Seat No.	

SLR-SP – 228

M.Sc. (Part – I) (Semester – I) Examination, 2015
ELECTRONICS (New)
Paper – I : Numerical Methods

Day and Date : Wednesday, 15-4-2015 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

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.*

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

1) The error appeared due to truncation of the higher order terms is called
   a) Truncation error b) Absolute error
   c) Round-off error d) Relative error

2) For solution of system of linear equation the coefficient matrix must be
   a) Singular b) Non-singular
   c) Sparse d) Primitive

3) In Gaussian elimination method, the coefficient matrix is reduced to _____ matrix.
   a) Identity b) Lower triangular
   c) Diagonal d) All of these

4) Laplace transformation of $\sin \omega t$ is given by F(s) =

   a) $\frac{\omega}{s^2 + \omega^2}$ b) $\frac{s}{s^2 + \omega^2}$

   c) $\frac{s^2}{\omega^2}$ d) $\frac{\omega^2}{s^2}$

5) If a set of n points is available, then n^{th} order forward difference is
   a) zero b) infinity
   c) 10 d) none of these

6) Newton-Cotes quadrature formula for 3 points gives _____ rules.
   a) Trapezoidal b) Simpson $\frac{1}{3}$
   c) Simpson $\frac{3}{8}$ d) Lagrangian

7) First order R-K method produces error due to truncation error designated as
   a) $O(h^2)$ b) $O(h^3)$
   c) $O(h^1)$ d) $O(h^4)$

8) Euler's method for solution of first order ordinary differential equation is based on
   a) Initial value problem
   b) Final value problem
   c) Boundary value problem
   d) None of these

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

1) Least squares fitting process of straight line gives empirical relation of the type $y = ax^2 + bx + c$.

2) R – 2R ladder network gives system of linear equations of tridiagonal coefficient matrix.

3) Laplace transformation of $f(t) = f^n$ is given by $F(s) = \frac{n!}{s^{n+1}}$.

4) Lagrangian interpolation formula is applicable for unequally spaced data points.

5) R – K method gives solution to the system of linear equation.

6) $\Delta^2 + 0 = (E-1)^2 y0$.

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

   1) What do you mean by forward substitution and backward substitution ?

   2) Find $f'(x)$ at x = 4 following is the set of points.

x	0	2	4	6	8
f(x)	0	4	16	36	64

   3) Write a note on inverse of matrix.

   B) Write a note on Laplace Inverse Transformation. **4**

3. A) Describe formulation of system of linear equations. Solve by using Gauss Jordan method. **8**

$2x_1 - 6x_2 + 8x_3 = 24$

$5x_1 + 4x_2 - 3x_3 = 2$

$3x_1 + x_2 + 2x_3 = 16$

   B) Write a note on LV factorization. **6**

4. A) Describe in detail least-squares fitting process for curve fitting. Fit the following data to straight line. **8**

x	2	4	6	8	10
y	1.6	3.6	7.9	17.4	38.6

   B) With suitable example describe Newton's backward difference interpolation. **6**

5. A) What do you mean by Laplace Transformation ? Discuss the transient response of RC circuit. **8**

   B) Derive the expression for Laplace Transformation of differentiation of function. **6**

6. A) Derive the expression first order and second order derivative of given interpolating polynomial. **8**

   B) Find Y(25) by using Newton's forward diff. method.

x	10	20	30	40	50
y	9.21	17.54	31.82	55.32	92.51

6

7. A) Describe Runge-Kutta method for solution of ordinary differential equation. **8**

   B) Evaluate $I = \int_0^1 \frac{1}{1+x}\,dx$. **6**

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SLR-SP – 229

Seat No.	

M.Sc – I (Semester – I) Examination, 2015
ELECTRONICS (New)
Paper – II : Instrumentation Design

Day and Date : Friday, 17-4-2015 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Q.* ***1*** *and Q.* ***2*** *are* ***Compulsory****.*
2) Solve ***any three*** *Q. out of Q.* ***3*** *to Q.* ***7****.*
3) Figure to the ***right*** *indicate* ***full*** *marks.*

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

1) The _____ is defined or repeatability.
a) precision b) resolution c) hysteresis d) sensitivity

2) The RTD is _____ sensitive but _____ stable or compared with thermistor.
a) less, more b) more, less c) more, more d) less, less

3) The _____ pressure is measured in relation to ambient.
a) absolute b) gauge c) differential d) all of these

4) The output voltage of the four element variable bridge is
a) $\frac{Vin}{4}x$ b) $\frac{Vin}{2}x$ c) Vin x d) Vin 4x

5) For transducer interfacing _____ amplifier are the most relevant.
a) General purpose
b) FET input and low bias I
c) High accuracy and low-drift differential
d) All of these

6) In case of 4 to 20 mA current transmission the full scale current span is
a) 0 to 20 mA b) 20 mA c) 16 mA d) 24 mA

7) The _____ conversion circuits are useful to measurement of fractional change in input signal.
a) ratiometric b) logarithmic c) precision d) none of these

8) The ZB30 is
a) isolation amplifier b) power supply
c) signal conditioner d) programmable amplifier

P.T.O.

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

1) The digital ground lines are usually quite noisy and have large current spike.
2) The LED is based on the principle of transmission of photon.
3) The AD 590 and LM 35 has provide the output signal of same type.
4) The copper amplifier can be electronic or mechanical.
5) The semiconductor strain gauge has more output than metal strain gauge.
6) The error and accuracy are expressed in percentage.

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

1) Discuss the static and dynamic characteristics.
2) Write a note on excitation.
3) Explain isolation amplifier model 289.

B) Explain 4 to 20 mA current transmission. **4**

3. A) Explain the need of DAS. Explain multi-channel DAS. **9**

B) Write a note on AD 524. **5**

4. A) Explain in detail general block diagram of instrument design for measurement. **9**

B) Write a note on IR proximity sensor. **5**

5. A) Explain the simple interfacing circuit for PT 100 and AD 590. **9**

B) Write a note on strain gauge. **5**

6. A) Explain in detail I to V and V to I convertor. **9**

B) Write a note on compact data loggers. **5**

7. A) Explain in detail AC and DC signal conditioning system. **9**

B) Write a note on electromagnetic and electrostatic shielding. **5**

SLR-SP – 230

Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2015
ELECTRONICS (New)
Paper – III : Power Electronics

Day and Date : Monday, 20-4-2015 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

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

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

1) In three phase unidirectional controller when two phase voltage are positive, remaining one is
   a) Positive b) Negative
   c) Zero d) None

2) AC voltage controllers are used in
   a) AC magnet control
   b) Lighting control
   c) Speed control of induction motors
   d) All of these

3) Single quadrant converter is also called
   a) Semiconverter b) Dual converter
   c) Half converter d) Full converter

4) In voltage source inverter the output ac voltage depends on
   a) Input ac voltage b) Input dc voltage
   c) Both (a) and (b) d) None of these

5) The chopper converts _____DC voltage into _____ DC volt.
   a) Fixed, variable b) Variable, fixed
   c) Fixed, fixed d) Variable, variable

P.T.O.

6) _____ is also called self commutated inverter.
   a) Parallel inverter b) Series inverter
   c) Bridge inverter d) Both (a) and (b)

7) Single phase half wave controller is also called as
   a) Bi-directional controller b) Uni-directional controller
   c) Single quadrant controller d) None of these

8) In three phase controller when three devices are conducting, _____ is equal to input phase voltage.
   a) Output phase voltage b) Output phase current
   c) Input current d) None

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

1) Integral cycle control can be advised only for loads with high time constant and limited range control.

2) A simplest method of eliminating third harmonics from the output voltage waveform of a single phase bridge inverter is to use single pulse modulation.

3) In three phase voltages V_a, V_b, V_c have similar waveforms but displaced from each other by 120°.

4) A chopper, where voltage as well as current remain negative is known as type-A chopper.

5) In dc choppers the waveform for I/P and O/P voltage are respectively continuous.

6) In AC on-off voltage controller the power factor is equal to $\sqrt{K}$.

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

1) Write a note on class-D-chopper.

2) Give the comparison between 180° mode and 120° mode three phase bridge inverter.

3) What do you mean by dual converter ?

B) Explain the need of free-wheeling diode. **4**

3. A) Explain the principle of step-down chopper with resistive load. Derive necessary relations. **8**

B) What are chopper control strategies ? **6**

4. A) Explain principle of ON-OFF controller in detail and derive the equation for output voltage. **8**

   B) What is inverter ? Explain operation of single phase bridge inverter. **6**

5. A) Explain single phase AC bidirectional voltage controller with resistive load and derive the relation for output voltage. **8**

   B) Discuss three phase to single phase cycloconverter. **6**

6. A) Describe the operation of fully controlled bridge rectifier with R-L load with necessary waveforms. **8**

   B) Explain symmetrical angle control technique used for power factor improvement of single phase converter. **6**

7. A) Explain three phase half wave controlled rectifier. Draw necessary waveform and derive it. **8**

   B) Discuss the effect of duty cycle on phase control. **6**

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SLR-SP – 231

Seat No.	

M.Sc – I (Semester – I) Examination, 2015
ELECTRONICS (New)
Paper – IV : Advanced Microcontrollers

Day and Date : Wednesday, 22-4-2015 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

***Instructions**: 1) Q. No. **1** and Q. No. **2** are **compulsory**.*
*2) Solve **any three** from Q. No. **3** to Q. No.**7**.*
*3) Figures to the **right** indicate **full** marks.*
*4) Draw **necessary** diagram and label them.*

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

1) Clearing a TRISx bit will make that perticular PIN as
   a) Output b) Input
   c) Input and Output d) Stop

2) BRGH bit of Transmit Status and Control Register (TXSTA) kept as 1 to select _____ speed.
   a) high b) low
   c) medium d) none of these

3) Select different register from the following
   a) R0 b) R1 c) R2 d) R3

4) Program memory address 0000H known as _____ vector.
   a) Interrupt b) Sleep mode
   c) Reset d) Both a) and c)

5) _____ is arithmetic instruction.
   a) SLEEP b) NOP
   c) RETFIE d) INCFSZ

6) _____ register is used to enable and disable individual external interrupts.
   a) GIMSK b) GISK c) SREG d) MCUCR

P.T.O.

7) PIC has _____ addressing modes.
a) 4 b) 6 c) 7 d) 2

8) _____ bit used to select two memory banks at each time in PIC microcontroller.
a) $\overline{IRP}$ b) RPI c) both a) and b) d) none of these

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

1) SEC instruction dosent affect carry flag.
2) IRP is used to select register bank in PIC micro controller.
3) AVR microcontroller has 8 channel 8 bit ADC.
4) PORTA of PIC is 8 bit Bi-directional I/O port.
5) The power on reset circuit activates when the power supply voltage is below a certain threshold.
6) RS pin of LCD is cleared to send command and set for send data on LCD.

2. A) Solve **any two** : **10**
1) Write note on Arithmatic instructions of AVR.
2) Explain in detail ports of PIC microcontroller.
3) Write note on memory of PIC microcontroller.

B) Write features of AVR microcontroller in detail. **4**

3. A) Write program to toggle LED connected to PORTA. **8**

B) Write note on interrupts of AVR. **6**

4. A) Configure on-chip ADC of PIC to convert analog input into digital connected at channel 0. **10**

B) Explain clock and reset circuit of AVR. **4**

5. A) Write note on times of AVR controller. **10**

B) Explain Relay Interfacing to the AVR. **4**

6. A) Explain architecture of PIC microcontroller. **8**

B) Write note on compare capture mode. **6**

7. A) Explain watchdog times of AVR. **7**

B) Explain addressing modes of PIC microcontroller. **7**

SLR-SP – 232

Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2015
ELECTRONICS (Old)
Paper – I : Mathematical Techniques

Day and Date : Wednesday, 15-4-2015 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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.*

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

1) Laplace transformation of $\frac{di(t)}{dt}$ is _____

a) $\frac{I(s)}{s}$ b) sI(s)

c) $\frac{I(s)}{1-\alpha}$ d) $(1-\alpha)Is$

2) The second order forward difference $\Delta^2 y_0$ can be expressed as _____

a) $(E-1)^2 y_0$ b) $\left(E^2-1\right)y_0$

c) $\frac{E^2}{y_0}$ d) $E^2 - y_0$

3) Fourier series expansion, the function should satisfy _____ condition.

a) Newton b) Euler

c) Dirichlet d) Gauss

4) R – 2R Ladder Network results into _____ matrix.

a) L-matrix b) U-matrix

c) Tri diagonal matrix d) All of these

P.T.O.

5) For numerical integration by Simpson $^1/_3$ rule _____ points are considered.

a) 2 b) 3

c) 4 d) None of these

6) Determination of solution of ordinary differential equation at $x = x_0$ is the _____ problem.

a) Initial value b) Final value

c) Boundary d) None of these

7) In Newton's forward difference the n^{th} order difference is always _____

a) 1 b) ∞

c) 0 d) All of these

8) The function is said to be even symmetric if $f(-t)$ = _____

a) $f(t)$ b) $-f(t)$

c) $f(-t)$ d) None of these

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

1) The Fourier coefficient q_0 represents maximum value the function.

2) Laplace transformation of unit function is $^1/_s$.

3) For square matrix if $|A| \neq 0$, then it is said to be singular matrix.

4) Lagrangian interpolating polynomial is for equally spaced data points.

5) For solution of ordinary differential equation R – K method can be adopted.

6) Each splines in cubic splines can be expressed by third order polynomial.

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

1) Describe Gaussian elimination method.

2) Write a note on least squares fitting process.

3) Evaluate $I = \int_1^2 x \, dx$.

B) What do you mean by Initial value and boundary value problem. **4**

3. A) Using Newton-cotes quadrature formula derive expression for Simpson's $^1/_3$ rule of numerical integration. **8**

   B) Using Simpson $^1/_3$ rule evaluate $I = \int_0^1 \frac{dx}{1+x}$. **6**

4. A) Obtain Laplace transformation of differentiation of function. **8**

   B) Using Laplace transformation describe the response of RC circuit for DC input. **6**

5. A) What do you mean by interpolation ? Describe Newton's forward difference interpolation technique. **8**

   B) Find y(0.3) for following data points. **6**

x :	0	0.2	0. 4	0.6	0.8	1.0
y :	1.0	0.808	0.664	0.616	0.712	1.0

6. A) Derive the expression for Fourier coefficient. **8**

   B) Derive Fourier series expansion for half wave rectifier wave. **6**

7. A) With suitable example describe Gauss-Jordan elimination method for solution of system of equation. **8**

   B) Solve by Gaussian elimination method. **6**

   $x_1 + x_2 - x_3 = -3$

   $6x_1 + 2x_2 + 2x_3 = 2$

   $-3x_1 + x_2 + x_3 = 5$

SLR-SP – 233

Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2015
ELECTRONICS (Old)
Paper – II : Instrumentation Design

Day and Date : Friday, 17-4-2015 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Q. **1** and Q. **2** are c**ompulsory**.*
*2) Attempt **any 3** questions from Q. **3** to Q. **7**.*

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

1) Self generating transducers are _____ transducers.
a) active b) passive c) secondary d) inverse

2) Quartz and Rochelle salt belongs to _____ of Piezo-electric material.
a) Natural group b) Synthetic group
c) Fiber group d) None of these

3) LVDT is a/an _____ transducer.
a) Magneto-strict ion b) Inductive
c) Resistive d) Eddy current

4) Capacitive transducers are normally employed for _____ measurement.
a) static b) dynamic c) transient d) both a) and b)

5) _____ is example of photo emissive cell.
a) LDR b) Photo diode
c) Photo multiplier d) None of these

6) Photo conductive cell consists of a thin film of _____
a) Quartz b) Lithium c) Selenium d) None of these

7) For conversion of analog signal into digital, _____ are used.
a) DAC b) ADC
c) Both a) and b) d) None of these

8) _____ is active temperature sensor.
a) Tachometer b) LM 35 c) PT 100 d) Thermocouple

P.T.O.

