(t)$          b) $x(t) = A.e^{-jbt}$
      c) $x(t) = A.e^{bt}$          d) $x(t) = A.t$

    2) A continuous time signal is said to be symmetrical if it satisfies the condition
      a) $x(t) = x(-t)$          b) $x(t) = -x(t)$
      c) $x(-t) = -x(t)$          d) $x(-n) = -x(n)$

    3) The Fourier series coefficient of the shifted signal $x(t - t_0)$ are

      a) $e^{-jnw_0 t_0}.c_n$     b) $e^{jnw_0 t_0}.c_n$     c) $c_n$          d) $e^{t-t_0}c_n$

    4) _____ symbol is used to write comment in matab.
      a) //          b) *          c) %          d) |

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

    6) If $f(t) = f(-t)$ and $f(t)$ satisfy the Dirichlets conditions then $f(t)$ can be expanded in a Fourier series containg
      a) only sine terms
      b) only cosine terms
      c) cosine terms and constant terms
      d) sine terms and constant terms

7) The parabolic signal is defined as

   a) $x(t) = \dfrac{At^2}{2}$; for $t \geq 0$

      $= 0$    for $t < 0$

   b) $x(t) = At$ for $t \geq 0$

      $= 0$   for $t < 0$

   c) $x(t) = A.e^{at}$

   d) $x(t) = u(t) . e^{at}$

8) Which of the following is energy signal ?

   a) $x(t) = e^{-at} u(t)$

   b) $x(t) = A \sin wot$

   c) $x(t) = B. \cos wot$

   d) $x(t) = A. e^{jwot}$

B) State **true** or **false** :      **6**

   1) The convolution operation satisfies commutative property.

   2) The noncausal system can be realised in real time.

   3) The sine signal is a periodic signal.

   4) An alternating waveform will always have even harmonics only.

   5) If a semicolon is typed at the end of a command in matlab then the output of command is not displayed.

   6) For power signal, the energy is infinite.

2. A) Write short note on **any two** :      **10**

   1) Compute $y(n) = x(n) * h(n)$ if $x(n) = h(n) = \{1, 2, -1, 3\}$.

   2) Write a note on Dirichlets conditions for Fourier series.

   3) What do you mean by signal ? Give typical examples on signals and system.

   B) Distinguish between the continuous time signal and discrete time signal.    **4**

3. A) Prove that a LTI system is causal if its impulse response, $h(n) = 0$ for negative values of n.    **8**

   B) Sketch a discrete time signal $x(n) = 2^{-n}$ for $-2 \leq n \leq 2$ and obtain    **6**

   i) $y(n) = 2 x(n) + \delta(n)$

   ii) $y(n) = x(n) .u(2 - n)$.

4. A) For the following signals, determine and sketch convolution y (n) graphically. **8**

$$x (n) = \frac{1}{3}n \quad ... \quad 0 \le n \le 6$$

$$= 0 \quad ...... \text{ otherwise}$$

$$h (n) = 1 \quad ... \quad -2 \le n \le 2$$

$$= 0 \quad ... \text{ otherwise}$$

B) Determine whether the following system are linear or not
   i) T [x (n)] = ax (n) + 6
   ii) y (n) = n.x$^2$ (n). **6**

5. A) Explain in detail how periodic signals can be represented by Fourier transform. **8**

   B) Write a note on amplitude and phase spectrum. **6**

6. A) Write a note on : **8**
   1) Matlab commands.
   2) Looping and conditioning commands, operators.

   B) Explain how Fourier coefficient evaluates. **6**

7. A) Determine the even and odd part of the following continuous time signals. **8**
   a) x (t) = e$^t$
   b) x (t) = 3 + 2t + 5t$^2$
   c) sin 2t + cost + sint cos2t.

   B) State the different properties of Fourier series and explain linearity property. **6**

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## M.Sc. (Part – II) (Semester – III) (CGPA) Examination, 2016
### ELECTRONICS
### Paper – IX : Digital Signal Processing

Day and Date : Tuesday, 29-3-2016　　　　　　　　　　　Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

**Instructions** : 1) Q. **1** and **2** are **compulsory**.
　　　　　　　　2) Answer **any three** questions from Q. **3** to Q. **7**.
　　　　　　　　3) **All** questions carry **equal** marks.

