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Set **P**

M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2017
Electronics
NUMERICAL METHODS

Day & Date: Thursday, 16-11-2017
 Time: 10.30 AM to 01.00 PM

Max. Marks: 70

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

Q.1 A) Choose the alternatives given below.**08**

- 1) On Laplace transformation, the function converts from _____.
 a) Time domain to frequency domain
 b) Frequency domain to time domain
 c) Time domain to amplitude domain
 d) Amplitude domain to time domain
- 2) If data consist n number of points, then Newton's forward interpolation method generates the polynomial of _____ order.
 a) n^{th}
 b) $(n+1)^{\text{th}}$
 c) $(n-1)^{\text{th}}$
 d) Second
- 3) For set of points of unequal interval _____ method of interpolation is suitable.
 a) Cubic splines
 b) Newton's forward difference
 c) Lagrangian
 d) All of these
- 4) In Gauss Jordan Elimination method, the coefficient matrix is reduced to _____ Matrix.
 a) Lower Triangular
 b) Identity
 c) Tridiagonal
 d) Upper Triangular
- 5) Laplace Transform of $f(t) = t^4$ is given by $F(s) =$
 a) $1/S$
 b) $(4)/(S)$
 c) $(24)/S^5$
 d) $(6)/(S^4)$
- 6) The R-2R ladder network can be solved by using _____ matrix system of equations.
 a) Tridiagonal
 b) U-matrix
 c) L-matrix
 d) All of these
- 7) For Newtons forward difference $\Delta^2 Y_0 =$ _____.
 a) E^2
 b) $(E-1)^2$
 c) $(E+1)^2$
 d) All of these
- 8) The Least squares method of curve fitting is developed by considering _____.
 a) Minimization of data points
 b) Minimization of sum of squares of errors
 c) Maximization of data points
 d) Maximization of errors

- B) State True or false.** **06**
- 1) Forward substitution method is adopted for U-matrix.
 - 2) On Laplace Transformation, an expression for current response through RL circuit consists of two parts DC and transient.
 - 3) Newton-Cotes integration formula for three points reduces to Simpson's one third rule.
 - 4) For solving ODE by Eulers method, final value of the function is considered.
 - 5) For cubic splines only two points are considered.
 - 6) The matrix of single column is called vector.

- Q.2 A) Attempt any two.** **10**
- 1) Derive expression for Laplace transformation of $f(t) = \cos wt$
 - 2) What do you mean by forward and backward substitution method for solution of system of equation?
 - 3) Solve

$$\begin{aligned} x_1 - x_2 + 2x_3 &= 4 \\ 2x_1 + 4x_2 + x_3 &= 6 \\ x_1 + x_2 + 5x_3 &= -2 \end{aligned}$$

B) Write a note on Piece-wise linear analysis. **04**

- Q.3 A) Describe formation of system of linear equations? Describe Gaussian Jordan elimination method for solution of system of linear equations.** **08**

B) Evaluate by using Simpson's one third rule for 10 points. **06**

$$I = \int_0^1 e^{-x} x$$

- Q.4 a) What do you mean by Laplace Transformation and Inverse Transformation? With suitable example describe partial fraction rule.** **08**

b) Obtain Laplace Inverse Transformation of the function **06**

$$F(S) = \frac{1}{(s+5)(s-3)}$$

- Q.5 a) Using Newton's forward interpolation formula derives the expression for first order and second order numerical differentiation.** **08**

b) Find first and second order derivative for following data $x = 6$. **06**

X	2	4	6	8	10
Y	1.583	1.797	2.044	2.325	2.651

- Q.6 a) What do you mean by quadrature? Describe in detail the Newton Cote formal for numerical integration. Obtain expression for Simpson mid-point and one third rule.** **08**

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

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

- Q.7 a) Using Taylars series derive the expression for solution of ODE for RK-II order method.** **08**

b) Using RK-II order method find value of $y(0.2)$ Given that **06**

$$\frac{dy}{dx} = x^2 - y \text{ and } y(0) = 1$$

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M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2017
Electronics
INSTRUMENTATION DESIGN

Day & Date: Saturday, 18-11-2017
 Time: 10.30 AM to 01.00 PM

Max. Marks: 70

- Instructions:** 1) Q. (1) and (2) are compulsory.
 2) Answer any three questions from Q.3 to Q.7.
 3) Answer any 5 questions.
 4) Figures to the right indicates full marks.