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

1) Wheatstone Bridge is DC Bridge.
2) A to D convertor use to measure and record.
3) AD524 is programmable instrumentation amplifier.
4) Strain gauge use to measure pressure.
5) SYHS230 is humidity sensor.
6) Relays are use to reduce noise.

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

1) Explain IR proximity sensor.
2) Write note on single channel data acquisition system.
3) Explain stain-gauge in detail.

B) What are Recorders ? Explain in short. **4**

3. A) Compare data acquisition system and the data logger. **8**

B) Explain F to V convertor in detail. **6**

4. A) Design instrumentation for measurement of temperature. **10**

B) Explain I to V convertor in detail. **4**

5. A) Explain Micro-controller based minimum system for data acquisition. **10**

B) Write note on plotters. **4**

6. A) General block diagram of instrument design for measurement, explain in detail. **10**

B) Explain characteristics of sensors. **4**

7. A) Write note on Grounding, Electromagnetic and electrostatic shielding. **8**

B) Write note on Actuators. **6**

SLR-SP – 235

Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2015
ELECTRONICS (Old)
Paper – IV : Advanced Microcontrollers

Day and Date : Wednesday, 22-4-2015 Total Marks : 70
Time : 11.00 a.m. to 2.00 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) With reference to Embedded systems, POR stands for _____

A) Power-of-ROM B) Power-of-RAM

C) Power-on-Reset D) Program-on-ROM

2) LCD module does not have following pin

A) $\overline{EN}$ B) RS C) R/W D) EOC

3) PIC 16F877 has _____ pins.

A) 28 B) 40 C) 32 D) 40

4) The program memory capacity of PIC 16F877 is _____ KB.

A) 10 B) 8 C) 14 D) 16

5) There are _____ general purpose registers in ATMega8.

A) 8 B) 16 C) 24 D) 32

6) On-chip RAM size in ATMega8 is _____

A) 64 Bytes B) 128 Bytes C) 512 Bytes D) 1024 Bytes

7) Single word instructions in PIC 16F877 are _____

A) 10 B) 20 C) 35 D) 40

8) There are _____ powerful instructions in ATMega8.

A) 72 B) 108 C) 130 D) 132

P.T.O.

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

1) PWM is related to duty cycle of pulse.
2) OLED consumes more power as compare to LED.
3) Data transfer is in serial form over I^2C Bus.
4) Timers in microcontroller counts external pulses.
5) AVR has on-chip flash memory.
6) Matrix type keyboard saves I/O lines.

2. A) Attempt **two** : **10**
   a) Explain status register of PIC 16F877.
   b) Enlist the features of AVR series microcontrollers.
   c) State the advantages and applications of I^2C devices.

   B) Explain the need of opto coupler in interfacing. **4**

3. a) Explain the architecture of PIC 16F877. **8**

   b) Explain interfacing of smart LCD module with AVR. **6**

4. a) Explain memory structure of PIC 16F877. **8**

   b) What are the advantages of bit oriented instructions ? Explain any five bit oriented instructions of AVR. **6**

5. a) What do you mean by an interrupt ? Explain how interrupts are processed by AVR microcontrollers. **8**

   b) Explain the procedure of developing project using MPLAB. **6**

6. a) Explain memory addressing modes of AVR with the help of examples. **8**

   b) Explain the step by step procedure to install MPLAB on desktop computers. **6**

7. a) Explain conditional branching instruments of AVR microcontroller with examples. **8**

   b) What is stack ? Explain any five stack related instructions of AVR. **6**

SLR-SP – 236

Seat No.	

M.Sc. – I (Semester – II) Examination, 2015
ELECTRONICS (New)
Paper – V : Control Theory

Day and Date : Thursday, 16-4-2015 Max. Marks : 70
Time : 11.00 a.m. to 2.00 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) Laplace transform of 1 is _____

a) $\frac{1}{s}$ b) s c) $\frac{s}{s+1}$ d) none of these

2) _____ is graphical representation of transfer function.

a) Node b) Loop c) Path d) Block diagram

3) For type one system, the steady state acceleration error is _____

a) 0 b) 1 c) $\frac{1}{Ka}$ d) none of these

4) Which of the following technique gives quick transient and stability response ?

a) Nyquist b) Root locus c) Bode d) Polar

5) Feedback system has advantage of _____ transient response.

a) Improving b) Decreasing c) Both a and b d) none of these

P.T.O.

6) If any root of the characteristic equation has a positive real part or if these is repeated root on the $j\omega$ axies the system is _____

a) stable b) unstable c) both a and b d) none of these

7) Time delay is the time required for the response to reach _____ of the find value in first attempt.

a) 60% b) 70% c) 50% d) 40%

8) _____ is undamped natural frequency.

a) ζ b) ω_c c) ω_n d) f

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

1) A high damping ratio will be a high overshoot.
2) Bode plote is a time domain test.
3) Nyquist criteria gives direct value of corner frequency.
4) The Bode plot is applicable to minimum phase network.
5) Open loop system is most sensitive to the presence of non linearities.
6) Feedback system has advantage of reduce sensitivity.

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

1) Explain comparison between open loop and close loop system.
2) Explain roll of controllers in process industry.
3) Write note on polar plots.

B) Explain discontinuous (ON-OFF) control action with their performance and characteristics. **4**

3. a) Explain standard test signals. **8**
b) Explain correlation between time and frequency response. **6**

4. a) Explain in detail Root Locus concept. **8**
b) Write note on regenerative feedback. **6**

5. a) Explain transient response of second order system. **8**
b) Write note on system transportation lag. **6**

6. a) Explain concept of sequencing and modulating controllers **8**
b) Write note on root contours. **6**

7. a) Explain in detail concept of stability. **8**
b) Write note on PD control action. **6**

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SLR-SP – 237

Seat No.	

M.Sc. (Part – I) (Semester – II) (New) Examination, 2015
ELECTRONICS
Paper – VI : Real Time Operating System

Day and Date : Saturday, 18-4-2015 Max.Marks : 70

Time : 11.00 a.m. to 2.00 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 alternatives : **8**

1) Semaphore is the _____ for the task for execution.

a) Protection b) Lock c) Permission d) Prohibition

2) _____ is the fundamental characteristics of the task.

a) Stack size b) Time schedule

c) Priority d) Context

3) To avoid starvation _____ task is executed.

a) Semaphore b) Idle

c) Ideal d) Event

4) If two tasks share the resources commonly, then _____ situation may occurs.

a) Spinlock b) Livelock

c) Deadlock d) Race condition

5) The pH electrode is always excited with the constant voltage source of _____ volt.

a) 220 mV b) 5 V

c) 420 mV d) 100 mV

6) Hard real time system is

a) Reversible b) Irreversible

c) Ideal d) None of these

7) The Kernel of the RTOS should provide _____ to the task.

a) Memory management b) Resource management

c) Time management d) All of these

8) For context switching _____ object is operating.

a) Dispatcher b) Queue

c) Event register d) Mutex

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

1) During pre-empitive scheduling the task of highest priority is always pre-empited.

2) For intertask communication the queue is acts as first-in first-out memory.

3) The task is an example of endless loop.

4) RTLinux Kernel is superimposition of the real time Kernel on Linux Kernel.

5) For context switching heap memory portion is used.

6) The mutex is not an object of the Kernel.

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

1) Write a note of FSM of the task.

2) Describe in detail the Round-Robin scheduling mechanism.

3) With suitable example describe the hard and soft real time systems.

B) What do you mean by context switching. **4**

3. A) With suitable block diagram describe a designing of an embedded system for measurement of humidity. Use AVR ATmega 8 L microcontroller. **7**

   B) What is RTOS ? Describe characteristics of RTOS. **7**

4. A) With suitable diagram explain priority based pre-empitive scheduling mechanism . **7**

   B) What do you mean by priority inversion ? **7**

5. A) Describe in detail the architecture of the Kernel of RTLinux. **7**

   B) What do you mean by semaphore ? **7**

6. A) Describe the structure of RTOS Kernel. Explain the scheduling mechanism. **7**

   B) Describe use of message box for intertask communication. **7**

7. A) Describe the architecture of the RTOS Kernel micro C/OS – II. **7**

   B) Write in program in any RTOS to Read/Write IO ports of any micro controller. **7**

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SLR-SP – 238

Seat No.	

M.Sc. (Part – I) (Semester – II) (New) Examination, 2015
ELECTRONICS
Optoelectronics (Paper – VII)

Day and Date : Tuesday, 21-4-2015 Total. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Questions **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) Optical fiber works with the _____
   a) Snell's law b) Total internal reflection
   c) Variation in RI d) All of these

2) In P-N junction photo diode _____ of the depletion layer depends upon the doping concentration.
   a) length b) hight c) width d) none of these

3) _____ gives the change in refractive index linearly proportional to the electrical field.
   a) Pockets effect b) Kerr's effect
   c) Faraday effect d) None of these

4) A quarterwave plate rotates the plane of polarization by _____ degree.
   a) 180 b) 90 c) 270 d) 360

5) For high speed optical network _____ is the best suitable light source.
   a) Surface emitting LED b) Edge emitting LED
   c) Fabry Perrot LED d) DFBLD

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) Avalanche Photo diode consumes _____ power.
   a) low b) high c) zero d) all of these
8) In optical fiber material dispersion causes _____ of the pulse.
   a) Distortion b) Attenuation
   c) Broadening d) Narrowing

B) State **true** or **false** : **6**
1) In birefringence crystals all rays are only travelling along the optic axis.
2) Kerr effect demonstrates electro-optic effect.
3) In single mode graded index fiber the RI of core is uniformly varies in the core.
4) A loss of OdBm power is equivalent with the loss of 10 mw power.
5) Optical detectors converts optical signal into electrical signal.
6) He-Ne laser is the coherent source of light.

2. A) Attempt **any two** : **10**
1) What do you mean by APD ?
2) Describe the methods of splicing.
3) Write a note on LED as optical source.

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

3. A) What do you mean by polarization of light ? Describe the phenomenon of birefringence. **10**

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

4. A) With suitable diagram describe in detail the construction and working of He – Ne LASER source. **10**

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

5. A) What do you mean by linear electro optic effect ? Describe pocket cell. **10**

B) Write a note on fabrication of optical fiber. **4**

6. A) Describe in detail the construction and working of PIN diode as optical detectors. **10**

B) Write a note on Acoustic Optic (AO) devices. **4**

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

B) Write a note on MCVO technique. **4**

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SLR-SP – 239

Seat No.	

M.Sc. (Part – I) (Semester – II) (New) Examination, 2015
ELECTRONICS
Paper – VIII : Signals and System

Day and Date : Thursday, 23-4-2015 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Answer **any 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 answers : **8**

1) The system y(n) = x(n) – x(n – 1) is _____ system.
   a) dynamic b) time invariant
   c) linear d) all above

2) An initially relaxed system is said to be unstable if _____ input produces _____ output.
   a) bounded, bounded b) unbounded, unbounded
   c) finite, infinite d) infinite, finite

3) The Fourier series expansion of odd periodic function contains only _____ terms.
   a) constant b) sine c) cosine d) variable

4) The unit parabolic function is denoted by p(t) is
   a) $P(t) = \frac{t^2}{2}.u(t)$ b) $P(t) = \frac{t^2}{2}.\delta(t)$
   c) P(t) = r(t) d) $P(t) = t^2$

5) Convolution is used to find
   a) The time response of LTI system
   b) The impulse response of an LTI system
   c) Frequency response of a system
   d) The phase response of a LTI system

6) A continuous time signal x(t) is said to be symmetric signal if its satisfies the condition
   a) x (–t) = –x(t) b) x(–t) = x(t)
   c) x(–t) = –x(2t) d) –x(–t) = x(–t)

7) The function $\frac{\sin(\pi u)}{\pi u}$ is denoted by _____ function.
   a) Signum b) Sinc (u) c) Rectangular d) Periodic

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

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

1) The symbol\used for left division.
2) Energy of a power signal is finite.
3) The unit parabolic function can be obtained by integrating the ramp function.
4) The representation of signal by mathematical expression is known as signal modelling.
5) Folding and time delaying of a signal are commutative.
6) While commands allows conditional looping in which statements within the loop are executed along as the condition is true.

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

a) What is MATLAB ? Explain the different commands of matlab.

b) Sketch the following signals :
   i) u(n + 2) – u(n – 3)
   ii) u(–n + 3).u(n)

c) Define signal. Give typical examples on signals and system.

B) Write a note on different types of file used in MATLAB. **4**

3. A) Check whether the following system **8**

   i) static/dynamic

   ii) linear/non-linear

   iii) tinvarient or not

   A modulator whose carrier frequency is ω_0 giving an output $y(t) = x(t) \cos \omega_0 t$.

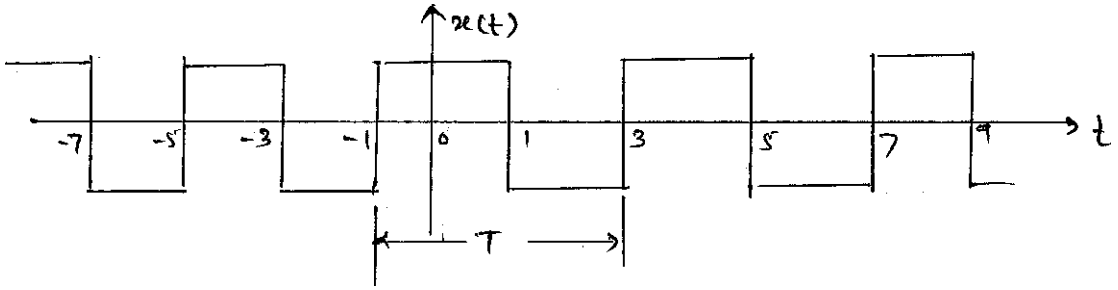
   B) Sketch the signal $x(t) = e^{-t}$ for an interval $0 \leq t \leq 2$ samples the signal with sampling period T = 0.2 sec. and sketch discrete time signal. **6**

4. A) Obtain linear convolution of following sequence using mathematical equation method.

   x(n) = {1, 2, 1, 2} and h(n) = {1, 1, 1}. **8**

   B) Prove that LTI system is completely characterized by unit impulse function. **6**

5. A) Find the trignometric Fourier series for the periodic signal x(t) shown in figure. **8**



   B) Explain exponential Fourier series representation. **6**

6. A) Explain in detail about different types of operations on signals with suitable examples. **8**

   B) Sketch a discrete time signal $x(n) = 3^n$ for $-2 \leq n \leq 2$ and obtain

   i) $y(n) = \frac{x(n)}{2} + \delta(-n+2)$

   ii) y(n) = x(n).u(–2–n). **6**

7. A) State the different properties of Fourier series and explain Parserval's theorem. **8**

   B) Write a note on continuous-time and discrete-time signals. **6**

SLR-SP – 240

Seat No.	