1. A) Select the most correct alternative from the following :　　　　　**8**

　　i) The sequence u(n) = {0, 0, 1, 0 ----} represents unit _____ signal at
　　　t = _____
　　　a) Impulse, 0　　　　　　　　b) Impulse, 2
　　　c) Step, 0　　　　　　　　　　d) Step, 2

　　ii) DFT : X(k) = DTFT : X($\omega$) if $\omega$ =
　　　a) $2\pi k/N$　　　　　　　　　b) $2\pi kN$
　　　c) $2\pi/kN$　　　　　　　　　d) $N/2\pi k$

　　iii) For an anti-casual finite duration sequence region of convergence is
　　　_____
　　　a) Entire Z-plane except $|Z| = 0$
　　　b) Entire Z-plane except $|Z| = \infty$
　　　c) Entire Z-plane except $|Z| = 0$ and $|Z| = \infty$
　　　d) Entire Z-plane

　　iv) Unit Delay by one sample of a signal sequence is represented by
　　　_____
　　　a) $Z^2$　　　　b) $Z^{-2}$　　　　c) $Z^0$　　　　d) $Z^{-1}$

　　v) In recursive discrete time system the output depends on _____
　　　a) Present input　　　　　　　b) Previous output
　　　c) Past input　　　　　　　　d) All of the above

vi) DFT of unit impulse signal $\delta(n)$ is _____

    a) = 0                 b) = 1

    c) > 1                 d) < 1

vii) If the ROC contains any pole the then the system is _____

    a) Stable

    b) Marginally stable

    c) Conditionally stable

    d) Unstable

viii) Discrete sampled signal is reconstructed by using _____ filter.

    a) Band pass            b) High pass

    c) Band stop            d) Low pass

B) State whether the statements are **true** or **false** :                 **6**

    i) Digital systems are quite flexible than analog systems.

    ii) $y(n) = 4x(n + 1) + x(n)$ represents a static system.

    iii) A discrete time signal is odd if $x(-n) = -x(n)$.

    iv) In Z-transform the ROC must be connected region.

    v) With the folding of a signal sequence, the origin does not shift.

    vi) FFT algorithms take more time than direct method for commuting DFT.

2. Write brief notes on the following :                 **14**

  a) Casual and non-casual systems.

  b) Comparison between linear and circular convolutions.

  c) Properties of region of convergence.

3. a) What is meant by continuous and discrete time signals ?       **4**

  b) What is LTI system ? Find the nature of time invariance of systems described by equations :

    i) $y(n) = n\, x(n)$ and

    ii) $y(n) = n\, x^2(n)$.                 **10**

4. a) What is linear convolution ? **4**

   b) Compute the linear convolution of following sequences : **10**

   x(n) = {1, 0, 1, 0, 1, 1} and h(n) = {1, –2, –2, 1}.

5. a) What is Z-transform ? Obtain Z transforms and region of convergence of
      finite duration sequence : x(n) = {1, 4, 3, 6, 5}. **4**

   b) Discuss direct form-I realization of a LTI system using following difference
      equation : y(n) = –4.5 y(n – 1) + 3.2 y(n – 2) + x(n) + 5.7 x(n – 1). **10**

6. a) What is 4-point DFT of a sequence x(n) ? **4**

   b) Compute linear convolution by overlap and save method of following sequences
      x(n) = {1, 1, 2, –2, –3, 4, –2, 3, 1} and h(n) = {1, 1, 2}. **10**

7. a) State the steps involved in Bilinear Transformation method of IIR digital filter
      design. **4**

   b) Apply BLT method to H(s) = $2/(s^2 + 3s + 2)$ with T = 1 sec and find H(z). **10**

_____

### M.Sc. (Part – II) (Semester – III) Examination, 2016
### ELECTRONICS (CGPA Pattern)
#### Paper – X : Advanced Digital Systems Design with VHDL

Day and Date : Thursday, 31-3-2016                                  Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

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

1. A) Choose correct alternative :                                                  **8**
   1) A circuit that implements a combinational logic function by storing a list of
      output values that correspond to all possible input combinations is
      a) Output logic macrocell          b) Look up table
      c) Logic element                   d) Parallel logic expander
   2) Which is avalid form of wait ?
      a) Wait until condition            b) Wait on signal_list
      c) Wait for time                   d) All of these
   3) How many architectures can be associated with an entity ?
      a) One          b) Two          c) Three          d) More than one
   4) Which statement is used to terminate the current loop iteration and proceed
      on the next iteration ?
      a) Exit          b) Next          c) Both          d) None of these
   5) What can not be defined within process ?
      a) Variable     b) Signal          c) Function       d) All of these
   6) If the declarative part in the architecture of a half adder is as below
      component XOR2
      port (X, Y : inBIT ;z: out BIT);
      end component
      component AND2
      port (L,M : inBIT;z:out BIT);
      end component
      Then what kind of architecture is it ?
      a) Structural   b) Dataflow          c) Behavioural    d) None of these

7) Most look-up tables in Field-Programmable Gate Arrays (FGPAs) use _____ inputs, resulting in _____ possible outputs.

a) 4, 8　　　　b) 4, 16　　　　c) 6, 12　　　　d) 2, 10

8) The Complex Programmable Logic Device (CPLD) features _____ type of memory.

a) Volatile　　b) Nonvolatile　　c) Both　　　　d) None of these

B) State **true** or **false** :　　　　　　　　　　　　　　　　　　**6**

1) The cells in a FPGA may contain registers, look-up tables and memory.

2) One architecture is associated with only one entity.

3) The next statement is used to terminate loop statement.

4) SPLDs, CPLDs and FPGAs are all PLD type of device.