Q.1 A) Choose the alternatives given below.**08**

- 1) In capacitance transducers the capacitance is depends upon _____.
 a) Dielectric constant b) Effective area of the plate
 c) Distance between two plates d) All of these
- 2) Which of the following has proper direction as well as magnitude?
 a) Excitation potential b) Grounding
 c) Shielding d) All of these
- 3) To measure physical parameters, in terms of change in the resistance, _____ bridge would be used.
 a) AC b) DC
 c) Capacitive d) All of these
- 4) For signal conditioning of both AC as well as DC signal, _____ is the most suitable monolithic signal conditioner.
 a) IC-2B31 b) IC-2B35
 c) IC-2B30 d) All of these
- 5) In case of LVDT, when core is at null position, which of the following is correct?
 a) $E_{s1} > E_{s2}$ b) $E_{s1} < E_{s2}$
 c) $E_{s1} = E_{s2}$ d) None of the above
- 6) Chromel – Alumel thermocouple is of _____ types of thermocouple.
 a) T b) E
 c) J-K d) None of these
- 7) The recorder, in which one of the variable is plotted against time is called _____.
 a) X-T recorder b) Digital recorder
 c) X-Y recorder d) Graphic recorder
- 8) The temperature coefficient of the sensor LM35 is _____.
 a) 25m V/°K b) 10m V/°C
 c) 10m V/°K d) None of these

B) State True or false.**06**

- 1) Isolation amplifier is used to isolate the stages in instrumentation amplifier.
- 2) Electromagnetic shielding is used for coupling with two circuitry.
- 3) For the single channel DAS the IC – 0808 ADC is used because it has only one analog channel.

- 4) The sensor SY-HS-220 is precision humidity sensor.
- 5) If transduced signal has a range of 0m V to 100m V and reference voltage for ADC is 2.56 volt, then gain of instrumentation amplifier should be more than 100 to avoid saturation.
- 6) For JK thermocouple AD595 is most suitable instrumentation amplifier.

- Q.2 A) Attempt any two of the following. 10**
- 1) What is need of DAS?
 - 2) Write a note on selection criteria for transducer.
 - 3) Explain general block diagram of measuring instrument.
- B) Explain in detail, Isolation amplifier. 04**
- Q.3 A) Explain construction and working principle of the thermocouple. 08**
- B) Write a note on V-F converter. 06**
- Q.4 A) What do you mean by recorder? Explain in detail the Strip chart recorder. 08**
- B) Write a note on 2B30 the programmable signal conditioner. 06**
- Q.5 A) Explain in detail the static as well as dynamic characteristics of sensors. 08**
- B) Write a note on Multi-channel DAS. 06**
- Q.6 A) Explain the concept of grounding and shielding? Write a note on AD620 as instrumentation amplifier. 08**
- B) Explain the method used to measure used to measure liquid level precisely. 06**
- Q.7 A) Explain strain gauge and derive the expression for gauge factor. 08**
- B) What do you mean by LCD, which should be used for measurement instrumentation? 06**

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M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2017
Electronics
POWER ELECTRONICS