M.Sc. (Part – I) (Semester – II) Examination, 2015
ELECTRONICS (Old)
Paper – V : Control Theory

Day and Date : Thursday, 16-4-2015 Total. Marks : 70
Time : 11.00 a.m. to 2.00 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) Laplace Transform of unit step is

a) 1/s b) 1 c) $1/s^2$ d) 1/(s – a)

2) The open loop transfer function represents _____ system.

a) type – 0 b) type – I c) type – II d) type – III

3) Maximum phase-lead of the compensator $D(s) = \frac{(0.5s+1)}{(0.05s+1)}$, is _____

a) 52 deg at 4 rad/sec b) 52 deg at 10 rad/sec
c) 55 deg at 12 rad/sec d) none of the above

4) In the signal flow graph the sink node has _____ branches.

a) only out going b) only in coming
c) both incoming and outgoing d) none of these

5) Open loop transfer function of type – I control system contains _____ integration.

a) single b) double c) triple d) none of these

P.T.O.

6) In bode plot frequency scale is

a) linear b) exponential c) logarithmic d) parabolic

7) In second order control system the response is over damped if damping factor is

a) $\xi < 1$ b) $\xi > 1$ c) $\xi = 1$ d) $\xi = 0$

8) The control that suffers from residual error is

a) PD b) PI c) PID d) ON-OFF

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

1) The Mass represents an element having inertia when a force is applied to a mechanical body of mass M, Displacement x takes place. For this the relationship between M, F and x is $F = M \frac{d^2x}{dt^2}$. Say true or false.

2) Maoson's gain formula is used for defining stability of the system.

3) Transient response of the system is the portion of the total time response during which the output changes from one state to another state ?

4) The peak time t_p is the time required for the response to reach the peak of first overshoot.

5) Polar plot is the plot of frequency Vs z.

6) For the unstable compensated system lead compensator provides fast response.

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

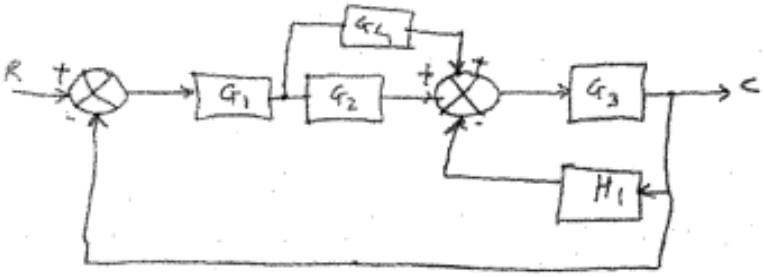
a) What are the different types of control system ? Explain with advantages and disadvantages close loop control system.

b) What is Mason's gain formula ? Explain the procedure to draw signal flow graph from block diagram.

c) Write a note on 'Correlation between time and frequency response'.

B) Write a note on regenerative feedback. **4**

3. A) Reduce each diagram to single block, and determine resulting equivalent transfer function. **8**



B) What are the various time domain specifications ? **6**

4. A) Explain Impulse response of Second order system. **8**

B) Write a note on Routh stability criterion. **6**

5. A) Explain step by step procedure to draw Bode Plot. **8**

B) Explain the term of signal flow graph. **6**

6. A) Explain the procedure to draw the root locus. **8**

B) Explain Nyquist Stability Criteria. **6**

7. A) Write a note on 'PID Controller'. **8**

B) Explain the roll of controllers in process industry. **6**

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SLR-SP – 241

Seat No.	

M.Sc. (Part – I) (Semester – II) Examination, 2015
ELECTRONICS (Old)
Paper – VI : Real Time Operating System

Day and Date : Saturday, 18-4-2015 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Answer **five** questions.*
*2) Questions **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) Select correct alternatives : **8**

1) A task may become ready for execution when it _____
   a) Acquire resources b) Acquire interrupts
   c) Has highest priority d) All of these

2) The emf generated from standard pH electrode in the range of _____ for pH range from 0 to 14.
   a) 0 to 140 mV b) – 420 mV to 420 mV
   c) 0 to 840 mV d) – 840 mV to 0

3) On acquire the mutex counter _____
   a) Decrements b) Increments
   c) Remains uncharged d) None of these

4) The communication path established between hardware and application program interface routine is called
   a) Mutex b) Queue c) Thread d) Pipe

5) In round-robin scheduling mechanism the tasks are allotted with _____
   a) Only priority b) Only fraction of CPU time
   c) Both priority and CPU time d) None of these

6) The RTOS Kernel micro-os-II has portability _____
   a) For microcontroller b) For 8951 microcontroller only
   c) For AVR microcontroller only d) For PIC microcontroller only

7) RTLinux supports to
   a) IEEE standards b) Digi standards
   c) Only ARM microcontrollers d) Only to VLSI devices
8) _____ of the following is used for intertask communication.
   a) Semaphore b) TCB c) SCB d) Queue

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

1) Hardware time ticks are used to remove the task from execution state.
2) On collapsing of the deadline the soft real time system results in catastrophic change.
3) Static priority solves the problem of priority inversion.
4) Clock and reset circuits are the prime requirements of an embedded system.
5) Event register is not a Kernel object.
6) The micro c/os-II Kernel is based on rate monotonic method of scheduling.

2. A) Attempt **any two** : **10**
   1) What do you mean by real time ? Give the characteristics of RTOS.
   2) Write a note on creation of the task.
   3) What do you mean by static and dynamic priority ?

   B) Write a note on round robin scheduling mechanism. **4**

3. A) Define the priority of the task. Describe states of the tasks in detail. **8**

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

4. A) Define the term scheduling. Describe with suitable example, priority based pre-emptive scheduling. **8**

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

5. A) What do you mean by mutex ? Describe priority inversion mechanism. **8**

   B) Describe hard and soft real time system. **6**

6. A) What do you mean by synchronization of task ? Explain the need of semaphore to avoid the problem of deadlock. **8**

   B) Design an embedded system to measure humidity of the environment. **6**

7. A) Describe micro c/os-II Kernel's features. **8**

   B) Describe with suitable diagram the intertask communication mechanism. **6**

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SLR-SP – 242

Seat No.	

M.Sc. (Part – I) (Semester – II) Examination, 2015
ELECTRONICS (Old)
Paper – VII : Optoelectronics

Day and Date : Tuesday, 21-4-2015 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

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

1) Numerical aperture, NA = sin θ =

a) n_1^2 b) n_2^2

c) $\left(n_1^2 - n_2^2\right)^{1/2}$ d) $(n_1 - n_2)^2$

2) _____ in the pulse is observed if refractive index of the material varies as a function of wavelength.

a) Dispersion b) Amplitude modulation

c) Losses d) None of these

3) _____ is the first order electro-optic effect.

a) Kerr b) Pockel

c) Faraday d) All of these

4) For quarter wave plate the phase difference between two optical wave is

a) 90° b) 180°

c) 45° d) 360°

P.T.O.

5) The OTDR is used to measure _____ of the optical fiber.

a) NA b) Dispersion

c) Attenuation d) None of these

6) For direct semiconductors the band gap is related to the wavelength of light λ as

a) $\lambda = \frac{1}{Eg}$ b) $\lambda = \frac{1.24}{Eg}$

c) $\lambda = Eg$ d) $\lambda = 1.24\ Eg$

7) _____ of the following shows linear electro-optic effect.

a) Glass b) $LiNbO_3$

c) SnO_2 d) Li_2O_3

8) On use of _____ the Pockel Phase modulator can be converted into intensity modulator.

a) Polarizer b) Analyzer

c) Both a) and b) d) None of above

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

1) For graded optical fiber $n_1 > n_2$.

2) Faraday effect is nothing but magneto-optic effect.

3) In AO modulation, change in refractive index due to mechanical strain is considered.

4) Photo detector, PN junction diode is always connected in forward biased mode.

5) Splicing is the method of measurement of loss in optical fiber.

6) Optically anisotropic crystals exhibit phase modulation.

2. A) Solve **any two** from the following : **10**

1) Write a note on LED as optical source.

2) Describe pulse spread due to material dispersion.

3) Describe the methods of coupling of optical fibers.

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

3. A) With working principle describe mechanism of optical communication through optical fiber. **8**

   B) Write a note on numerical operature. **6**

4. A) What do you mean by birefringence ? Describe electro-optic effect. Compare Pockel's and Kerr's modulators. **8**

   B) Write a note on quarter wave retarding plate. **6**

5. A) What are methods of measurement of characteristic of optical fiber ? Describe loss measurement method. **8**

   B) Describe photo transistor as optical detectors. **6**

6. A) Describe in detail magneto-optic effect of light modulation. **8**

   B) Write a note on He-Ne Laser optical source. **6**

7. A) What do you mean by step and graded index optical fibers ? **8**

   B) Describe APO as optical detectors. **6**

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SLR-SP – 243

Seat No.	

M.Sc. (Part – I) (Semester – II) Examination, 2015
ELECTRONICS (Old)
Paper – VIII : Electronics Circuit Design

Day and Date : Thursday, 23-4-2015 Max.Marks : 70

Time : 11.00 a.m. to 2.00 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 purpose of the clock input to a flip-flop is to

a) Clear the device

b) Set the device

c) Always cause the output change states

d) Controlling the synchronous input

2) IC 74121 is

a) Monostable multivibrator b) Schmitt trigger

c) Analog multiplexer d) All of these

3) The minimum number of flip-flop required in counter to count 60 pulses is

a) 4 b) 6 c) 8 d) 10

4) The minimum voltage drop across IC regulator 78XX/79XX series is

a) 3V b) 2V c) 1V d) 0V

5) IC design is preferred over discrete circuit design since

a) Inexpensive b) More reliable

c) Versatile d) All of these

P.T.O.

6) The CMOS IC has _____ advantage.

a) High fan-out capability b) Good noise immunity

c) Large noise swing d) All of these

7) For RC phase shift oscillator with R = 1KΩ, C = 0.1μf the oscillating frequency is

a) 650 Hz b) 650 KHz c) 6.5 KHz d) 1.59 KHz

8) The binary to gray conversion code of 1010 is

a) 1100 b) 1111 c) 1010 d) 1110

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

1) LC oscillator can be used for frequency between 1 KHz to 100 KHz.

2) In triangular wave generator the frequency of the square wave and triangular wave is the same.

3) TTL and CMOS ICs are not directly compative.

4) IC 741 can be used in the design of regulators.

5) K-map uses gray code presentation.

6) The input capacitor removes the transient response in the voltage regulator.

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

1) Write a note on design of capacitance meter.

2) Explain zener shunt regulator.

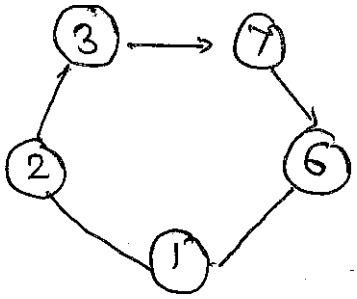
3) Explain on-off controller.

B) Write a note on IC SMPS design. **4**

3. A) Design a fullwave rectifier circuit with an LC filter to supply gv dc at 50 mA with ripple factor of 0.02. **8**

B) Write a short note on three terminal IC regulator. **6**

4. A) Design a counter which will be through the following sequence using JK flipflop. **8**



B) Design 16 : 1 mux using 4 : 1 mux. **6**

5. A) Explain frequency synthesizer in detail. **8**

B) Describe the operation of op-amp astable multivibrator. **6**

6. A) Design a comparator circuit using IC 741 which compares the input signal at two different values +5V and – 5V. **8**

B) Explain TTL to CMOS interface. **6**

7. A) Design a square wave generator using IC 741 for the given specifications f_0 = 5.5 KHz, Duty cycle = 50%. **8**

B) Explain monostable multivibrator using gate. **6**

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SLR-SP – 244

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2015
ELECTRONICS (New – CGPA)
Paper – IX : Digital Signal Processing

Day and Date : Wednesday, 15-4-2015 Total Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

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

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

1) The ROC statement for anticausal sequence
   a) Entire z-plane except $|z| = \infty$
   b) Entire z-plane except $|z| = 0$
   c) Entire z-plane except $|z| = 0$ and $|z| = \infty$
   d) None of these

2) If a signal is shifted in time domain by k samples then the magnitude spectrum is unchanged but the phase spectrum is changed by amount
   a) ωk b) $-\omega k$
   c) $e^{j\omega}$ d) $e^{-j\omega}$

3) Auto-correlation is denoted by
   a) $\gamma_{xx}(l)$ b) $\gamma_{xy}(l)$
   c) $\gamma_{yx}(l)$ d) $\gamma_{x}(l)$

4) Fourier transform of a function $e^{-at}u(t)$ is
   a) $\frac{1}{a - j\omega}$ b) $\frac{1}{a + j\omega}$
   c) $\frac{1}{a^2 + \omega^2}$ d) $\frac{1}{a^2 - \omega^2}$

P.T.O.

5) In time scaling property x(at) is compressed version of the signal x(t) by a factor a, when
   a) $a > 1$ b) $a < 1$
   c) $a = 1$ d) $a \neq 1$
6) The ROC of right hand exponential sequence is _____ part of circle having radius α.
   a) Interior b) Exterior
   c) Both a) and b) d) None
7) Shifting the sequence in time domain by l samples is equivalent to multiplying the sequence in frequency domain by
   a) $e^{-j2\pi kl/N}$ b) $e^{j2\pi kl/N}$
   c) $e^{-j2\pi kl}$ d) $e^{j2\pi kl}$
8) If sampling frequency f_s is _____ then aliasing error is observed.
   a) $f_s \geq \omega$ b) $f_s \leq 2\omega$
   c) $f_s > 2\omega$ d) $f_s \leq \omega$

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

1) Poles are roots of the denominator, or the values of z for which x(z) becomes finite.
2) Direct form-II realization is also called as canonic form.
3) Ideal filters are practically not realizable.
4) An initially relaxed system is BIBO stable if and only if every bounded input produce unbounded output.
5) Fourier transform provides a valuable technique for frequency domain analysis and design continuous time signal.
6) In circular advance shift sequence x(n) in clockwise direction by k samples.

2. A) Attempt **any two** : **10**
   1) Explain FIR system. Compare FIR with an IIR filter.
   2) Draw the spectrum of a sampled signal and explain aliasing.
   3) Explain development of Fourier transform.

   B) Explain the properties of ROC of x(z). **4**

3. A) State different properties of z-transform and explain initial value theorem in detail. **8**

   B) State and prove time differentiation properly of Fourier transform. **6**

4. A) Find the linear convolution of $x_1(n)$ and $x_2(n)$ using z-transform.

$$x_1(n) = \left\{1,\ 2,\ \underset{\uparrow}{3},\ 4\right\} \text{ and } x_2(n) = \left\{1,\ 2,\ \underset{\uparrow}{0},\ 2,\ 1\right\}. \quad \textbf{8}$$

B) Determine the IZT of the following **6**

$$x(z) = \frac{3}{z - \frac{1}{4} - \frac{1}{8}z^{-1}}, \text{ x(n) is causal.}$$

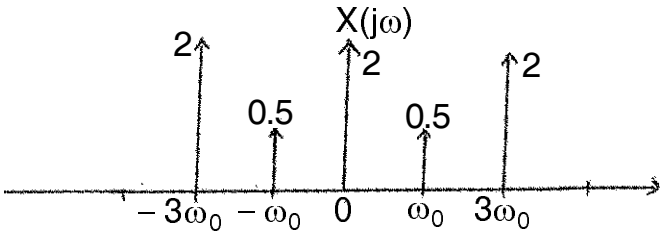
5. A) Obtain direct form I and II cascade form realization of a system described by

$$y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n) + \frac{1}{2}x(n-1). \quad \textbf{8}$$

B) Explain direct Form realization of FIR system. **6**

6. A) Determine the 8-point DFT of the sequence x(n) = {1, 2, 1, 2}. **8**

B) Determine the inverse Fourier transform of the spectrum. **6**



7. A) Why the problem of aliasing occurs during sampling process ? What is the use of anti-aliasing filter ? **8**

B) Determine the sequence. **6**

$y(n) = x(n) \textcircled{N} h(n)$

where $x(n) = \left\{\underset{\uparrow}{1},\ 2,\ 3,\ 1\right\}$ and h(n) = {4, 3, 2, 2}.