5) The output of an encoder is a binary code for 1-of-N input.

6) One application of a digital multiplexer is serial to parallel conversion.

2. a) Explain operator overloading.　　　　　　　　　　　　　　　　**5**

b) Write a note on simulation.　　　　　　　　　　　　　　　　　**5**

c) Explain with suitable example package and package body.　　　**4**

3. a) Write VHDL code for 16:1 multiplexer using 4:1 multiplexer as a component.　**8**

b) Explain data flow modeling.　　　　　　　　　　　　　　　　　**6**

4. a) Draw and explain FPGA configurable logic block.　　　　　　　**8**

b) Write a note on priority encoder.　　　　　　　　　　　　　　　**6**

5. a) Draw and explain structure of function block of CPLD.　　　　　**8**

b) Implement 1 bit full subtractor using 8:1 multiplexer.　　　　　**6**

6. a) Write a VHDL code for MOD-8 counter.　　　　　　　　　　　　**8**

b) Compare CPLD and FPGA.　　　　　　　　　　　　　　　　　**6**

7. a) Write VHDL code for 4-bit comparator.　　　　　　　　　　　　**8**

b) Draw and explain FPGA configurable I/O block.　　　　　　　　**6**

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**Seat No.**

# M.Sc. (Part – II) (Semester – III) Examination, 2016
## ELECTRONICS (CGPA) (Elective – I)
### Paper – XI : ARM Microcontroller and System Design

Day and Date : Saturday, 2-4-2016          Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

**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** indicates **full** marks.

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

   1) The ARM LPC2148 has _____ on chip URAT.

     a) 1          b) 3          c) 4          d) 2

   2) The ARM processor has a total of _____ registers.

     a) 32          b) 28          c) 37          d) 36

   3) The synonym of AMBA is

     a) ARM Microcontroller Bus Architecture

     b) ARM Micro-Bus Architecture

     c) Advanced Microcontroller Bus Architecture

     d) Advanced Micro-Bus Architecture

   4) 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

   5) The _____ register is the link register.

     a) r15          b) r13          c) r7          d) r0

**P.T.O.**

6) When subroutine is called processor stores return address in _____ register.

   a) programe counter
   b) stack pointer
   c) link register
   d) none of these

7) The _____ is placed in between main memory and core.

   a) dynamic RAM
   b) static RAM
   c) cache memory
   d) all of these

8) In case of ARM LPC2148, I2C bus is _____

   a) bidirectional   b) unidirectional   c) omnidirectional   d) all of these

B) State **true** or **false** :                                                     **6**

1) The ARM processors support to the Byte address.

2) The user mode of ARM LPC2148 is non-privileged mode.

3) The r0 to r7 are unbanked and r8 to r14 are banked registers.

4) The Harvard as well as Von Neumann architecture is used for ARM core architecture.

5) The 512 KB flash memory is present in ARM LPC2148.

6) The more than one Reset source is available for ARM LPC2148.

2. A) Answer **any two** :                                                           **10**

1) Explain memory organization of ARM LPC2148.

2) Give classification of instruction set.

3) Explain the clock and reset circuit.

B) Explain the modes of ARM microcontroller.                                        **4**

3. A) Explain the architecture of ARM microcontroller instruction set. Give the classification of instruction set.                                               **9**

B) Explain the interrupts and exceptions of ARM microcontroller.                    **5**

4. A) Compare ARM, Jazzal and Thumb instruction set. **9**

   B) Explain the architecture of system bus. **5**

5. A) Describe the design of ARM microcontroller based system for temperature measurement. **9**

   B) Explain the concept of barrel shifting. **5**

6. A) Explain on-chip UART. **9**

   B) Describe the pipelining of ARM microcontroller. **5**

7. A) Explain on-chip ADC of ARM LPC2148. **9**

   B) Write a note on I/O ports of ARM LPC2148. **5**

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**Seat No.**

### M.Sc. (Part – II) (Semester – III) Examination, 2016
### (CGPA)
### ELECTRONICS
### Paper – XII : Medical Instrumentation (Elective – II)

Day and Date : Tuesday, 5-4-2016                                      Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

**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.

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

    1) The _____ mV is the action potential of the cell.

       a) + 20           b) + 90           c) – 90           d) – 20

    2) The leakage current for biomedical instrumentation should not be greater than _____

       a) 10 micro A     b) 20 micro A   c) 30 micro A   d) 50 micro A

    3) Bioelectric potentials are generated at a _____ level.

       a) Chemical       b) Cellular       c) Electrical     d) Skin

    4) The _____ type of electrode is used for EMG measurement.

       a) Limb           b) Needle         c) Surface       d) Floating

    5) The cell membrane in excited state permits the entry of _____ Ions.

       a) K+             b) Cl+            c) Na+           d) P+

    6) The _____ is the record of potential generated by brain.

       a) ECG            b) EEG           c) EMG           d) PCG

    7) The _____ wave represents repolarization of ventricles.

       a) P              b) S             c) T             d) Q

    8) The pH electrode emf changes by _____ Volt per 1°C.

       a) 0.02 micro     b) 0.02 m        c) 0.2 m         d) 0.2 micro

**P.T.O.**

B) State **True** or **False** : **6**

1) The 10-20 electrode system has 21 electrode locations and used for ECG measurement.