Day & Date: Tuesday, 21-11-2017
 Time: 10.30 AM to 01.00 PM

Max. Marks: 70

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

Q.1 A) Choose the alternatives given below.**08**

- 1) The ____ voltage controller is used in speed control of Induction motor.
 - a) AC
 - b) DC
 - c) Both a & b
 - d) None of these
- 2) In the operation of McMurry half bridge inverter is based on the assumption that load current is ____ during the communication period.
 - a) Varies
 - b) Decreases
 - c) Increases
 - d) Constant
- 3) In McMurry half-bridge inverter ____ are the commutating components.
 - a) Capacitors
 - b) Inductors
 - c) Both a & b
 - d) None of these
- 4) In case of step down cycloconverter the output frequency is _____ supply frequency.
 - a) Less than
 - b) Greater than
 - c) Equal to
 - d) None of these
- 5) The chopper is _____ converter.
 - a) AC to DC
 - b) DC to AC
 - c) AC to AC
 - d) DC to DC
- 6) In three phase half wave controlled rectifier for interval $\alpha \geq \pi/6$, the average load voltage is given by _____.
 - a) $\frac{3V_m}{2\pi} \left[1 + \cos \left(\frac{\pi}{6} + \alpha \right) \right]$
 - b) $\frac{V_m}{2\pi} [\cos \alpha + 1]$
 - c) $\frac{V_m}{2\pi} [\cos \alpha - 1]$
 - d) None of thee
- 7) The _____ is application of AC voltage controllers.
 - a) Lighting control
 - b) Speed control of DC motor
 - c) AC magnet control
 - d) All of these
- 8) In voltage source inverter output AC voltage depends on ____ voltage.
 - a) Input AC
 - b) Input DC
 - c) Both a & b
 - d) None of these

B) State True or false.**06**

- 1) The RMS load voltage for integral cycle control is $V_s \sqrt{K}$.
- 2) The rectifier is DC to AC convertor.

- 3) In phase operation of multiphase chopper, it turn on and off at a different instant.
- 4) In symmetrical configuration of single phase full wave half controlled bridge rectifier, angle for all the devices is $\pi - \alpha$ rad.
- 5) In McMurry Bedford communication the feedback diode are equally effective in centre taped circuits catering for inductive loads.
- 6) In type A chopper, SCR is turned off when its current drops below its holding current value for specific duration.

Q.2	A) Attempt any two. (Short Questions)	10
	1) State the advantages & disadvantage of unidirectional and bidirectional controllers.	
	2) Write a note on single phase full wave full controlled bridge rectifier with R load.	
	3) Write a note on class C chopper.	
	B) Explain integral cycle controller.	04
Q.3	a) Explain three to single phase cycloconverter.	07
	b) Explain half controller bridge rectifier with free wheeling diode.	07
Q.4	a) Explain single phase full bridge inverter.	07
	b) Explain step up and step down chopper.	07
Q.5	a) With neat circuit diagram and waveform explain the operation of full wave controlled rectifier with inductive load.	07
	b) Derive the relations for average output voltage and RMS output voltage full wave controlled rectifier with inductive load.	07
Q.6	a) Explain with suitable waveform three phase unidirectional controller.	07
	b) Explain McMurry full bridge inverter.	07
Q.7	a) Explain in detail single PWM and multiphase PWM inverters.	07
	b) Explain in detail mid point and bridge type cycloconverter.	07

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M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2017
Electronics
ADVANCED MICROCONTROLLERS