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SLR-SP – 245

Seat No.	

M.Sc. II (Semester – III) Examination, 2015
(New) (CGPA)
ELECTRONICS
Paper – X : Advanced Digital Systems Design with VHDL

Day and Date : Friday, 17-4-2015 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** and **2** are **compulsory**.*
*2) Attempt **any three** question from Q. No. **3** to **7**.*
*3) Figures to the **right** indicates **full** marks.*

I. A) Choose the correct alternative : **8**

1) Component instantiation statements are _____ statement.
a) Concurrent b) Sequential c) Assertion d) Both (a) and (b)

2) Error management in VHDL is carried out by _____ statement.
a) assignment b) assert c) generate d) none of these

3) PLD is a chip implemented for _____ circuitry.
a) logic b) analog c) virtual d) none of these

4) The operand for the '&' operator is
a) one-dimensional array b) element type
c) multi-dimensional array d) both (a) and (b)

5) The front-end design include _____ level abstraction of design flow.
a) lay-out b) technology c) circuit d) none of these

6) VHDL supports _____ type of design methodologies.
a) top-down b) bottom-up c) mixed d) all of these

7) The most commonly used logic block is a look up table present in
a) CPLD b) FPGA c) SPLD d) all of these

8) Every entity has its _____ architecture.
a) different b) own c) mixed d) entity

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

1) A configuration is used to bind an architecture body to its entity declaration.
2) IN : = X “01 _ 11 _ 00” statement assigns binary value.
3) The expression with syntax of NOR operator is legal.
4) The anti-fuse programming technique is a reprogramming technique.
5) FPGA architecture is more granular as compared to CPLD.
6) In back-end design the physical source is created from logic source.

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

1) Explain the concept of HDL.
2) Discuss component declaration using half-adder.
3) Explain the concept of macro cell

B) Draw the structure of CPLD. **4**

3. A) Explain in detail basic language elements in VHDL. **10**

B) Write a VHDL Code for Full-adder. **4**

4. A) Clarify the PLD in detail. Explain FPGA. **9**

B) Write a VHDL Code for 4 to 1 multiplexer. **5**

5. A) State the various architecture bodies and explain in detail mixed style of body with suitable example. **9**

B) Write a VHDL Code for shift register. **5**

6. A) Explain in detail EDA tools. **9**

B) Write VHDL Code for ALU. **5**

7. A) Discuss in detail packages and libraries. **9**

B) Explain resolution function. **5**

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Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2015
ELECTRONICS (New) (CGPA)
Elective – I, Paper – XI : ARM Microcontroller and System Design

Day and Date : Monday, 20-4-2015 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Attempt **five** questions.*
*2) Question **1** and **2 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) _____ is highest priority exception.

a) FIQ b) IRQ c) Reset d) Abort

2) To improve the code density ARM uses

a) Thumb 16 bit instruction set

b) Jazzale 32 bit instruction set

c) 64 bit instruction set

d) None of these

3) In LPC 2148, when internal reset is removed the processor begins executing at

a) address 0 b) address 1 c) address 5 d) address 7

4) _____ mode is non-privilaged mode.

a) user b) abort c) supervisor d) undefined

5) In LPC 2148, the I^2C bus supports bit rates upto

a) 100 Kbits/s b) 200 Kbits/s c) 300 Kbits/s d) 400 Kbits/s

6) Thumb instruction set executes _____ bit instructions.

a) 8 b) 4 c) 16 d) none of these

P.T.O.

7) ____ are banked registers.

a) $r_{14} – r_{17}$ b) $r_7 – r_{13}$ c) $r_0 – r_7$ d) $r_8 – r_{14}$

8) In RAM processor, register file contains total _____ registers.

a) 20 b) 27 c) 37 d) 40

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

1) All instructions in ARM are conditionally executed.
2) The ARM processors doesn't support byte addressibility.
3) In LPC 2148, I^2C bus is unidirectional.
4) The LPC 2148 contain 3 UART's.
5) ARM core is 64 bit processor.
6) r_{13} register is the stack pointer.

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

1) Describe the pipelining of ARM microcontroller.
2) Write a note on SPSR.
3) Explain modes of ARM microcontroller.

B) Mention the salient features of LPC 2148. **4**

3. A) Describe the ARM core philosophy in detail. **8**

B) Write a note on AMBA bus architecture of ARM microcontroller. **6**

4. A) Explain with suitable block diagram the architecture of LPC 2148. **8**

B) Describe memory organisation of LPC 2148. **6**

5. A) Describe in detail interrupts and exception of ARM microcontroller. **8**

B) State and explain the nomenclature used for ARM microcontroller with example. **6**

6. A) Explain ARM and Thumb ISA in detail. **8**

B) Write a note on different operating modes in ARM. **6**

7. A) Describe the designing of ARM microcontroller based an embedded system to measure temperature. **8**

B) Explain barrel shifter in detail. **6**

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SLR-SP – 247

Seat No.	

M.Sc. – II (Semester – III) Examination, 2015
ELECTRONICS (New) (CGPA)
Elective – I : Paper – XI : CMOS Design Technologies

Day and Date : Monday, 20-4-2015 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

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

1) The voltage at which MOS device begins to conduct called as _____ voltage.

a) Threshold b) Supply
c) Ground d) None of these

2) In D-region P-device is in _____ region.

a) Saturation b) Non-saturation
c) Both a) and b) d) None

3) When channel length (L) of n-device changes then _____ is change.

a) β_n b) β_p
c) β_n / β_p d) both a) and c)

4) In saturated load inverter gate of the p-device connected to _____

a) V_{dd} b) V_{ss}
c) Ground d) Output

P.T.O.

5) In Silicon On Insulator (SOI) _____ is used as substrate.

a) Saphire b) Magnesium aluminate spinel

c) Silicon d) Both a) and b)

6) Dynamic power dissipation is occur due to _____

a) Switching transient current b) Leakage current

c) Both a) and b) d) None of these

7) Time for waveform is rise from 10% to 90% of its steady-state value called as _____

a) Rise time b) Fall time

c) Delay time d) None of these

8) Minimum size of N-well layer is _____

a) 2λ b) 5λ

c) 10λ d) 15λ

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

1) Simulation process produce net list.

2) In region D MOS device acts as an amplifier.

3) Minimum size of via is 5λ .

4) Static power dissipation is occure due to switching transient time.

5) Placement is connection of logic cells.

6) Photo resist material is used as mask in fabrication process.

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

1) Explain latch up.

2) Explain transistor sizing.

3) Explain component level.

B) Write a note on simulation. **4**

3. A) Explain nMOS enhancement transistor. **8**

   B) Explain Noise margin. **6**

4. A) Explain DC characteristics of CMOS inverter. **8**

   B) Explain n-well process. **6**

5. A) Derive pull up to pull down ratio. **8**

   B) Write a note on power dissipation. **6**

6. A) Explain semi-custom design flow. **8**

   B) Derive threshold voltage equation. **6**

7. A) With necessary diagram, explain following design rules : **8**

      a) n-well

      b) Poly

      c) Metal

      d) Via.

   B) Write a note on characteristics of digital electronics design. **6**

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Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2015
ELECTRONICS (New) (CGPA)
Paper – XII : Medical Instrumentation (Elective – II)

Day and Date : Wednesday, 22-4-2015 Total Marks : 70
Time : 3.00 p.m. to 6.00 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 _____ type of electrode is used for EMG measurement.

a) Limb b) Needle

c) Surface d) Floating

2) The cell membrane in excited state impedes the entry of _____ Ions.

a) Na^+ b) Cl^+

c) K^+ d) P^+

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

a) ECG b) EEG

c) EMG d) PCG

4) The _____ mV is the resting potential of the cell.

a) + 20 b) + 90

c) – 90 d) – 20

5) The ultrasonic frequencies utilized for medical instrumentation ranges from _____ Hz.

a) 1 to 15 K b) 1 to 15 M

c) 1 to 15 G d) 1 to 20 G

P.T.O.

6) 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

7) The heart rate is controlled by _____ system and partially by _____ activity.

a) Automatic nervous, harmonic

b) Harmonic, automatic nervous

c) Controlled nervous, harmonic

d) Harmonic, controlled nervous

8) The contact impedance is _____ than the electrical impedance of the body tissue measured beneath the skin.

a) Less b) Greater

c) Equal d) None of these

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

1) Pre-gelled disposable electrodes generally suffers from motion artefacts.

2) X-ray picture is called radiography.

3) The differential amplifier always provides the protection against leakage currents.

4) The body fluid is ionic.

5) The positive potential of the cell membrane during excitation is action potential.

6) The body fluid is slightly alkaline.

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

1) Explain skin contact impedance.

2) Draw neat labeled engineering diagram of cardiovascular system.

3) Write the basics of diagnostic radiology.

B) Explain contact impedance. **4**

3. A) Classify the electrode. Explain the surface electrodes in detail. **9**

   B) Write a note on blood pressure measurement. **5**

4. A) Explain the origin of bio-potential in detail. **9**

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

5. A) Explain in detail microcontroller based ECG recording system. **9**

   B) Explain the source of noise. **5**

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

   B) Explain the architecture of X-ray machine. **5**

7. A) Explain in detail basic recording system. **9**

   B) Write a note on pO_2 electrode. **5**

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Seat No.	

M.Sc. – II (Semester – III) Examination, 2015
ELECTRONICS (New-CGPA)
Paper – XII : Digital Communication (Elective – II)

Day and Date : Wednesday, 22-4-2015 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

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

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

1) In Shannon's channel capacity theorem rate of information is _____ than channel capacity.

a) greater b) less

c) both a) and b) d) none of these

2) Source coding _____ redundancy.

a) decreases b) increases

c) unaffected d) none of these

3) The amplitude level is constant in _____ quantization.

a) Uniform b) Non-uniform

c) Robert d) None of these

4) The important element of digital communication is

a) Signal b) Sampling

c) Encoder d) All of these

P.T.O.

5) PCM modulation is type of _____ modulation.
   a) analog b) digital
   c) phase d) none of these

6) Quantization is process of
   a) Rounding off b) Approximation
   c) Both a) and b) d) None of these

7) Granular noise present in _____ modulation.
   a) Adaptive delta b) Delta
   c) ASK d) FSK

8) In PSK modulation _____ detection method is used.
   a) coherent b) synchronous
   c) non-coherent d) none of these

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

1) Block parity check is error detection technique.
2) The hamming code is error connection method.
3) In discrete channel both input and output are digital.
4) Quantization is nothing but conversion of analog signal into digital signal.
5) DTMF stand for Digital Tone Multi Frequency.
6) The combined effect of sampling and quantization produces the quantized output.

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

1) Write a note on DTMF.
2) Explain parity check error detection technique.
3) Explain power and energy of sampling signals.

B) Write a note on quantization. **4**

3. A) Explain Shannon's channel capacity theorem. **8**

   B) Explain Alpha-Numeric code. **6**

4. A) Explain elements of digital communication system. **8**

   B) Explain in detail pulse code modulation. **6**

5. A) What is meant by Hamming Code ? Explain its structure and correct the error for 1110101. **8**

   B) Explain FSK modem. **6**

6. A) Explain in detail Satellite communication. **8**

   B) Explain delta modulation. **6**

7. A) Explain in detail pulse code modulation. **8**

   B) Write a note on Repeater used in digital communication. **6**

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Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2015
ELECTRONICS (New) (CGPA)
Elective – II : Paper – XII : CMOS Analog Circuit Design

Day and Date : Wednesday, 22-4-2015 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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.*

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

1) In MOS transistor, the substrate should _____ grounded.
   a) Strongly b) Weak
   c) Moderately d) None of these

2) In case of class-A CMOS Amplifier PMOS is used as _____ Load.
   a) Passive b) Active c) Pull down d) None of these

3) For current amplification which of the following CMOS Amplifier can be used
   a) Source follower b) Class-A
   c) Push-Pull CS Amplifier d) None of these

4) The gain of switched capacitor inverting amplifier is given by A =
   a) Ci $*$ CF b) CF/Ci c) Ci/CF d) CF^2

5) The SiO_2 layer deposited at the Gate of MOS transistor forms _____
   a) Depletion layer b) Conductive layer
   c) Barrier potential d) None of these

6) If source and the bulk both are connected to ground, then small signal output resistance is given by _____

   a) $R = \lambda / ID$ b) $R = \lambda \cdot ID$ c) $R = \frac{1}{\lambda \cdot ID}$ d) $\frac{ID}{\lambda}$

7) If two PMOS transistor are powered with same supply and gates of both PMOS are connected to one drain, then the circuit will be _____
   a) Current source b) Current sink
   c) Current mirror d) None of these

8) When the gate voltage reaches to threshold voltage, then substrate under neath of the gate becomes _____
   a) Potential hill b) Potential well
   c) Inverted d) Saturated

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

1) The NMOS transistors acts as current sink, when gate potential is $V_{DD}/2$.
2) For switched capacitor circuit the clocks ϕ_1 and ϕ_2 should be out of phase.
3) The parasitic resistor exhibit fringing effect.
4) For NMOS transistor of CMOS amplifier acts as active load.
5) Output CMOS amplifiers are typically designed for resistive as well as capacitive load.
6) BiCMOS transistor is suitable for low frequency applications.

2. A) Attempt **any two** of the following. **10**
   1) Describe switched capacitor summing amplifier.
   2) Write a note on class-A CMOS Amplifier.
   3) What do you mean by CMOS capacitance ?

   B) Write a note on NMOS transistor as a switch. **4**

3. A) Describe single stage CMOS amplifier and explain large signal model. **8**
   B) Write a note on band gap as reference source. **6**

4. A) Describe basic principle of switching capacitor. With suitable diagram explain switched capacitor integrator circuit. **8**
   B) Write a note on MOS diode. **6**

5. A) With suitable block diagram describe single stage CMOS operational amplifier. **8**
   B) Write a note on current mirror circuit. **6**

6. A) Describe indetail CMOS differential amplifier. **8**
   B) Write a note on BiCMOS transistor. **6**

7. A) Describe the effect of phase and frequency on performance of switched capacitor circuit. **8**
   B) Describe the current mechanism in NMOS transistor. **6**

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Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2015
ELECTRONICS (Old)
Paper – IX : Digital Signal Processing

Day and Date : Wednesday, 15-4-2015 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

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

1. a) Choose the correct answer. **8**

1) The ROC statement for causal sequence is
   a) Entire z-plane except $|z| = \infty$
   b) Entire z-plane except $|z| = 0$
   c) Entire z-plane except $|z| = 0$ and $|z| = \infty$
   d) None of these

2) Energy of power signal is
   a) Finite b) Infinite c) Zero d) 1

3) z-transform of delayed unit impulse, $\delta(n - k)$ =
   a) z^{-k} b) z^{k} c) 1 d) n-$\delta(n)$

4) To find the inverse z-transform _____ is one of the method.
   a) Residue method b) Convolution
   c) Windowing method d) Impulse invariance method

5) A plot of imaginary part verseus real part is called as
   a) Complex z-plane b) Real z-plane
   c) Convolution d) None

6) The difference between the instantaneous value of the quantized signal and input is called
   a) Quantization error b) Quantization noise
   c) Both a) and b) d) None of these

P.T.O.