2) The body fluid is slightly alkaline and more acidic.

3) The positive potential of the cell membrane during excitation is resting potential.

4) The preamplifier along with differential amplifier always provides the protection against leakage currents.

5) In arteries blood flow is linear.

6) The X-ray picture of heart is called radiography.

2. A) Answer **any two** : **10**

1) Explain the Nernst equation.

2) Draw neat labeled engineering diagram of cardiovascular system.

3) Explain the role of jellies and cream in electrical conductivity of electrode.

B) Draw neat labeled cell potential diagram. **4**

3. A) Explain the concept of resting and action potential of bio-potentials. **9**

B) Write a note on EMG electrode. **5**

4. A) Explain the details biomedical recording system. **9**

B) Write a note on chemical biosensors. **5**

5. A) Give classify the electrode of ECG and explain the surface electrodes in detail. **9**

B) Discuss the source of noise in medical instrumentation. **5**

6. A) Explain in detail modern imaging system. **9**

B) Discuss the measurement of blood pressure. **5**

7. A) Explain the SA and AV node in detail. **9**

B) Explain the heart sound. **5**

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Seat
No.

## M.Sc. (Part – II) (Semester – IV) (CGPA) Examination, 2016
## ELECTRONICS
### Paper – XIII : Microwave Devices, Antennas and Measurements

Day and Date : Wednesday, 30-3-2016　　　　　　　　　Total Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

**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.

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

　　1) An ideal isolator

　　　　A) is a reciprocal transmission device

　　　　B) completely absorbs the power for propagation in one direction

　　　　C) provides lossless transmission in the opposite direction

　　　　D) both B) and C)

　　2) _____ is transferred electron device.

　　　　A) BARITT diode

　　　　B) IMPATT diode

　　　　C) Gunn diode

　　　　D) Step recovery diode

　　3) Absolute permeability of vacuum is

　　　　A) 1　　　　　　　　　　　　　B) 0

　　　　C) $\infty$　　　　　　　　　　　　D) None of these

　　4) The reflex klystron is a _____ cavity klystron oscillator.

　　　　A) three　　　　　　　　　　　B) two

　　　　C) single　　　　　　　　　　　D) four

5) The SI unit for electric field intensity is

   A) A/m                           B) V/m

   C) Webers                     D) $C/m^2$

6) For free space, the intrinsic impedance is _____ ohms.

   A) 75          B) 150         C) $\infty$         D) 377

7) Double minima method is used for the measurement of

   A) Low VSWR                 B) High VSWR

   C) Either low or high        D) Medium

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

   A) Sectoral H-plane

   B) Sectoral E-plane

   C) Pyramidal

   D) Sectoral H-plane or sectoral E-plane

B) State **true** or **false** :                                      **6**

1) The presence of slot in the transmission line changes the boundary conditions.

2) In two-cavity klystron amplifier, the cavity close to the cathode is known as catcher cavity.

3) Since another antenna is required to excite a reflector antenna, it is usually called a secondary antenna.

4) In transmission-line problems matching means simply terminating the line in short circuit impedance.

5) In Rotary-vane attenuator, the input transition converts the $TE_{10}$ wave into a vertically polarized $TE_{11}$ wave in circular guide.

6) To communicate efficiently between two points, it is important that the transmitted signal be sharply focused and aimed at the receiving antenna.

2. A) Write short answers (Attempt **two**) :                        **10**

1) Explain the fundamental difference between transistors and TEDs.

2) Define the coupling factor and the directivity of a directional coupler.

3) Write the basic advantages and hazards of Microwave.

B) Explain the different applications of Microwave.           **4**

3. a) Describe Maxwell's equations for EM waves. **8**

   b) With vector-phasor representation, explain the linear, circular and horizontal polarization of an electromagnetic wave. **6**

4. a) Obtain the equations for

   i) attenuation constant

   ii) phase constant,

   iii) characteristic impedance

   iv) phase velocity for a transmission line at microwave frequencies. **8**

   b) What do you mean by transmission lines ? Derive transmission line equations with its solution. **6**

5. a) Draw a schematic diagram of a Magnetron. Explain briefly the construction. **8**

   b) Explain the two-valley model of electron energy versus wave number for n-type GaAs. **6**

6. a) Obtain the $TE_{mn}$ field equations in rectangular waveguide. **8**

   b) With a schematic diagram explain the characteristics of a hybrid ring. **6**

7. a) Briefly explain RWH theory. **8**

   b) Draw the cross-sectional view of a crystal rectifier. Briefly explain its construction. **6**

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**Seat No.**

# M.Sc. (Part – II) (Semester – IV) (CGPA) Examination, 2016
## ELECTRONICS
### Paper – XIV : Networking and Data Communication