Day & Date: Thursday, 23-11-2017
 Time: 10.30 AM to 01.00 PM

Max. Marks: 70

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

Q.1 A) Choose the alternatives given below. 08

- 1) Reset pin of PIC 16F877 microcontroller is _____.
 a) Active Low b) Active High
 c) High to Low d) Low to High
- 2) Each Port pin of AVR atmega8 Microcontroller sink or source _____ mA.
 a) 10 b) 20
 c) 15 d) 25
- 3) PIC 16F877 microcontroller has _____ bytes of Data Memory (RAM).
 a) 36 x8 b) 368x8
 c) 38x8 d) 368 x14
- 4) In AVR _____ register forms 16 bit X register.
 a) R26 – R27 b) R28 – R29
 c) R30 – R31 d) None of these
- 5) PIC microcontroller is Reduced Instruction Set _____.
 a) Controller b) Computer
 c) Both a & b d) None of these
- 6) _____ is used the LPM instruction of AVR Microcontroller.
 a) R0 b) R1
 c) R2 d) R3
- 7) Interrupt of PIC microcontroller Interrupt on overflow from _____.
 a) F5h to 00h b) F0h to 00h
 c) FFh to 00h d) None of these
- 8) _____ Register used to enable or disable external interrupts.
 a) GIMSK b) GMSK
 c) ADMUX d) None of these

B) State True or false. 06

- 1) ADFM bit of ADCON1 is used for Result Format Selection.
- 2) PIC 16F877 has 35 two word instructions.
- 3) AVR atmega8 microcontroller has 4 resister banks.
- 4) To select Bank 2 and 3 of PIC microcontroller at a time, the IRP bit of status register is set.
- 5) AVR atmega8 microcontroller has 13 general purpose registers.
- 6) PORTB of PIC microcontroller has a weak internal pull-up.

Q.2	a) Answer any two of the following.	10
	1) Write note on Addressing Modes of AVR atmega8.	
	2) Write note on PWM mode of PIC microcontroller.	
	3) Write note on resister bank of PIC 16F877 microcontroller.	
	b) Compare LP and ST instructions of AVR microcontroller.	04
Q.3	a) Write a note on Architecture of AVR microcontroller.	08
	b) Explain in detail arithmetic and data transfer instructions of PIC microcontroller.	06
Q.4	a) Explain in detail interfacing of LCD to PIC microcontroller.	08
	b) Write a note on Timer 1 of AVR microcontroller.	06
Q.5	a) Explain compare and capture mode of PIC microcontroller.	08
	b) Write note on features of AVR microcontroller.	06
Q.6	a) Write a note WDT mode of PIC microcontroller.	08
	b) Explain firing of thyristor using PIC 16F877 microcontroller.	06
Q.7	a) What do you mean by Power on reset and Brown out reset?	08
	b) Write note on clock and reset circuit of AVR microcontroller.	06

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Set **P**

M.Sc. (Semester - III) (New) (CBCS) Examination Oct/Nov-2017
Electronics
DIGITAL SIGNAL PROCESSING

Day & Date: Thursday, 16-11-2017
 Time: 02.30 PM to 05.00 PM

Max. Marks: 70

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

Q.1 A) Choose the alternatives given below.**08**

- 1) The important characteristics of ideal filters are _____.
 - a) Ideal filters have constant gain in the passband and zero gain in the stop band
 - b) Ideal filters have zero gain in the passband and constant gain in the stop band
 - c) Ideal filters has nonlinear phase response
 - d) Ideal filters have zero gain in the passband and stop band
- 2) If $x(n)$ is causal sequence then its final value is _____.
 - a) $x(0) = \lim_{z \rightarrow \infty} X(Z)$
 - b) $x(0) = \lim_{z \rightarrow 0} X(Z)$
 - c) $x(\infty) = \lim_{z \rightarrow 1} X(Z)$
 - d) $x(\infty) = \lim_{z \rightarrow 1} X(Z) (1 - Z^{-1})$
- 3) If $x(n)$ is anticausal sequence then ROC is _____.
 - a) Interior part of circle of radius α
 - b) Exterior part of circle of radius α
 - c) Intersection of two circles of radii α & β
 - d) Entire Z plane except $|Z| = 0$ & $|Z| = \infty$
- 4) In DIT FET algorithm obtaining N-point DFT _____ numbers of multiplications are required.
 - a) N^2
 - b) $N^2 - N$
 - c) $\frac{N}{2} \log_2 N$
 - d) $N \log_2 N$
- 5) The advantages of bilinear transformation method are _____.
 - a) The mapping is one to one
 - b) There is no aliasing effect
 - c) There is one to one transformation from the s-domain to z-domain.
 - d) All of above
- 6) The DFT of delayed unit impulse $\delta(n - n_0)$ is _____.
 - a) $e^{-j2\pi i k n_0 / N}$
 - b) $e^{j2\pi i k n_0 / N}$
 - c) $e^{j\pi i k n_0 / N}$
 - d) $e^{-j\pi i k n_0 / N}$
- 7) The necessary condition to use the practical low pass filter without any distortion is _____.
 - a) $f_s < 2w$
 - b) $f_s > 2w$
 - c) $f_s = 2w$
 - d) $f_s > w$