7) The signal x(t) is said to be an odd signal if it statisfies the condition
   a) x(– t) = – x(t) b) x(– t) = x(t)
   c) x(t) = – x(t) d) n = 0

8) The amplitude of unit impulse function is 1 at
   a) n = 0 b) n = 1 c) n < = 0 d) n > = 0

b) Fill in the blank. **6**

1) Recovery of CT signal is possible from the sampled data by the process of [modulation, interpolation]

2) The z-transform for the DT sequence x(n) = u(n) is

$$\left[1/z-1, \frac{z}{z-1} \right]$$

3) The ROC of right hand exponential sequence is _____ part of circle having radius α.
[exterior, interior]

4) Dynamic system are with
[memory, memory less]

5) A signal which cannot be described by any mathematical expression is called as _____ signal.
[random, detministic]

6) T [x(n)] = $e^{x(n)}$ is _____ system.
[linear, non linear]

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

1) A system is time invariant if its input-output characteristics do not change with time.

2) Causal FIR system is recursive system.

3) An initialy relaxed system is BIBO stable if and only if every bounded input produces unbounded output.

4) If sampling frequency fs is less than w then an error called aliasing error.

5) In bilateral z-transform the summation is carried out from $-\infty$ to ∞.

6) A fourier transform is calculated only discrete points then it is called as DFT.

2. Attempt **any four**. **20**

1) Explain 2-transformer and ROC.

2) What is an FIR filter ? Compare an FIR filter with an IIR filter.

3) Write a note on standard test signal.

4) Write a note on sampling.

5) Obtain z-transform of $x(n) = a^n u(n)$ using scaling property.

3. a) What is relation between DFT and z-transform ? Explain what is convolution ? **10**

b) Obtain the linear convolution of two sequences defined as **10**

$x(n) = u(n) - u(n-3)$

$h(n) = u(n-1) + u(n-2) - u(n-4) - u(n-5)$

using circular convolution.

4. a) Develop parallel form realization for the digital filter with transfer function **10**

$$H(z) = \frac{1 + 2z^{-1} + z^{-2}}{1 - 0.75z^{-1} + 0.125z^{-2}}$$

b) Determine IZT of the following : **10**

$$x(z) = \frac{1 - \frac{1}{2}z^{-1}}{1 + \frac{3}{4}z^{-1} + \frac{1}{8}z^{-2}}, \quad |z| > \frac{1}{2}.$$

5. a) State different properties of z-transform and explain any two in detail. **10**

b) Obtain linear convolution of following sequence using z-transform.

$x_1(n) = \{1, 2, \underset{\uparrow}{3}, 4\}$ and $x_2(n) = \{1, 2, \underset{\uparrow}{0}, 2, 1\}$ **10**

6. a) Explain how to represent discrete time system via difference equation. Also explain properties of discrete time system. **10**

   b) What is overlap save method of fast convolution ? **10**

7. a) Determine the z-transform of following equation : **10**

      i) $x_1(n) = \{2, 1, 3, 4, 0\}$

      ii) $x_2(n) = \{2, \underset{\uparrow}{1}, 2, 1, 0, 1\}$

   b) Determine whether the following systems are linear or not : **10**

      i) $y(n) = nx(n)$

      ii) $y(n) = \cos x(n)$.

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Seat No.	

M.Sc. – II (Semester – III) Examination, 2015
ELECTRONICS (Old)
Paper – X : Advanced Digital Systems Design with VHDL

Day and Date : Friday, 17-4-2015 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

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

1) The _____ are the EOA tools for back-end design process.
   a) Programming tools b) Implementation tools
   c) Physical verification d) All of these

2) Error management in VHDL is carried out by _____ statement.
   a) Generate b) Assert
   c) Assignment d) All of these

3) The '&' operator is called _____ operator.
   a) addition b) multiplication
   c) concatenation d) both a) and b)

4) Every entity has its _____ architecture.
   a) mixed b) own c) different d) none of these

5) The test bench is used for _____ of design.
   a) net-list b) verification
   c) programming d) none of above

6) The _____ statement is used to iterate through a set of sequential statements.
   a) wait b) null c) loop d) if-then

7) The _____ assignment operator is used to assign a value to a constant.

a) < = b) : = c) => d) all of these

8) Component instantiation statements are _____ statements.

a) assertion b) sequential c) concurrent d) none of above

B) Fill in the blanks : **6**

1) Simulation is a _____ way of emulating the behaviour of a circuit.

(logical/mathematical)

2) The statement 'wait for O ns;' means to wait for _____ delta cycle.

(one / zero)

3) The 16 # A # F 5 represents _____

($10 * 16^5$ / 10 * 16 * 5)

4) The Exit and next statement are used only _____ a loop.

(outside / inside)

5) The content of package STD _ LOGIC _ 1164 are accessed by using _____ and use clauses.

(library / type)

6) The generate statement is _____ statement.

(sequential / concurrent)

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

1) The character literals are always written between single quotes.

2) The operators NAND and NOR are associative.

3) The process statement is itself a sequential statement.

4) The wait statement provides an alternate way to suspend the execution of a process.

5) The statement IN : = B "01 – BO" assigns binary value.

6) Items declared in a package declaration are accessed by other design units by using the use and literary clauses.

2. Solve **any four** : **20**

   1) State the advantages of VHDL.

   2) Explain syntax of process statement.

   3) Explain logical operators is in VHDL.

   4) Explain component declaration with OR gate.

   5) Write the VHDL code for Half Adder.

3. A) Explain in detail basic language element of VHDL. **12**

   B) Write the VHDL code for 8 to 1 mux. **8**

4. A) Discuss in detail packages and literaries. **12**

   B) Write the VHDL code for 4-bit shift register. **8**

5. A) Discuss the various types of architecture bodies and explain 4 to 2 encoder for structural style of modeling. **12**

   B) Write the VHDL code for ALU. **8**

6. A) Write a note on : **12**

      1) Entity

      2) Architecture.

   B) Write the VHDL code for 7-seg display. **8**

7. A) Explain in detail structural layout and generies. **12**

   B) Write the VHDL code for 4-bit counter. **8**

SLR-SP – 253

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2015
(Elective – I) ELECTRONICS (Paper – XI) (Old)
Advanced Microcontroller Based System Design

Day and Date: Monday, 20-4-2015 Total. Marks: 100
Time: 3.00 p.m. to 6.00 p.m.

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

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

1) PIE1 Resistor used to Enable _____
   a) Interrupt b) WDT c) USART d) ADC

2) To shield cable to prevent Electromagnetic effect we use _____ coating on cable.
   a) soft iron b) ferromagnetic material
   c) plastic d) both a and b

3) _____ gives frequency as output signal.
   a) Optocoupler b) Tachometer
   c) Thermocouple d) RTD

4) Reset circuit of PIC consist of _____
   a) Diode, Resistor, Capacitor b) Switch, Capacitor
   c) Switch, Diode d) Switch, Diode, Capacitor, Resistor

5) In current to voltage conversion input voltage (V_{in}) and R_i replaced by _____
   a) current b) voltage c) V_{in} d) V_{out}

P.T.O.

6) Sleep and powerdown mode use to _____

a) reset μc b) turn of μc c) save power d) none of these

7) PIC has program memory 8 kbyte with _____ bit wide.

a) 10 b) 16 c) 14 d) 12

8) Postscaler is used to scale the _____

a) output b) clock source c) both a and b d) input

B) Fill in the blanks. **6**

1) ADC of AVR have _____ input channels (8/10)

2) To send data on smart LCD, which is connected to micro-controller, the En pin of LCD made _____ (high to low/low to high)

3) Coupler are use to _____ two devices. (connect/isolate)

4) Ro from AVR resistor file used for _____ memory. (load program/ load data)

5) Power on reset of AVR is _____ (Active high/Active low)

6) Port E is _____ (3 bit/4 bit)

C) Say **true** or **false**. **6**

1) Read relay is filled with nitrogen gas.

2) Optocoupler is used for isolation high voltage and low voltage devices.

3) Timer 0 of AVR is 16 bit.

4) Timer 1 of PIC is 16 bit.

5) PCON Resistor used to save power.

6) Global Interrupt Enable (GIE) bit of PIC micro-controller consist in status Resistor.

2. Attempt **any four**. **20**

   1) Explain Internal ADC of AVR.

   2) Explain need of isolation.

   3) Write note on timer 0 of PIC 16F877.

   4) Convert voltage into current.

   5) Explain the internal WDT of AVR.

3. A) Write note on 4 to 20 mA current loop and I to V conversion. **12**

   B) Write a program to on-off LED's which are connected to port E, draw circuit diagram for PIC 16F877. **8**

4. a) Draw minimum hardware module for AVR and explain block diagram of micro-controller based system. **10**

   b) Explain timer 2, also explain PWM technique using timer 2. **10**

5. a) Draw neat labeled diagram of clock and reset circuit. Explain it in detail of AVR. **10**

   b) Write note on timer 1 of pic 16F877. **10**

6. a) Write note on types of optocoupler, explain in brief. **10**

   b) Draw and explain architecture of PIC 16F877. **10**

7. a) Write note on V to F convertion. **10**

   b) Explain in brief electromagnetic shielding and grounding **10**

SLR-SP – 253

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2015
(Elective – I) ELECTRONICS (Paper – XI) (Old)
Advanced Microcontroller Based System Design

Day and Date: Monday, 20-4-2015 Total. Marks: 100
Time: 3.00 p.m. to 6.00 p.m.

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

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

1) PIE1 Resistor used to Enable _____
   a) Interrupt b) WDT c) USART d) ADC

2) To shield cable to prevent Electromagnetic effect we use _____ coating on cable.
   a) soft iron b) ferromagnetic material
   c) plastic d) both a and b

3) _____ gives frequency as output signal.
   a) Optocoupler b) Tachometer
   c) Thermocouple d) RTD

4) Reset circuit of PIC consist of _____
   a) Diode, Resistor, Capacitor b) Switch, Capacitor
   c) Switch, Diode d) Switch, Diode, Capacitor, Resistor

5) In current to voltage conversion input voltage (V_{in}) and R_i replaced by _____
   a) current b) voltage c) V_{in} d) V_{out}

P.T.O.

6) Sleep and powerdown mode use to _____

a) reset μc b) turn of μc c) save power d) none of these

7) PIC has program memory 8 kbyte with _____ bit wide.

a) 10 b) 16 c) 14 d) 12

8) Postscaler is used to scale the _____

a) output b) clock source c) both a and b d) input

B) Fill in the blanks. **6**

1) ADC of AVR have _____ input channels (8/10)

2) To send data on smart LCD, which is connected to micro-controller, the En pin of LCD made _____ (high to low/low to high)

3) Coupler are use to _____ two devices. (connect/isolate)

4) Ro from AVR resistor file used for _____ memory. (load program/ load data)

5) Power on reset of AVR is _____ (Active high/Active low)

6) Port E is _____ (3 bit/4 bit)

C) Say **true** or **false**. **6**

1) Read relay is filled with nitrogen gas.

2) Optocoupler is used for isolation high voltage and low voltage devices.

3) Timer 0 of AVR is 16 bit.

4) Timer 1 of PIC is 16 bit.

5) PCON Resistor used to save power.

6) Global Interrupt Enable (GIE) bit of PIC micro-controller consist in status Resistor.

2. Attempt **any four**. **20**

   1) Explain Internal ADC of AVR.

   2) Explain need of isolation.

   3) Write note on timer 0 of PIC 16F877.

   4) Convert voltage into current.

   5) Explain the internal WDT of AVR.

3. A) Write note on 4 to 20 mA current loop and I to V conversion. **12**

   B) Write a program to on-off LED's which are connected to port E, draw circuit diagram for PIC 16F877. **8**

4. a) Draw minimum hardware module for AVR and explain block diagram of micro-controller based system. **10**

   b) Explain timer 2, also explain PWM technique using timer 2. **10**

5. a) Draw neat labeled diagram of clock and reset circuit. Explain it in detail of AVR. **10**

   b) Write note on timer 1 of pic 16F877. **10**

6. a) Write note on types of optocoupler, explain in brief. **10**

   b) Draw and explain architecture of PIC 16F877. **10**

7. a) Write note on V to F convertion. **10**

   b) Explain in brief electromagnetic shielding and grounding **10**

SLR-SP – 254

Seat No.	

M.Sc. – II (Semester – III) Examination, 2015
ELECTRONICS (Old)
Paper – XI : Elective – I : Digital Communication

Day and Date : Monday, 20-4-2015 Max. Marks : 100
Time : 3.00 p.m. to 6.00 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 correct alternative : **8**

1) In communication the sampling technique improver the _____
   a) high efficiency b) cheaper equipments
   c) high speed communication d) all of these

2) The earth station receivers common up-down converter has _____ IF.
   a) 50 MHz b) 100 MHz
   c) 70 MHz d) 120 MHz

3) In Shannon capacity theorem if _____ then transmission may be accomplished without error in present of noise.
   a) $C > R^2$ b) $R << C$
   c) $C < R$ d) $C < R^2$

4) The _____ is the analog modulation technique.
   a) PWM b) PCM c) ADM d) DM

5) In line coding AMI is subcoding of _____ method.
   a) bipolar b) unipolar c) polar d) biphase

6) The quantization error is function of _____
   a) signal amplitude b) intervals between levels
   c) signal phase d) signal frequency

7) ISDN user which of cable _____

a) Coaxial b) Fiber optic

c) Twisted pair d) Speaker

8) Which of the following type of HPA is not used in earth station _____

a) TWT b) Magnetron

c) Klystron d) Transistor

B) Fill in the blanks : **6**

1) The form of modulation used in ADSL is _____
(QAM/PSK)

2) Bandwidth of ASK is _____ than FSK.
(less/higher)

3) The _____ is the one way communication system.
(simplex/duplex)

4) The ADSL user _____ type of multiplexing.
(FDM/TDM)

5) In modem the space signal is represented by _____ frequency.
(1070 Hz/1225 Hz)

6) The centre of gravity of earth is called _____
(geocentre/geostation)

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

1) The highest distance point from the earth is called apogee.

2) Digitization is process of rounding of signal to particular desired standard level.

3) Asynchronous transmission is farter than synchronous transmission.

4) The modulation technique is used as encoding data only when analog signal.

5) With QAM a 56 kbps signal can be transmitted within a 3kHz bandwidth.

6) The hamming code is error detection method.

2. Answer **any four** : **20**
   1) Describe block diagram of modem.
   2) Explain digital reception in ADM.
   3) Explain sampling theorem.
   4) Explain any two line coding technique.
   5) Explain the structure of DTMF.