Day and Date : Friday, 1-4-2016                                    Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

**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.

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

    1) The _____is designed to forward some packets and filter others.
      a) Firewall                     b) Cryptography
      c) SONET                     d) ATM

    2) The UDP is used for
      a) Multicasting            b) Management process
      c) Route updating protocol    d) All of these

    3) The media access control is the sub layer of _____ layer.
      a) Physical      b) Network      c) Data link      d) All of these

    4) There is no need of CSMA/CD method in _____ Ethernet.
      a) Full duplex     b) Bridged     c) Switched     d) All of these

    5) The Bluetooth technology has _____ number of channels of _____ Hz bandwidth each.
      a) 79, 4K      b) 79, 1M      c) 256, 1M      d) 256, 4K

    6) In IPv4 addressing the /n defines the
      a) Addressing    b) Destination    c) Mask      d) Source

    7) The ATM is a _____ relay protocol.
      a) Cell          b) Bit          c) Byte        d) Point

    8) The routing table may be _____ table.
      a) Dynamic                  b) Static
      c) Dynamic or Static       d) None of these

B) State **True** or **False** : **6**
1) The Bootstrap Protocol (BOOTP) is client/server type of protocol.
2) The IP address 241.255.255.255 is class D address.
3) In SONET the duration of STS-3 frame is 125 microseconds.
4) The TDD-TDMA is a half-duplex type of communication.
5) The RG-58 is used for thin Ethernet.
6) In ADSL the channel 1 is reserved for voice communication.

2. A) Attempt **two** : **10**
1) Write a note on IPv6 protocol.
2) Write a note on guided transmission media.
3) Explain remote logging.

B) Discuss the Bluetooth technology. **4**

3. A) Explain in detail TCP/IP model. **9**

B) Write a note on SONET. **5**

4. A) What do you mean by switched network ? Explain circuit switched network. **9**

B) Write a note on DSL. **5**

5. A) Discuss in detail ATM. **9**

B) Explain the domain name system. **5**

6. A) Discuss in detail address mapping. **9**

B) Write a note on multicast routing protocol. **5**

7. A) Explain in detail IPv4 addressing. **9**

B) Write a note on connecting devices. **5**

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**SLR-MS – 358**

| Seat No. | |
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### M.Sc. – II (Semester – IV) (Electronics) (CGPA) Examination, 2016
### Paper – XV : NANO ELECTRONICS (Elective – III)

Day and Date : Monday, 4-4-2016                                    Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

**Instructions** : 1) Q. **1** and Q. **2** are **compulsory**.
                 2) Solve **any three** questions out of Q. **3** to Q. **7**.
                 3) Figures to the **right** indicates **full** marks.

1. A) Choose correct alternatives :                                              **8**

   1) The transistor of the order of 100 nm obeys _____ principles.
     a) Classical physics
     b) Quantum
     c) Both a) and b)
     d) None of these

   2) The motion of particles in the nanoworld is determined by _____ mechanics.
     a) Wave
     b) Quantum
     c) Both a) and b)
     d) None of these

   3) The split gate techniques is used to _____ the electron gas dimensionality.
     a) Lower                   b) Increase
     c) Equal                 d) None of these

   4) The coulomb blockade voltage range is _____

     a) $< \dfrac{e}{2c}$                 b) between $- \dfrac{e}{2c}$ and $+ \dfrac{e}{2c}$

     c) $> \dfrac{e}{2c}$                 d) None of these

5) The _____ quantum well profile may be produced by the MBE growth technique.

   a) Square

   b) Triangular

   c) Parabolic

   d) None of these

6) The shape of potential energy is of _____

   a) Square well            b) Square dot

   c) Square wire           d) None of these

7) The operation of Negative Differential Resistor (NDR) quantum well electronic devices is based on _____

   a) Resonant tunnel effect

   b) Quantum confined stark effect

   c) Both a) and b)

   d) None of these

8) The _____ is the organic semiconductors.

   a) Polyphenylenevinglene

   b) Polyfluorene

   c) C-60

   d) All of these

B) State **true** or **false** :       **6**

1) The quantum dot is effectively zero dimensional system.

2) The triangular wave functions are neither symmetric or antisymmetric due to the asymmetry of the potential well.

3) The quantum well is effectively zero dimensional system.

4) The modulation doped heterojunctions gives high frequency transistor, MODFET.

5) In quantum cellular automata the information is contained in the arrangement of charges of the dots rather than in the flow of the charges.

6) The RTD is three dimensional electron states.

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

    1) Explain nanotuber in short.

    2) Write a note on quantum mechanical coherence.

    3) Explain parabolic quantum well.