- 8) If $x(t)$ is odd then $X(j\omega)$ _____.
- a) Imaginary & even
 - b) Imaginary & odd
 - c) Real & odd
 - d) Real & even

B) State True or false. **06**

- 1) Using VLSI technology, the hardware of analog filter can be reduced.
- 2) If the signal is shifted in frequency, the magnitude spectrum does not change but only the phase spectrum will be altered.
- 3) Convolution of two sequences in the time domain is equivalent to multiplication of its Z- transforms in Z domain.
- 4) Analog filter is stable if the poles lie on the L.H.S. of s-plane.
- 5) In Symmetry property of DFT, when $x(n)$ is real valued then $X(N-K) = X^*(K)$
- 6) The multiplication of any sequence with $u(-n-1)$ gives casual sequence.

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

- 1) Explain how sampling can be done with an impulse function.
- 2) Write short note on bilinear transformation.
- 3) Obtain the z-transform finite duration sequence $x(n) = \{1, 2, 4, 3, 5, 7\}$



B) Explain development of fourier transform. **04**

Q.3 A) Given $x(n) = 2^n$ and $N=8$, find $X(K)$ using DIT FFT algorithms. **08**

B) Find the 4 point DFT of given window function, $w(n) = u(n) - u(n-N)$ **06**

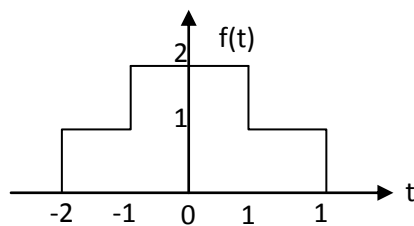
Q.4 A) An analog filter has the following transfer functions $H(S) = 1/(S+1)$ using bilinear. **08**

B) Determine the Z transform and ROC of the given signal $x(n) = 2^{n+2}[u(n-1)]$. Is the signal is causal? **06**

Q.5 A) State and prove parseval's theorem of DFT. **08**

B) Explain bilinear transformation for IIR filter design. **06**

Q.6 A) Find the Fourier transform of the signal shown in figure. **08**



B) Find Fourier transform and sketch the magnitude spectrum of unit Step function. **06**

Q.7 A) Using graphical method, obtain a 4- point circular convolution of two DT signals defined as, $x(n) = \{1, 2, 3, 1\}$ and $h(n) = \{4, 3, 2, 2\}$ **08**

B) Use residue method to obtain $x(n)$ from $X(Z) = Z(Z+1)/(Z-1)^2$ **06**

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**M.Sc. (Semester - III) (New) (CBCS) Examination Oct/Nov-2017
Electronics**

ADVANCED DIGITAL DESIGN WITH VHDL

Day & Date: Saturday, 18-11-2017
Time: 02.30 PM to 05.00 PM

Max. Marks: 70

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

Q.1 A) Choose the alternatives given below.