3. A) Explain block diagram of digital communication. **10**
   B) What is hamming code ? Explain its structure and correct the error for 10110010 code. **10**

4. A) Explain in detail satellite station. **10**
   B) Explain in detail ADM transmission system and how it is differs from DM. **10**

5. A) What is analog and digital base band transmission ? Explain PWM and PSK. **12**
   B) Explain error correction method. **8**

6. A) Explain in detail ISDN. **12**
   B) What is digital communication technique and explain FSK technique. **8**

7. A) What is quantization ? Explain uniform quantization. **10**
   B) Explain in detail signals in digital communication. **10**

SLR-SP – 256

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2015
ELECTRONICS (Old)
(Elective – II) Paper – XII : Medical Instrumentation

Day and Date : Wednesday, 22-4-2015 Total Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

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

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

1) The recording of electrical activity associated with the functioning of heart is known as
   a) ECG b) EMG
   c) EEG d) EOG

2) Typical EMG signal ranges from
   a) .01-0.5 mV b) 0.1-0.5 mV
   c) 0.1-0.5 V d) None

3) The most commonly used electrodes in patient monitoring are
   a) SCALP electrode
   b) Needle electrode
   c) Skin Electrode
   d) Contact Electrode

4) Typical thermodynamic pressure for arterials system is
   a) 30-300 mmHg b) 5-15 mmHg
   c) 6-25 mmHg d) None of the above

5) The isolation amplifiers are optimized for signal frequencies in range of
   a) 0.05-100 Hz b) DC-1 KHz c) 1 KHz-10 KHz d) None

6) T wave represents
   a) Repolarization of both ventricular
   b) Time which an impulse leaving the SA node
   c) Time taken by heart impulse to travel through inter ventricular system
   d) None of the above

7) The normal rate of heart at rest
   a) 72 beats/min
   b) 68 beats/min
   c) 82 beats/min
   d) 100 beats/min

8) The X-ray picture is called
   a) Electroencephalogram
   b) Radiograph
   c) Electrocardiogram
   d) None

b) Fill in the blanks : **6**

1) The most commonly used electrodes for ECG recording are the chloride silver having approximately diameter of _____ mm.
   [6-8, 10-12]
2) A _____ diameter silver cathode constitutes a pO_2 measuring electrode.
   [14 mm, 24 mm]
3) The spectral analysis transforms the analog EEG signal recorded on _____into a signal displayed on frequency axis. [Time axis, Volt axis]
4) Isolation amplifiers are commonly used for providing protection against _____ current. [Leakage, Excess]
5) Resistance of _____ shows a fall with increase in temperature.
   [Thermister, posisters]
6) The X-rays in medical diagnostic region have wavelength of the order of _____ m and they propagate with a speed of 3×10^{10} cm/s.
   [10^{-12}, 10^{-10}]

c) State **True** or **False**. **6**

1) Skin electrode is of a value much greater than the electrode impedance of body tissue as measured beneath the skin.
2) Human cells have a typical membrane thickness of 0.02 mm.
3) Manganese, cobalt and nickel have a large positive temperature coefficient of resistance.
4) X-rays are at high wavelength end of electromagnetic spectrum.
5) EMG is usually recorded by using surface electrodes or needle electrodes which are directly inserted into body.
6) Limb electrodes are generally made of German silver.

2. Attempt **any four** : **20**

   1) Why proper grounding is required ? Explain the term ground loop with necessary diagrams.

   2) List electrodes for ECG, EEG and EMG. Explain any one in detail.

   3) Write a note on X-ray imaging.

   4) Explain how to measure pH of blood.

   5) Write a short note on measurement of bio potentials.

3. a) With basic principle and block diagram explain computerized analysis of ECG. **20**

   b) Explain concept of blood pressure and technique for measurement of BP.

4. a) With proper block diagram explain complete blood gas analyzer in detail. **20**

   b) Write a note on blood oxygen sensor.

5. a) What is ECG ? Explain with basic principle of ECG, an isolation preamplifier used in modern ECG machines. **20**

   b) Describe the architecture of MRI system.

6. a) With basic principle and block diagram explain EMG in detail. **20**

   b) What is concept of electric impedance ? Explain impedance bridge circuit in detail.

7. a) Using Nernst equation explain how to find the potential of a cell membrane. Explain any one type of potentiometric sensors. **20**

   b) With neat circuit diagram explain instrumentation amplifier.

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SLR-SP – 258

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2015
(Elective – II) ELECTRONICS (Old)
Paper – XII : Computer Aids for VLSI Design

Day and Date : Wednesday, 22-4-2015 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Answer* ***five*** *questions.*
2) Questions ***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) In computer aided VLSI design _____ characteristics should be considered.

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

2) The cell that does not contain an instance in any other cell is at the top level of hierarchy is called _____

a) leaf cell b) root cell

c) composition cell d) none of these

3) _____ is the behavioural level design environment.

a) Microwind b) Xilinx c) Proteuos d) None of these

4) In stick diagram, the diffusion layer is of _____ colour.

a) Red b) Green c) Yellow d) Blue

5) In computer aided VLSI design, the view is nothing but aggregation of small units called _____

a) Cell b) Blocks c) Bus d) Switches

6) The FPGA consist of combination of _____

a) IOB b) CLB c) Cell d) None of these

P.T.O.

7) In temporal view _____ is used as input vectors.
   a) clock pulse b) current
   c) raster scan d) none of these

8) Following tool is used for static analysis
   a) Timing diagram b) Routing
   c) GRC d) None of these

B) Fill in the blanks : **6**

1) To express the behavioural view, the design consist of _____ language.
   (Description, Assembly)
2) The process of drawing a schematic of the circuit is called _____
   (Schematic Capture, Algorithmic Capture)
3) When routing is done on four sides of a rectangular area, then the router is called _____
   (Switch, Switch box)
4) _____ is the process of positioning the cells.
   (Placement, Routing)
5) Integrated circuits are manufactured on large disk of silicon, called _____
   (wafer, boat)
6) Every objects in the VLSI device are associated with _____
   (attributes, abstraction)

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

1) A Group of about 40 wafers is called boat load.
2) The FPGA based design is semicustom design.
3) The microwind design tool is based on component level design.
4) Geometrical rule checking is based on power consumption.
5) The PLA consist of CLB.
6) Behavioural is the first stage of VLSI design.

2. Answer **any four** of the following : **20**
   1) Write a short note on structural view.
   2) What do you mean by programmable gate array ?
   3) Write a note on design flow.
   4) Describe the term behavioural level simulation.
   5) Write a note on placement and routing.

3. a) What do you mean by synthesis tools ? Describe cell contents generation and manipulation. **12**
   b) With labelled diagram describe the architecture of the FPGA. **8**

4. a) What do you mean by dynamic analysis ? Explain logic level analysis in detail. **12**
   b) Write a note on temporal views. **8**

5. a) What do you mean by representation ? Describe the general issues of representation. **12**
   b) Mention the names of various layers used to design stick diagram of nmos circuit. **8**

6. a) What do you mean by VLSI design ? Discuss the characteristics of VLSI design. **12**
   b) Write a note on branching factor. **8**

7. a) What do you mean by hierarchy ? Describe in detail the geometrical design rule checking. **12**
   b) Describe in brief the issues of connectivity. **8**

SLR-SP – 259

Seat No.	

M.Sc. (Part – II) (Semester – IV) Examination, 2015
ELECTRONICS (New) (CGPA)
Paper – XIII : Microwave Devices, Antennas and Measurements

Day and Date : Thursday, 16-4-2015 Total Marks : 70
Time : 3.00 p.m. to 6.00 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) _____ band is the IEEE microwave frequency band designation for frequency range 4.000 GHz to 8.000 GHz.

A) L B) S C) C D) X

2) A circularly polarized wave has _____ dB ellipticity since $E_{max} = E_{min}$.

A) 0 B) 20 C) 30 D) 10

3) The distance between two successive minima on standing-wave pattern in lossless line is _____

A) $\lambda/4$ B) λ C) 2λ D) $\lambda/2$

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

A) short circuit B) its characteristic

C) any D) lowest

5) TEDs _____

A) operate with either junctions or gates

B) are bulk devices having no junctions or gates

C) are fabricated from compound semiconductors

D) both B) and C)

P.T.O.

6) Well-designed directional couplers have a directivity of _____

A) 1 B) zero

C) only 30-35 dB D) infinity

7) If a rectangular waveguide carrying a dominant mode is flared out in the plane of magnetic field lines, it is called an _____ horn.

A) E-plane sectoral B) H-plane sectoral

C) Pyramidal D) Pyramidal exponential

8) Bolometer or the detector sensitivity is _____

A) a measure of bridge unbalance

B) slope of the static curve of dc resistance plotted against power for the detector

C) usually expressed in ohms pre milliwatt

D) both B) and C)

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

1) In TEM wave electric and magnetic fields are perpendicular to each other and both lie in a plane transverse to the direction of propagation.

2) For lossless transmission line, $R = G = \infty$.

3) The dominant mode in a particular guide is the mode having the lowest cutoff wavelength.

4) Slow-wave structures are special circuits that are used in microwave tubes to reduce the wave velocity in a certain direction.

5) In Cassegrain antenna system the main dish is paraboloid while the subdish is hyperboloid.

6) In waveguide thermistor mount, the thermistor is usually placed near the side wall of the waveguide where the electric field is minimum.

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

1) Explain briefly the classification of magnetrons.

2) Explain the method of excitation of TE_{10} mode in rectangular waveguide.

3) Explain the double minimum method of measurement of VSWR.

B) Explain the effect of dc bias on the current sensitivity of the crystal rectifier. **4**

3. a) Discuss the transmission and reflection of electromagnetic wave at the boundary between to ideal dielectrics for oblique incidence. **8**

   b) Explain the displacement current concept. **6**

4. a) What do you understand by standing wave and standing-wave ratio ? Explain briefly the relationship between reflection coefficient and standing-wave ratio. **8**

   b) A transmission line has a characteristic impedance of $50 + j0.05\ \Omega$ and is terminated in a load impedance of $75 - j10.25\ \Omega$. Calculate the reflection coefficient and the standing wave ratio. **6**

5. a) Draw a schematic diagram of a reflex klystron. Explain the process of velocity modulation in this tube. **8**

   b) Explain the three-valley-model energy level for InP diode. **6**

6. a) With a schematic diagram explain the characteristics of magic tee. **8**

   b) An air-filled rectangular waveguide of inside dimensions 2.286×1.016 cm operates in the dominant mode. Find the cutoff frequency. Determine the phase velocity of the wave in the guide at a frequency of 9.0 GHz. **6**

7. a) With schematic diagrams, explain briefly the probes which are extensively used in the standing-wave detector. **8**

   b) Explain various types of feed arrangements for microstrip patch antenna. **6**

SLR-SP – 260

Seat No.	

M.Sc. (Part – II) (Semester – IV) Examination, 2015
ELECTRONICS (New-CGPA)
(Networking and Data Communication) (Paper – XIV)

Day and Date : Saturday, 18-4-2015 Max. Marks : 70

Time : 3.00 p.m. to 6.00 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 IEEE 802.11 specifications covers the _____ layers.

a) Physical b) Data Link c) Network d) Both a) and b)

2) The L2CAP provides

a) Multiplexing b) Segmentation and reassembly

c) QoS d) All of these

3) In _____ line encoding technique the transition at the middle of the bit is used for synchronization.

a) Manchester b) Differential Manchester

c) Both a) and b) d) None of these

4) The _____ channels of ADSL are used for downstream data and control.

a) 225 b) 5 c) 25 d) 1

5) The Bluetooth technology has _____ number of channels of _____ Hz bandwidth each.

a) 79, 4K b) 79, 1M c) 256, 1M d) 256, 4K

P.T.O.

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 jitter refers to the variation in the packet arrival time.
2) The 10Base2 is a thick used for thick Ethernet.
3) The BSS with an AP is called an infrastructured network.
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 transmission impairment.
   2) Write a note on unguided transmission media.
   3) Explain DNS in the internet.

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

3. A) Explain in detail OSI model. **9**
   B) Write a note on virtual switched network. **5**

4. A) Explain in detail DSL. **9**
   B) Write a note on congestion control. **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 connection devices. **5**

_____

Seat No.	

SLR-SP – 261

M.Sc. – II (Sem. – IV) Examination, 2015
ELECTRONICS (New) (CGPA)
Paper – XV : Nanoelectronics (Elective – III)

Day and Date : Tuesday, 21-4-2015 Max. Marks : 70
Time : 3.00 p.m. to 6.00 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** indicate **full** marks.*

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

1) The molecular beam epitaxy technique is important particularly in forming _____ dimensional electron gases.

a) 3 b) 2 c) 1 d) none of these

2) The homostructures are made from the same material with _____ doping.

a) non-uniform
b) uniform
c) non-uniform as well as uniform
d) none of these

3) The _____ dimensional electron gas is quantum well.

a) one b)two c) three d) none of these

4) The concept of SET is based on the behaviour of _____ dimensional nanometric structures.

a) 3 b) 2 c) 1 d) none of these

5) The _____ are organic semiconductors.

a) low-molecular weight materials
b) polymers
c) both a) and b)
d) none of these

P.T.O.

6) The barrier height of a potential square well for holes is _____ and for electrons is

a) 0.2 eV, 0.4 eV b) 0.4 eV, 0.2 eV

c) 1.4 eV, 0.4 eV d) 0.2 eV, 1.4 eV

7) The heterojunctions are based on _____ compounds.

a) III – V b) IV – V

c) III – IV d) all of these

8) The OLED does not requires a ____

a) backlight b) filter

c) both backlight and filter d) none of these

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

1) The quantum wire is effectively two dimensional system.

2) The electron energies in the quantum well obtained for infinite well and finite well are do not differ too much.

3) The Si Ge heterojunctions have minimum lattice constant difference between Si and Ge.

4) The Multiple Quantum Wells (MQW) are formed by several single quantum well.

5) OLEO's is an electroluminescent organic material between two conductors of different work functions.

6) The transistor based on hot electrons is called hot electron transistor.

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

1) Explain the limitations of conventional microelectronics.

2) Explain the multiple quantum well.

3) Explain the concept of superlattice.

B) Write a note on organic semiconductor. **4**

3. A) Explain in detail fabrication methods of nano materials. **8**

B) Explain square quantum well of the finite depth. **6**

4. A) Explain in detail basic properties of 2-dimensional semiconductor nanostructures. **8**

   B) Write a note on modulation doped quantum well. **6**

5. A) Explain in detail Coulomb Blockade. **8**

   B) Explain the energy bands in organic semiconductor. **6**

6. A) Explain in detail resonant tunnel effect. **8**

   B) Write a note on quantum dots. **6**

7. A) Explain in detail parabolic and triangular quantum well. **8**

   B) Write a short note on single electron transistor. **6**

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SLR-SP – 262

Seat No.	

M.Sc. (Part – II) (Semester – IV) (New) Examination, 2015
ELECTRONICS (CGPA) (Elective – III)
Paper – XV : Optical Fiber Communication

Day and Date : Tuesday, 21-4-2015 Max.Marks : 70

Time : 3.00 p.m. to 6.00 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 alternatives : **8**

1) In case of stimulated emission, the emitted light depicts

a) Deviation in the frequency

b) Deviation in amplitude

c) Matching of frequency with injected light

d) None of these

2) _____ is used as front-end amplifier for an optical receiver.

a) Pre-amplifier b) Post amplifier

c) In-line amplifier d) SOA

3) The critical angle of incidence is given by φ_c =

a) $\frac{n_2}{n_1}$ b) $\sin \frac{n_2}{n_1}$

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

4) In _____ optical fiber the refractive index changes gradually.

a) Step index b) Graded index

c) Multi core d) Multi mode step index

P.T.O.

5) The photodiode detectors are always

a) Forward biased b) Reverse biased

c) Unbiased d) None of these

6) _____ material is normally used for DFA.

a) Er b) Cu

c) SiO_2 d) Al

7) A Raman amplifier is based on _____ called stimulated Raman scattering.

a) Linear electro-optic effect b) Kerr's effect

c) Non-linear effect d) Faradays effect

8) Which of the following is suitable for increase in the channel capacity ?

a) PCM b) WDM

c) ASK d) FSK

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

1) Power amplifier is nothing but the booster amplifier.