  B) Explain the SET.                                                      **4**

3. A) Explain in detail top-down and bottom-up fabrication methods for nanomaterials.                                                                     **8**

  B) Draw the sketch of AlGaAs-GaAs-AlGaAs square potential well.          **6**

4. A) Explain in detail quantum dots and wiver.                                    **8**

  B) Write a note on organic LED.                                          **6**

5. A) Explain in detail Heterojunctions.                                           **8**

  B) Write a note on tunneling diode.                                      **6**

6. A) Explain in detail coulomb blockade.                                          **8**

  B) Write a note on SET circuit design.                                   **6**

7. A) Explain the concept of superlattice and Kronig-Penney model of superlattice.  **8**

  B) Write a note on fullerencer.                                          **6**

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Seat No.

## M.Sc. (Part – II) (Semester – IV) (CGPA) Examination, 2016
## ELECTRONICS
### Paper – XV : Optical Fiber Communication (Elective – III)

Day and Date : Monday, 4-4-2016        Max. Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

**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.

1. A) Choose correct alternative :        **8**

    1) Which of following is suitable for increase in the channel capacity ?
       a) PCM        b) WDM        c) FDM        d) All of these

    2) The critical angle of incidence is given by $\phi_c =$ _____

       a) $\dfrac{n_2}{n_1}$        b) $\sin \dfrac{n_2}{n_1}$        c) $\sin^{-1}\left(\dfrac{n_2}{n_1}\right)$        d) $\dfrac{n_2 - n_1}{n_2}$

    3) For multichannel WDM commission system which of the following standards are used ?
       a) G.692        b) G.694.1        c) G.652        d) G.695

    4) In case of stimulated emission, the emitted light depicts
       a) Variation in the frequency
       b) Matching in the frequency with injected light
       c) Deviation in the direction of propagation
       d) None of these

    5) The photo diode detectors are always
       a) Forward biased        b) Reverse biased
       c) Unbiased        d) All of these

    6) The width of depletion layer of PIN diode is _____ PN junction diode.
       a) Equal to        b) Less than
       c) Greater than        d) None of these

7) _____ material is normally used for DFA.
a) Er  b) Cu  c) $SiO_2$  d) None of these

8) In _____ fiber the refractive index of core is uniform through out.
a) Graded index  b) Step index
c) Multimode step index  d) None of these

B) State **true** or **false** :  **6**

1) The WDM is essentially an example of frequency division multiplexing.
2) Power amplifier is also called as booster amplifier.
3) Raman optical amplifier is based on stimulated scattering.
4) For optical amplifiers the doping of rare earth element is most suitable.
5) The Shannon's capacity theorem is not suitable for optical communication.
6) Numerical aperture is the measure of light collecting ability of the fiber.

2. A) Answer **any one** :  **10**
1) What do you mean by step index and graded index fiber ?
2) Discuss the sources of error during optical fiber communication.
3) Discuss the basic principle of optical transmitter.

B) What do you mean by numerical aperture ?  **4**

3. A) With suitable diagram describe the construction and working optical fiber.  **10**

B) Discuss the spectral bands of optical fiber communication.  **4**

4. A) Describe the principle of WDM. What do you mean by dense WDM ?  **10**

B) Describe in detail semiconductor optical amplifier.  **4**

5. A) What do you mean by performance measurement parameters ? Describe the methods of dispersion measurement.  **10**

B) Describe the term sensitivity of the receiver.  **4**

6. A) With block diagram describe the optical fiber communication system.  **10**

B) Discuss the spreading of pulse due to material dispersion.  **4**

7. A) Describe an architecture of EDFA. in detail.  **7**

B) What are fundamentals of optical transmitter and receiver ? With suitable diagram describe optical transmitter.  **7**

_____

**SLR-MS – 360**

1. A) Fill in the blanks.                                                                 **8**

     1) PLCs operates on _____

         a) + 5, – 5 & GND            b) + 5, GND

         c) – 5, GND               d) + 5

     2) In PLC addressing format _____ is Bitdelemiter.

         a) /            b) \            c) :            d) ::

     3) A single input timer called as _____ timer.

         a) retentive             b) nonretentive

         c) mono input           d) none of these

     4) RTU stands for _____

         a) Remote Temperature Unit      b) Remote Terminal Unit

         c) Both a and b            d) None of these

     5) _____ Registers are also known as working register.

         a) Holding      b) Input      c) Output      d) Group

     6) In general PLCs have _____ number of input and output.

         a) same      b) different      c) 8      d) 10

     7) In SCADA the "C" stands for _____

         a) Control      b) Computer      c) Controller      d) None of these

**P.T.O.**

8) In PLC input module Ac Bridge is used for _____
   a) Ac excitation
   b) Rectification
   c) Filter noise
   d) None of these

B) State **true** or **false**.                                                    **6**

1) EPROM memory chip erasable by UV Light.

2) In PLC addressing format, : is file delimeter.

3) PLCs are available in only two size.

4) OG is stands for Output Group Register.

5) The J/P to the PLC is always analog and the O/P of PLC is always digital in nature.

6) In PLC programming ladder diagram is only one programming language available.

2. A) Solve **any two**.                                                    **10**
   1) Write note on PLC memory.
   2) Compare CCS and DCS system.
   3) Explain Design process of mechatronics.