08

- 1) The _____ are the programming technologies used for PLD.
 - a) SRAM
 - b) EPROM
 - c) Flash
 - d) All of these
- 2) The FPGA architecture are based on _____ to generate logic functions.
 - a) LUT
 - b) Multiplexer
 - c) Macrocell
 - d) Both a & b
- 3) The VHDL supports _____ design methodology.
 - a) Top – down
 - b) Bottom – up
 - c) Mixed
 - d) All of these
- 4) The Generate statement is _____ statement.
 - a) Sequential
 - b) Concurrent
 - c) Process
 - d) All of these
- 5) The _____ adding operator used in VHDL.
 - a) '+'
 - b) '-'
 - c) '&'
 - d) All of these
- 6) The meaning of 'H' is _____ in Data types STD_LOGIC_1164.
 - a) High
 - b) 1
 - c) Weak 1
 - d) All of these
- 7) The GENERIC statement is declared in _____ of the VHDL code.
 - a) Architecture
 - b) Entity
 - c) Process
 - d) All of these
- 8) The mode of ports in entity declaration are _____ types.
 - a) 2
 - b) 3
 - c) 4
 - d) None of these4

B) State True or False.

06

- 1) The wait statement provides an alternate way to suspend the execution of a process.
- 2) The place and route tool belongs to front end design process.
- 3) The component declaration is appeared in the declaration part of architecture.
- 4) The LOOP statement is used to iterate through the set of concurrent statement.

- 5) The generic and constant values are assigned by ':'=' assignment operator.
- 6) The process statement is itself a concurrent statement.

Q.2	A) Attempt any two. (Short questions)	10
	a) State in brief features of VHDL.	
	b) Explain the CPLD.	
	c) Write a note on Macrocell.	
	B) Explain the entity using controlled inverter.	04
Q.3	a) Discuss the basic language element of VHDL? Explain identifier and operators in detail.	
	b) Write the VHDL code for 8 to 1 multiplexer.	05
Q.4	a) Explain the various types of architecture bodies for VHDL with suitable example.	09
	b) Write VHDL code for decade counter.	05
Q.5	a) Explain the PLD design flow for IC fabrication. Example the EDA tools for PLD.	09
	b) Write VHDL code for 8 to 3 encoder.	05
Q.6	a) Give the detail classification of PLD devices. Explain the FPGA in detail.	09
	b) Write VHDL code for 4 – bit gray to binary code.	05
Q.7	a) Explain the Attributes and Generic for VHDL.	09
	b) Write VHDL code for ALU using concurrent statement.	05

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Set **P**

M.Sc. (Semester - III) (New) (CBCS) Examination Oct/Nov-2017
Electronics

ARM MICROCONTROLLER AND SYSTEM DESIGN

Day & Date: Tuesday, 21-11-2017
Time: 02.30 PM to 05.00 PM

Max. Marks: 70

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

Q.1 A) Choose the alternatives given below.

08

- 1) _____ type of non-privileged processor mode is entered due to raising of high priority of an interrupt.
 - a) User mode
 - b) Fast interrupt mode (FIQ)
 - c) Interrupt mode (IRQ)
 - d) Supervisor mode (SVC)
- 2) ___ instructions are called Program Status Register transfer instructions.
 - a) LDR, STR
 - b) LDM, STM
 - c) MCR, MRC
 - d) MSR, MRS
- 3) What are the values of the I and F bits in the Program Status Register on reset?
 - a) I=0, F=0
 - b) I=1, F=1
 - c) I=0, F=1
 - d) I=1, F=0
- 4) The glue logic that connects the memory system to the AMBA bus logic and control.
 - a) Main memory
 - b) Reset
 - c) ARM core
 - d) Glue logic
- 5) 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
- 6) _____ vector is called when you execute a SWI instruction.
 - a) Undefined instruction
 - b) Reset
 - c) Software interrupt
 - d) Prefetch abort
- 7) The memory map address _____ is reserved for the vector table.
 - a) 0xFFFFFFFF
 - b) 0x000000AA
 - c) 0x000000FF
 - d) 0x00000000
- 8) _____ register is accessible in all processor modes.
 - a) Link register
 - b) Bank register
 - c) Unbanked register
 - d) Current program register

B) State True or false.