2) For optical amplifiers the doping of rare earth element is most suitable.

3) The WDM system is most suitable for narrow band communication.

4) Numerical aperture is the measure of light collecting ability of the fiber.

5) Total internal refraction is the basic principle of optical communication.

6) In case of optical amplifiers the population inversion is obtained by external pumping.

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

1) Discuss the basic principle of optical receiver.

2) Write a note on optical spectral band.

3) Discuss the sources of error during optical fiber communication.

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

3. A) What do you mean by step and graded index optical fiber ? With suitable block diagram, describe optical receiver system. **10**

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

4. A) Discuss the basic principle of optical amplifier. With suitable diagram explain an architecture of EDFA. **10**

   B) What is optical dispersion ? **4**

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

   B) Write a note on optical transmitter. **4**

6. A) What do you mean by WDM ? Describe the components of WDM. **10**

   B) Discuss the advantages of dense WDM. **4**

7. A) What do you mean by performance measurement parameters ? Describe the methods of power and attenuation measurement. **10**

   B) Write a note on polarization of light. **4**

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SLR-SP – 263

Seat No.	

M.Sc. – II (Semester – IV) Examination, 2015
ELECTRONICS (New CGPA) (Elective – IV) (Paper – XVI)
Mechatronics and Industrial Automation

Day and Date : Thursday, 23-4-2015 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions** : 1) Q. **1** and Q. **2** are **compulsory.
*2) Solve **any three** from Q. **3** to Q. **7**.*
*3) Figure to the **right** indicates **full** marks.*
*4) **Draw** necessary diagram.*

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

1) The PLC _____ function is also called as DRUM controller.
   a) Sequencer b) Master control
   c) Timer d) Counter

2) Normally _____ contact : When this contact closes, the function carried out some kind of action.
   a) Open b) Close
   c) Both a) and b) d) None of these

3) In subtraction, when the result is _____ , the coil turns ON.
   a) Positive b) Negative
   c) One d) Zero

4) Most of PLCs operates on _____
   a) + 5, – 5 b) + 5, Gnd
   c) + 5, – 5 and GND d) +5, GND

5) Modular design is one of the advantage of _____
   a) CCS b) DCS
   c) RTU d) PLC

6) _____ is stands for output group register.
   a) OG b) IG
   c) HR d) RTU

P.T.O.

7) A single input timer is called a _____ timer.
   a) Retentive b) Nonretentive
   c) Both a) and b) d) None of these
8) In general PLC have _____ number of input and outputs.
   a) Same b) Different
   c) Only b) d) None of these

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

1) MMI stands for man machin interface.
2) 00 : 01 : : 02 is addressing format of PLC.
3) Output of output logic of I/O module is connected to the CPU.
4) HR stands for Input Register.
5) A node is a connection point for two or more devices.
6) RTU stands for Remote Temperature Unit.

2. A) Solve **any two** : **10**
   1) Write note on DCS communication.
   2) Explain applications of mechatronic system.
   3) Write note on PLC processor.

   B) Compare monolithic and Distributed SCADA system. **4**

3. A) Explain arithmetic functions of PLC in detail. **8**

   B) Explain design process of mechatronic system. **6**

4. A) Write note on architecture of PLC. **8**

   B) Explain PLC selection in detail. **6**

5. A) Explain in detail I/O module and their characteristics. **8**

   B) Write note on mod bus. **6**

6. A) Write note on timer and counter of PLC. **8**

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

7. A) Explain concept of industrial automation. **8**

   B) Write note on display units of DCS. **6**

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SLR-SP – 264

Seat No.	

M.Sc. (Part – II) (Semester – IV) (New) Examination, 2015
ELECTRONICS (CGPA)
Paper – XVI : Mixed Signal Based SoC Design (Elective – IV)

Day and Date : Thursday, 23-4-2015 Total Marks : 70

Time : 3.00 p.m. to 6.00 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 alternatives : **8**

1) The Variable Clock VC2 is derived from

a) VC1 b) SYSCLK×2

c) SYSCLK×1 d) CPUCLK

2) The PSoC1 device from Cypress comprises an array of _____ programmable digital blocks.

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

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) To establish serial communication in SPI mode _____ input of programmable digital block is used.

a) data b) auxiliary c) interrupt d) none of these

P.T.O.

5) The input impedance of programmable gain amplifier of PSoC devices is
   a) very low b) high c) ultra high d) all of these

6) Which of the following is most suitable to produce constant current source to drive the active sensor interfaced of the chip ?
   a) IDAC b) VDAC c) Vdd d) TIA

7) In switched capacitor technique the two clock should be
   a) out of phase b) in phase
   c) of phase difference of 90° d) none of these

8) The PSoC devices are having _____ mA current sourcing capacity per pin.
   a) 25 mA b) 10 mA c) 20 mA d) 15 mA

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

1) In case of Cypress PSoC 3, the 8051 core is used for processing.
2) Decimator block of delta sigma ADC is used to increase the sampling frequency.
3) As per the hardware configurability, the global odd numbered buses are interfaced with global even numbered ports only.
4) SC analog block can be programmed as an integrator.
5) The delta sigma ADC of PSoC demonstrate the use of oversampling.
6) If VDD = 5V, then on configuration of Vref of AGND option, the reference voltage for analog cores is 1.048 V.

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

1) With block diagram, describe the an architecture of M8C core of PSoC1
2) Write a note on system bus.
3) What do you mean by clocking subsystem of PSoC ?

B) Write a note on Interrupt subsystem. **4**

3. A) Describe the principle of Switching Capacitor. Discuss the fundamental building block of SC programmable analog block. **7**

B) What do you mean by continuous time analog block ? Describe in detail the functional building block. **7**

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

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

5. A) What do you mean by Delta Sigma modulation ? With suitable diagram describe an architecture of Delta Sigma ADC of PSoC device. **7**

   B) Describe an interfacing of PIR sensor to PSoC device. **7**

6. A) With suitable block diagram describe the design of mixed signal based system on chip for measurement of temperature of the environment. **7**

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

7. A) What do you mean by mixed signal based SoC design ? Discuss the characteristics programmable system on chip. **7**

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

SLR-SP – 265

Seat No.	

M.Sc. (Part – II) (Semester – IV) (New) Examination, 2015
ELECTRONICS (CGPA)
Paper – XVI : Wireless Sensor Network (Elective – IV)

Day and Date : Thursday, 23-04-15 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Answer* ***five*** *questions.*

2) Q. No. ***1*** *and* ***2*** *are* ***compulsory****.*

3) Attempt ***any three*** *from Q. No.* ***3*** *to Q. No.* ***7****.*

4) Figures to the right indicates ***full*** *marks.*

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

1) IEEE _____ standard has been adopted by the Zigbee Alliance for Wireless Sensor Network.

a) 802.15.1 b) 802.15.4 c) 802.11 d) 802.11.4

2) In 2.4 GHz band _____ channels are available for WSN configuration.

a) 16 b) 4 c) 10 d) None of these

3) The Wireless Sensor Network is the collaborative networking of

a) End devices

b) Coordinators

c) End devices and coordinators

d) Routers

4) Physical layer of the WSN decides

a) Frequency of communication and nature of modulation

b) Address of the nodes

c) Packeting of data

d) Networking protocols

5) The zigbee devices, consist of on chip
   a) Transreceiver model
   b) Microcontroller core
   c) Microcontroller core along with communication interfaces
   d) None of these

6) In Hierarchical protocols the end devices communicate with the
   a) end device
   b) cluster head
   c) coordinator
   d) base station

7) FFD stands for _____ device.
   a) False Function
   b) Full Function
   c) Four Functions
   d) None of these

8) C1WSN is invariably mesh based system with _____ radio connectivity between wireless sensor nodes.
   a) Single hop
   b) Multihop
   c) Random hop
   d) None of these

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

1) SPIN is data centric negotiation based family of protocol.
2) PEGASIS is the best example of hierarchical networking.
3) The wireless sensor nodes are not autonomous devices.
4) Zigbee devices can be configured only in unicast mode.
5) For programming of the Zigbee devices the XCTU is recommended.
6) MAC layer performs the task of assembling and disassembling of the packet.

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

1) With the block diagram describe an architecture of WSN.
2) What do you mean by networking protocols ?
3) What do you mean by network security in WSN ?

B) Mention applications of Wireless Sensor Network. **4**

3. A) Describe block diagram and pin description of the Zigbee device. **10**

B) Write note on LEACH protocol. **4**

4. A) Describe in detail, the standards IEEE 802.15.4. Explain network layers of the WSN. **10**

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

5. A) With suitable diagram explain the design of sensor node for WSN using AVR microcontroller for agricultural application. **10**

   B) Explain serial communication UART in Zigbee technology. **4**

6. A) Describe operating modes of Zigbee devices. **10**

   B) What do you mean by energy management in WSN ? **4**

7. 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 C2WSN. **4**

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SLR-SP – 266

Seat No.	

M.Sc. (Part – II) (Semester – IV) Examination, 2015
ELECTRONICS (Old)
Paper – XIII : Microwave Devices, Antennas and Measurements

Day and Date : Thursday, 16-4-2015 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

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

1) The reflex klystron is a _____ cavity klystron oscillator.
A) three B) two C) single D) four

2) Microwaves are electromagnetic waves whose frequencies range from approximately _____
A) 300 Hz to 1000 GHz B) 300 kHz to 1000 kHz
C) 300 Hz to 1MHz D) 300 MHz to 1000 GHz

3) An ideal directional coupler should have _____ directivity.
A) smallest possible B) zero
C) infinite D) unity

4) The SMC is a _____ ohm connector that is smaller than the SMA.
A) 100 B) 300 C) 150 D) 50

5) Bolometer or detector sensitivity is _____
A) usually expressed in ohms per milliwatt
B) is the slope of the static curve of d-c resistance plotted against power for the detector
C) both A) and B)
D) measure of the bridge unbalance

6) For a rectangular-cavity resonator having a > b < d, the dominant mode is _____ mode.

A) TM_{101} B) TE_{110} C) TM_{100} D) TE_{101}

7) In double minimum method of measurement of high VSWR, the probe is _____

A) always located in the region of low impedance
B) located in the region of high impedance
C) located either in the region of low or high impedance
D) strictly located in the region of high impedance

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) Fill in the blanks : **6**

1) The dominant mode in a particular guide is the mode having the _____ cutoff frequency. (lowest/highest)

2) The application of the ac network theory requires that all dimensions of the circuit elements be much _____ than the wavelength. (smaller/larger)

3) The range of microwave power 10 mW to 1 watt is referred to as _____ level power. (low/medium)

4) The bandwidth of a square or circular patch antenna _____ with decreasing substrate thickness h. (decreases/increases)

5) A flat line is _____ (resonant/nonresonant)

6) Magnetron oscillators are ordinarily operated in the _____ mode. ($\pi / 2\pi$)

c) 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. Write short answers (**any four**) : **20**

a) With rms-phasor explain a liner polarized wave.

b) Explain any two applications of a magic tee.

c) What are the scales on the Smith Chart ? Explain briefly.

d) With schematic diagram explain the construction of Cassegrain antenna.

e) Explain the fundamental difference between transistors and TEDs.

3. a) Obtain the equation for line impedance at the sending end of the line. **12**

b) Explain the boundary conditions for electric and magnetic fields. **8**

4. a) Explain the most obvious and most essential requisite of thermistor mount. What do you understand by “O-O” and “S-S” mounts ? **12**

b) Describe Maxwell’s equations for EM waves. **8**

5. a) Explain two-valley model of electron energy versus wave number for n-type GaAs. **12**

b) What are various types of horn antennas ? Explain the construction of H-plane and E-plane sectoral horns. **8**

6. a) Explain the construction and working of the rotary-vane attenuator. **12**

b) What do you mean by transmission lines ? Explain transmission line equations. **8**

7. a) Explain the use of a crystal detector as heterodyne converter in detection of microwave power. **12**

b) Explain two kinds of probes which are extensively used in standing-wave detector. **8**

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SLR-SP – 267

Seat No.	

M.Sc. (Semester – IV) Examination, 2015
ELECTRONICS (Old)
Paper – XIV : Networking and Data Communication

Day and Date : Saturday, 18-4-2015 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Attempt **any 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** indicates **full** marks.*

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

1) Bluetooth is an _____ network.
   a) infrastructured b) ad-hoc
   c) both a) and b) d) none of these

2) The differential Manchester combiner the ideas of
   a) RZ and NRZ – I b) RZ and NRZ – L
   c) NRZ and NRZ – I d) NRZ and ZRZ – L

3) Asynchronous Transfer Mode (ATM) is the _____ relay protocol.
   a) bit b) cell
   c) byte d) 2 byte

4) In SONET the duration of STS – 3 frame is
   a) 125 μs b) 375 μs
   c) 80 μs d) None of these

5) The _____ control is achieved by adding trailer at the end of frame.
   a) flow b) error
   c) access d) all of these

6) The presentation layer is responsible for
   a) translation b) compression
   c) encryption d) all of these

P.T.O.

7) Blt stuffing is process of adding 0 extra bit whenever there is successive _____ 1 bit in the text.
   a) five b) seven
   c) six d) four
8) HTTP user the services of TCP on Port
   a) 80 b) 90
   c) 70 d) none of these

B) Fill in the blank. **6**

1) _____ is needed to send video over the internet. (Expansion/Compression)
2) The HDLC is _____ oriented protocol (bit/byte).
3) A _____ is device installed between the internal network of an organization and the rest of the internet (firewall/repeater).
4) RG-58 is used for _____ ethernet (thin/thick).
5) File transfer protocol needs _____ TCP connection (two/one).
6) 4C : 01 : 02 : 01 : 2C : 4B is a _____ address (multicast/unicast).

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

1) OSI is the network organization.
2) TOM is designed for analog signal.
3) The effective bandwidth of a digital signal is infinite
4) Add/drop multiplexer allow insertion and extraction of signals.
5) A BSS with an AP is called Ad-hoc network.
6) The repeater is operate at the physical and data link layer.

2. Attempt **any four** : **20**

1) Explain bridge.
2) Write a note on transmission impairment.
3) Explain domain name space.
4) Write note on circuit switched network.
5) Discuss architecture of bluetooth.

3. A) Explain OSI model in detail. **12**

   B) Explain ZPv4. **8**

4. A) Explain in detail ATM. **12**

   B) Write a note on DSL. **8**

5. A) Explain in detail data link layer protocol. **12**

   B) Write a note on WWW and Electronic mail. **8**

6. A) What do you mean cryptography ? **12**

   B) Write a note on ZP security. **8**

7. A) Explain in detail UDP and TCP. **12**

   B) Explain DNS in the internet. **8**

SLR-SP – 268

Seat No.	

M.Sc. (Part – II) (Semester – IV) Examination, 2015
ELECTRONICS (Old)
(Paper – XV) : ARM Microcontroller and System Design

Day and Date : Tuesday, 21-4-2015 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

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

1. A) Select the correct alternatives : **8**

1) When subroutine is called, processor stores return address in

a) Program Counter b) Stack Pointer

c) Link Register d) None of these

2) _____ are banked registers.

a) $r_{14} – r_{17}$ b) $r_7 – r_{13}$ c) $r_0 – r_7$ d) $r_8 – r_{14}$

3) ARM7 has _____ stage pipeline.

a) 3 b) 5 c) 7 d) 9

4) LPC 2378 has _____ timers/counts.