B) Introduction of mechatranic system.                                **4**

3. A) Write note on SCADA protocols.                                **8**

B) Write note on sequencer function in detail.                        **6**

4. A) Explain in detail J/O modules and their characteristics.          **8**

B) Using given boolean equation, write PLC ladder diagram program
   $[y = (a + \overline{b}) * (c + \overline{a})]$.                        **6**

5. a) Explain in detail PLC Registers.                                **8**

b) Write note on PLC Programming.                                    **6**

6. a) Explain in detail Display units of DCS.                          **8**

b) Write note on PLC power supply.                                    **6**

7. a) Concept of Industrial Automation. Explain in detail.              **8**

b) Write note on DCS communication.                                  **6**

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Seat No.

## M.Sc. (Part – II) (Semester – IV) (CGPA) Examination, 2016
## ELECTRONICS
### Paper – XVI : Mixed Signal Based SoC Design (Elective – IV)

Day and Date : Wednesday, 6-4-2016                    Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

**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** indicates **full** marks.

1. a) Choose correct alternative :                                      **8**

　1) The PSoC1 device from Cypress comprises an array of _____ programmable analog blocks.

　　a) 12　　　　　　b) 16　　　　　　c) 24　　　　　　d) 4

　2) The internal main oscillator of PSoC1 device has_____ frequency.

　　a) 32.768 KHz　　　　　　　　b) 732 KHz

　　c) 24 MHz　　　　　　　　　　d) 12 MHz

　3) In mixed signal based SoC design, the computing core performs the task of _____

　　a) Execution of firmware only

　　b) Execution of API routine only

　　c) Synchronization of all on-chip resources

　　d) None of these

　4) Which of the following is most suitable to produce constant voltage source to drive the active sensor interfaced of the chip ?

　　a) IDAC　　　　b) VDAC　　　　c) Vdd　　　　d) TIA

5) In continuous time analog block of PSoC devices the gain can be configured up to _____

   a) 2          b) 256          c) 8          d) 48

6) For programmable gain analog amplifier, if reference input is configured for AGND, then the reference voltage selected is_____

   a) Zero volt        b) Vdd/2        c) Vdd        d) – Vdd

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) The PSoC devices are having _____ mA current sinking capacity per pin.

   a) 25 mA        b) 10 mA        c) 20 mA        d) 15 mA

B) State **True** or **False** :          **6**

1) As per the hardware configurability, the global odd numbered buses are interfaced with global odd numbered ports only.

2) If VDD = 5V, then on configuration of Vref to band gap reference option, then reference voltage for analog cores is 1.048 V.

3) Continuous time analog block cannot be configured as instrumentation amplifier.

4) For delta sigma ADC the low pass filter circuit is incorporated to remove higher order components.

5) The clocks used to ensure the switched capacitor analog components should be in phase.

6) In case of Cypress PSoC 5, the 8051 core is used for processing.

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

1) With block diagram, describe the general architecture of PSoC devices.

2) Write a note on global IO ports and their configuration.

3) Based on SC principle, describe the design of different amplifier.

B) Write a note on configuration of UDB as PWM.          **4**

3. A) Describe the basic principal of Delta Sigma ADC. With suitable diagram describe an architecture of Delta Sigma ADC of PSoC device. **7**

   B) What do you mean by an array of programmable analog block ? Discuss the basic building block of continuous time analog block. **7**

4. A) With the suitable diagram describe an array of programmable digital blocks. Discuss fundamental architecture of programmable digital block. **7**

   B) Describe in detail programmable UART block of PSoC device. **7**

5. A) What do you mean by mixed signal based SoC design ? Discuss the salient features of Cypress programmable system on chip. **7**

   B) Give the configuration LCD module of PSoC device. **7**

6. A) With suitable block diagram describe the design of mixed signal based system on chip for measurement of concentration of $CO_2$ gas. **7**

   B) Describe in detail the configuration of VDAC of the PSoC devices. **7**

7. A) Describe an architecture of the system bus. Write a note on memory subsystem of PSoC device. **7**

   B) Describe in detail clock system of the PSoC devices. **7**

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Seat
No.

## M.Sc. (Part – II) (Semester – IV) (CGPA) Examination, 2016
## ELECTRONICS : Elective – IV
## Paper – XVI : Wireless Sensor Network

Day and Date : Wednesday, 6-4-2016                    Max. Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

**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** indicates **full** marks.

1. A) Choose correct alternative :                                                  **8**

1) Which of the following layer is not present in Wireless Sensor Network communication architecture ?
   a) Physical          b) MAC          c) Application     d) Presentation

2) In 928 M band _____ channels are available for WSN configuration.
   a) 16              b) 4              c) 10             d) None of these

3) Category 2, C2WSN, of Wireless sensor network utilizes _____ Routing.
   a) Static           b) Dynamic       c) Multihop       d) None of these

4) In WSN the sensor node may one of following mode.
   a) Receive          b) Transmit      c) Idle           d) All of these

5) In PEGASIS final aggregation of data is given to
   a) Chain Leader    b) Cluster head c) End device     d) None of these

6) According to IEEE 802.15.4 standards the data rate for Zigbee devices is
   a) 100 Mbps        b) 250 Mbps      c) 250 Kbps       d) 1Mbps

7) Networking implies the concept of _____ and logical connectivity.
   a) Physical          b) Virtual       c) Software       d) None of these

8) The LEACH protocol featured with
   a) Fast communication                b) Energy efficiency
   c) Wide bandwidth                     d) None of these

B) State **true** or **false** : **6**

1) Zigbee Device Object (ZDO) responsible for overall device management and security schemes.