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

5) AMBA stands for

a) ARM Microcontroller Bus Architecture

b) ARM Microprocessor Bus Architecture

c) Advanced Microcontroller Bus Architecture

d) None of these

6) _____ register is accessible in all processor modes.

a) Link register b) Banked register

c) Unbanked register d) Current program status register

P.T.O.

7) ARM supports _____ types exception.

a) 1 b) 2 c) 4 d) 5

8) The cache is placed between

a) Flash memory and registers.

b) Main memory and core

c) Peripherals

d) None of these

B) Fill in the blanks : **6**

1) Jazellel executes _____ bit instructions.

(8, 16)

2) LPC 2378 has _____ SRAM for etternet interface.

(16 KB, 32 KB)

3) _____ are unbanked registers.

($r_{11} – r_{13}$, $r_0 – r_7$)

4) ARM processor can operated in _____ modes.

(9, 7)

5) _____ register is the program counter.

(r_{15}, r_{13})

6) LPC 2378 has _____ flash memory.

(32 KB, 512 KB)

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

1) r_{14} register is the link register.

2) Thumb instructions set executes 16 bit instructions.

3) LPC 2378 has four Timers/Counters.

4) Banked register is accessible in all processor modes.

5) To improve the code density ARM uses Thumb instruction set.

6) ARM core is 64 bit processor.

2. Write short answers (**any four**) : **20**

   a) Compare ARM, Jazzele and Thumb instruction set.

   b) With suitable block diagram describe AMBA Bus architecture.

   c) What do you mean by TDMI ?

   d) What do you mean by mulitply and accumulate instruction ?

   e) Write a note on memory organization of LPC 2378.

3. a) Explain with suitable block diagram the architecture of LPC 2378. **12**

   b) Describe the pipelining of ARM microcontroller. **8**

4. a) What do you mean by ARM instruction set architecture ? Give the classification of instruction set. **12**

   b) Describe modes of ARM processor. **8**

5. a) Describe the designing of ARM microcontroller based an embedded system to measure humidity. **12**

   b) Describe the interfacing of optocouple to LPC 2378. **8**

6. a) Mention the salient features of LPC 2378 and describe register section of ARM core. **12**

   b) Write a note on barrel shiffer. **8**

7. a) Describe the ARM core philosophy and explain AW section in detail. **12**

   b) Write a note on interrupts/exceptions. **8**

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SLR-SP – 269

Seat No.	

M.Sc. – II (Semester – IV) Examination, 2015
ELECTRONICS (Old)
Paper – XV : PRO ASIC System Design

Day and Date : Tuesday, 21-4-2015 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

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

1) ASSP is synonym of _____
   a) Application Specific Standard Point
   b) Application Specific Standard Product
   c) Application Specific Standard Pin
   d) Application Specific Standard Positive

2) Channelless Gate Array is also known _____
   a) Channel free gate array b) Sea-of-gates array
   c) SOG array d) All of these

3) The programmable ASIC interconnect is _____ based metalization.
   a) gold b) silver
   c) aluminum d) all of these

4) In Xilinx LCA the programmable interconnection points connects the _____ to the routing network.
   a) logic element b) CLB
   c) macro d) none of these

5) The thermal resistance θ_{JA} for VQFP package is _____ $^{\circ}CW^{-1}$.
   a) 44 b) 68 c) 33 d) 40

6) The totem-pole output buffer has _____ stacked transistors of the same type.
   a) one b) two c) three d) four

7) The bulk resistance of metal-metal antifuse link is _____

a) 500 μΩ cm b) 500 Ω cm

c) 500 Ω d) 500 mΩ cm

8) The CBIC reduces the risk due to _____ standard cell library.

a) Pretested b) Predefined

c) Precharacterized d) All of these

B) Fill in the blank : **6**

1) The module ADO is a _____

(datapath/datapath cell)

2) ZN = OAI 22 [A, S, B, NOT (S)] is _____ 2 : 1 MUX.

(inverting/non inverting)

3) ACT-2 and ACT-3 architectures uses two different types of logic modular and one of them is equivalent of a _____ flip-flop.

(O/RS)

4) The AOI family has _____ number of cells with three index numbers or less.

(70/56)

5) All logic cells are predefined and possibly all mark layers are customized in _____ ASIC.

(full custom/semi-custom)

6) The intrinsic parasitic capacitance of an antifuse is appro. 1-2 fF for _____ CMOS process.

(1 μm/0.5 μm)

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

1) Actel's LVT (1010, 8 channels) has connects to 200 antifuse.

2) The 0.5 μm or 1.0 μm technology is not used for XC 3000 interconnect parameters.

3) The flip-flop with a fast clock to Q delay is build using inverters with TG.

4) Xilinx CLBs contain both combinational logic and flip-flop.

5) FPGA are not ideal for prototyping system or for low-volume production.

6) The microprocessor is ASIC chip.

2. Solve **any four** : **20**
   1) Explain Shannon's expansion theorem.
   2) Write a note on library architecture.
   3) Explain Xilinx I/O blocks.
   4) Write a note on gate-array based ASIC.
   5) Explain routing resources.

3. A) What do you mean programmable ASIC IO cells ? **12**
   B) Explain datapath logic cells. **8**

4. A) Explain in detail different types of ASIC. **12**
   B) Explain RC delays in antifuse. **8**

5. A) Explain in detail programmable ASIC logic cells from ACTEL. **12**
   B) Write a note on pushing bubbles. **8**

6. A) Explain in detail following terms : **12**
      1) Cell compilers
      2) CMOs as resistor.
   B) Write a note on speed grading. **8**

7. A) Explain in detail issues of ASIC library design. **12**
   B) Write a note on Elmores constant. **8**

SLR-SP – 270

Seat No.	

M.Sc. Electronics (Semester – IV) (Old) Examination, 2015
Paper – XVI : INDUSTRIAL CONTROLLERS AND AUTOMATION

Day and Date : Thursday, 23-4-2015 Total Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

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

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

1) Select correct statement for final value theorem X (∞) = _____

a) $\lim_{z \to 1}$ [$(z^{-1} - 1)$ X (z)] b) $\lim_{z \to 0}$ [$(z^{-1} - 1)$ X (z)]

c) $\lim_{z \to \infty}$ X (z) d) all of these

2) Z – transform of the δ(n) is = _____

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

3) Programmable logic controllers (PLC's) are used for _____

a) Producing on-off output voltage

b) Actuating elements such as electric motor, solenoid etc.

c) Both a and b

d) None of these

4) VDU stands for _____

a) Vertual display unit b) Video display unit

c) Vertical display unit d) None of these

5) JSP stands for _____ in SCADA protocols.

a) In-System-Programming b) Inter-Operable System Project

c) In System Process d) Both a) and b)

P.T.O.

6) _____ display shows part of Group display, Graph of output and source of the I/O signal.

a) Group b) Overview c) Detail d) Graphic

7) A ladder diagram is used as a _____

a) PLC programming b) Storage facility

c) Communication facility d) None of these

8) In digital control system _____ is essential when sensor output is analog.

a) Amplifier b) Clipper c) Clamper d) ADC

B) Fill in the blanks. **6**

1) Z-transform of $\frac{z}{z-3}; |z| > 3$ is _____ (3^{-k} u(n)/3^{h}u(n))

2) _____ is used for isolation (Optocupler/OFC)

3) _____ is not SCADA protocol (Ambabus/Profibus)

4) _____ is used to program PLC (Programmer/I/O Module)

5) SCADA system distributes in _____ types. (2/3)

6) _____ display shows simulation of the system (Group/Graphic)

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

1) C language is used for PLC programming.

2) ROC stands for Region of convergence.

3) $\frac{1}{1+Ts}$ is transfer function of low pass system.

4) Modbus is one of the SCADA protocol.

5) Digital control system is less noisey system.

6) $x(0) = \lim_{z \to \infty} [X(1)]$.

2. Attempt **any four**. **20**

   1) Draw and explain centralized control system.

   2) Write a note on poles and zeros.

   3) Explain Digital Control System.

   4) Write a note on Registers of PLC.

   5) Explain Remote Terminal Unit (RTU).

3. A) Compair Centralized Control System (CCS) and Distribute Control System in detail. **10**

   B) Explain time and frequency domain system with suitable example. **10**

4. A) With suitable Example, Explain Z-transform theorems. **10**

   B) Write note on memory and Power Supply unit of PLC's. **10**

5. A) Draw and Explain Architecture of SCADA system in detail. **10**

   B) Explain timers of PLC with suitable Example. **10**

6. A) Explain Programming for ON-Off I/O for PLC. **10**

   B) Explain transformation of problem in to W domain. **10**

7. A) Design ladder diagram for Simple Process Control. **10**

   B) What do you mean by Master Control Relay (MCR) ? With suitable example. Explain MCR in detail. **10**

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Seat No.	

M.Sc. (Part – II) (Semester – IV) Examination, 2015
ELECTRONICS (Old)
Paper – XVI : Wireless Sensor Network

Day and Date : Thursday, 23-4-2015 Total Marks : 100

Time : 3.00 p.m. to 6.00 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 alternatives : **8**

1) In Qos based routing protocol, the balance between _____ of data and _____ is maintained.
   a) Quality, Energy consumption
   b) Power, Quality
   c) Quality, Speed
   d) Quality, Data rate

2) Routing is the process of _____ data through path in network traffic.
   a) Sending b) Checking
   c) Breaking d) None of these

3) 802.11 standard is used for
   a) WLAN b) WPAN
   c) Both a) and b) d) None of these

4) For saving battery power Mobile Station (MS) enter into _____ .
   a) Transmission mode b) Receiving mode
   c) Cluster head d) Sleep mode

P.T.O.

5) IEEE standard for Zigbee is _____
   a) 802.15.4 b) 802.15.5
   c) 802.15.6 d) 802.15.7
6) In flat routing _____ node play same role.
   a) 50% b) 75%
   c) 80% d) all
7) In three tiered architecture of WSN the upper tier is _____
   a) Access point b) Mobile agent
   c) Static sensor node d) None
8) _____ standard used in wired LAN.
   a) IEEE 802.3 b) IEEE 802.5
   c) IEEE 802.16 d) IEEE 802.20

b) Fill in the blanks : **6**

1) For saving battery power Mobile Station (MS) enter into _____
   (sleep mode, receiving mode)
2) The channel bit rate of GSM is _____ kbps.
   (270, 250)
3) LEACH is _____ based protocol.
   (cluster, optimal chain)
4) Protocol standard of Zigbee is _____
   (IEEE 802.15.1, IEEE 802.15.4)
5) 802.11 standard used for _____
   (WLAN, WPAN)
6) SPR stands for _____
   (short path routing, sleep primary routing)

c) Identify **true**/**false** statement : **6**

1) Lower energy node used for sensing.
2) MAC stand for Media Access Control.
3) Short path routing is frequently approximated to straight line routing.
4) Network topology changed in WSN due to failure of intermediate node.
5) IEEE 802.15.4 is protocol standard of Zigbee.
6) The primary component of WSN is sensor.

2. Attempt **any four** : **20**
   a) Write a note on CDMA.
   b) Write a note on cluster gateway switch routing protocol.
   c) Explain MAC management in 802.15 wireless PAN.
   d) Explain sensor network management.
   e) Write a note on SPR.

3. a) Explain schemes of routing in dynamic wireless sensor network. **10**
   b) Explain Tiered architecture in sensor network. **10**

4. a) Draw and explain architecture and wireless sensor network. **10**
   b) Give the application of wireless sensor network. **10**

5. a) Draw and explain architecture of zigbee module. **10**
   b) Explain taxonomy of routing technique in wireless network. **10**

6. a) Explain 802.11 wireless networking protocol. **10**
   b) What is energy management ? Explain any two types. **10**

7. a) Explain 802.15 wireless networking protocol. **10**
   b) Explain security issues of wireless sensor network. **10**

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Seat No.	

M.Sc. (Part – II) (Semester – IV) Examination, 2015
ELECTRONICS (Old)
Paper – XV1 : Mixed Signal SoC Design

Day and Date : Thursday, 23-4-2015 Total Marks : 100
Time : 3.00 p.m. to 6.00 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) Mixed signal based SoC comprises _____
   a) analog block with microcontroller
   b) digital blocks with microcontroller
   c) both analog and digital blocks with microcontroller core
   d) only microcontroller

2) _____ is the basic characteristic of the PSOC devices.
   a) Integrability b) Configurability
   c) Adoptability d) None of these

3) BiCMOS is the combination of _____
   a) two CMOS transistors
   b) two BJT
   c) BJT and CMOS transistor
   d) all of these

4) In case of cypress PSOC1 the analog blocks are arranged array of _____
   a) rows b) columns
   c) bytes d) none of these

5) In delta-sigma a analog to digital convertor the input signal should be within _____

a) OV to + Vref
b) – Vref to OV
c) – Vref to + Vref
d) none of these

6) In switched capacitor analog blocks of PSOC, the resistor is given by _____

a) $R = \frac{1}{cfs}$
b) R = c.fs
c) $R = \frac{c}{fs}$
d) $R = \frac{1}{fs}$

7) In case of cypress PSOC the sinking current is _____

a) 10 mA
b) 25 mA
c) 5 mA
d) 1 mA

8) Variation in the clock frequency due to temperature variation is called as _____

a) frequency modulation
b) clock Jitter
c) temperature Jitter
d) none of these

B) Fill in the blanks : **6**

1) The crystal frequency for external clock is _____
[24 MHz, 32.768 KHz]

2) The M8C microcontroller is having _____ interrupt sources
[8, 25]

3) The PSOC comprises _____ reference levels for continuous time analog bocks.
[3, 1]

4) The decimeter used in $\Delta \cdot \Sigma$ modulator ADC to _____ converts the frequency.
[down, up]

5) Type C switched capacitor block consists of _____ analog input.
[1, 2]

6) _____ is the fundamental stage for CMOS operational amplifier.
[current mirror, pull up]

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

1) PSOC1 device has global odd and global even digital bus inter connect.
2) The switch capacitor block is only used to configure the programmable gain amplifier.
3) The ADC of mixed signal devices has programmable resolution.
4) In case of SAR ADC the resolution is equal to $\frac{2^B - 1}{2}$.
5) PSOC1 is having unprogrammable communication interfaces.
6) The clock source Vc_2 is obtained from Vc_3.

2. Attempt **any four** of the following : **20**

1) Write a note on BiCMOS transistor.
2) What do you mean by concept of system on chip ?
3) What do you mean by clock source of PSOC devices ?
4) Write a note on switched capacitor summing amplifier.
5) Discuss the term reconfigurability.

3. A) What do you mean by mixed signal technology ? Describe in detail the architecture of mixed signal based programmable system on chip. **12**

B) Write a note on system buses. **8**

4. A) Discuss the principle of switched capacitor. Describe in detail the switched capacitor analog block of PSOC1. **12**

B) Write a note on CMOS operational amplifier design. **8**

5. A) Describe in detail, the continuous time analog building blocks. **12**

B) Write a note on configuration of programmable gain amplifier. **8**

6. A) What do you mean by delta-sigma modulation ? Describe in detail, the delta-sigma ADC. **12**

B) Discuss the impact of circuit non-idealities on ADC performance. **8**

7. A) Describe in detail the mixed signal based system on chip for temperature measurement. **12**

B) Write a note on programmable digital timer block. **8**