2) The wireless sensor nodes are not autonomous devices.

3) In Zigbee stack the Physical Layer is used for sensing and communication interfaces.

4) Zigbee devices consists of only communication interfaces.

5) The C1WSN realizes multihopping mechanism.

6) The end devices are full function devices.

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

1) Describe an architecture of standard Wireless Sensor Node.

2) Give the Pin description of zigbee device.

3) What do you mean by energy management in Wireless Sensor Network ?

B) Write a note on IEEE 802.15.4 standards. **4**

3. A) With suitable diagram describe an architecture of the Wireless Sensor Network. Describe the functions of end devices, coordinators and routers. **10**

B) Give the classification of the WSN. **4**

4. A) What do you mean by Hierarchical architecture of the WSN ? Describe in detail the function of PEGASIS protocol. **10**

B) Write a note on security issues in the WSN. **4**

5. A) With Pin description give an architecture of the Zigbee device. Describe transmit and receive mode of the zigbee device. **10**

B) Write a note on RF module CC2520. **4**

6. A) With suitable diagram, describe the designing of sensor node using zigbee and AVR microcontroller for industrial applications. **10**

B) Write a note on unicast and broadcast mode. **4**

7. A) Describe in detail the network layers recommended for WSN. What do you mean by ZDO ? **10**

B) Give applications of the WSN technology. **4**

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Seat No.

**M.Sc. (Part – I) (Semester – II) (Old – CGPA) Examination, 2016**
**ELECTRONICS**
**Paper – VII : Optoelectronics**

Day and Date : Monday, 4-4-2016                                         Total Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

**Instructions :**  1) Question **1** and **2** are **compulsory**.
2) Solve **any three** from Q. **3** to Q. **7**.
3) Figures to the **right** indicate **full** marks.
4) **All** questions carry **equal** marks.

1. A) Choose correct alternatives :                                         **8**

   1) A halfwave plate rotates the plane of polarization by _____ degree.

      a) 180                                     b) 90

      c) 270                                     d) 360

   2) Birefringence occurs due to

      a) material properties              b) applied electric field

      c) applied magnetic field          d) none of these

   3) In semiconductor photo diode detectors _____ current increases linearly with increase in the intensity of incident light.

      a) forward                              b) reverse

      c) leakage                             d) all of these

   4) The Kerr effect demonstrate, the change in refractive index due to change in applied

      a) electric field                       b) magnetic field

      c) acoustic field                      d) none of these

   5) Avalanche photo diode consume _____ power.

      a) low                                   b) high

      c) zero                                  d) all of these

**P.T.O.**

6) Silica fiber has highest data rate at _____ wavelength.

    a) 850 nm                b) 1300 nm

    c) 1400 nm             d) 1550 nm

7) Which of the following is birefringent material ?

    a) Glass                  b) $LiNbO_3$

    c) $LiAlO_3$             d) $NbO_3$

8) LASER is _____ source of light.

    a) Coherent            b) Incoherent

    c) Incandescent       d) None of these

B) State **true** or **false** :           **6**

1) Kerr modulator is the best example of electro optic effect.

2) The detectors converts electrical signal into optical signals.

3) In graded index fiber the refractive index gradually changes through core.

4) Fiber optic communication is sensitive to electro magnetic interference.

5) For total internal reflection, the angle of incidence should be greater than critical angle.

6) Faraday's effect of light intensity modulation is magneto-electric phenomenon.

2. A) Answer **any two** :           **10**

1) What do you mean by splicing ?

2) Write note on He-Ne laser as optical source.

3) Describe total internal reflection.

B) Describe in detail the AO modulator.     **4**

3. A) What do you mean by light intensity modulation ? Describe in detail electro optic effect on polarization of light.     **10**

B) Write a note on pocket cell.     **4**

4. A) With suitable diagram describe in detail the construction and working of LED as a optical source. **10**

   B) Describe the methods of fiber loss measurement. **4**

5. A) Describe in detail the semiconductor photo diode as light detectors. Discuss its advantages and disadvantages. **10**

   B) What are types of optical fibers ? Describe any one of them. **4**

6. A) What do you mean by birefringence ? Describe in detail the operation of quarter wave plate. **10**

   B) Discuss Faraday's effect of polarization of light. **4**

7. A) Describe in detail, the design parameters of an optical fiber cable. **10**

   B) Describe the concept of material dispersion **4**

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