06

- 1) The ARM core uses the Link register to monitor and control internal operations.
- 2) All instructions in ARM are conditionally executed.

- 3) Swap is a load- store instruction.
- 4) The ARM processors does not support to the byte address.
- 5) The CPSR has two interrupt mask bits, 7 and 6 to control the masking of IRQ and FIQ, respectively.
- 6) User mode is non – privileged mode.

Q.2	A) Attempt any two.	10
	1) State and explain the nomenclature used ARM processor with example.	
	2) Compare ARM, Jazzal and Thumb instruction set.	
	3) Discuss the features of ARM LPC 2148.	
	B) Explain the clock and reset circuit of ARM LPC 2148.	04
Q.3	a) Describe the design of ARM microcontroller based system for temperature measurement.	08
	b) Write a note on I/O ports of ARM LPC 2148.	06
Q.4	a) Explain ARM bus architecture in brief.	08
	b) Explain watch dog timer.	04
Q.5	a) Give the functions of following registers in ARM processor.	08
	i. Stack Pointer	
	ii. Link register	
	iii. Program counter	
	b) Write a note on barrel shifting.	06
Q.6	a) Write embedded c program to interface LED to ARM microprocessor with suitable diagram.	08
	b) Write a note on I/O ports of ARM LPC 2148.	06
Q.7	a) Explain on-chip UART of ARM microcontroller.	08
	b) Draw the block diagram of ARM LPC 2148.	06

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M.Sc. (Semester - III) (New) (CBCS) Examination Oct/Nov-2017
Electronics
CMOS DESIGN TECHNOLOGIES

Day & Date: Tuesday, 21-11-2017
 Time: 02.30 PM to 05.00 PM

Max. Marks: 70

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

Q.1 A) Choose the alternatives given below.**08**

- 1) Guard ring are used to _____.
 a) Prevent latchup
 b) Collect injected majority carriers
 c) Collect injected minority carriers
 d) All of these
- 2) For pseudo-nMOS inverter the gate of the p-device is connected to _____.
 a) VDD
 b) Ground
 c) Output
 d) Floating
- 3) In Silicon on Insulator (SOI) _____ is used as substrate.
 a) Sapphire
 b) Magnesium aluminate spinel
 c) Silicon
 d) Both a & b
- 4) In VLSI design, aggregates are commonly referred to as _____.
 a) Instance
 b) Cells
 c) Tools
 d) Both a & b
- 5) Fall time is the time for a waveform to fall from _____ of its steady state value.
 a) 50% to 10%
 b) 90% to 50%
 c) 90% to 10%
 d) 50% to 20%
- 6) The basic raw material used in CMOS fabrication is _____.
 a) Disk of silicon
 b) Water of silicon
 c) Both a & b
 d) Ingots of silicon
- 7) Absolute value of threshold voltage decreases with an _____ in temperature.
 a) Decrease
 b) Increase
 c) Constant
 d) None of these
- 8) In CMOS capacitor the dielectric material used is _____.
 a) 100 nm SiO₂
 b) 10 μm SiO₂
 c) 10 nm SiO₂
 d) 100 μm SiO₂

B) State True or false.**06**

- 1) Photoresist material is used as mask in fabrication process
- 2) An increase in the temperature of an MOS device result in decrease in carrier mobility.
- 3) Voltage transfer characteristics of CMOS inverter are independent of ratio β_n/β_p .

- 4) Static power dissipation occurs due to charging and discharging of load capacitance.
- 5) For DC characteristics of CMOS inverter in D region n devices is in non-saturated region and p device is in saturated region.
- 6) In PMS design environment P stands for process.

Q.2	A) Attempt any two.	10
	1) Explain Noise margin.	
	2) Write a note on circuit elements in CMOS process.	
	3) Explain power dissipation.	
	B) Derive an expression for threshold voltage.	04
Q.3	a) What do you mean by stick diagram? Draw a stick diagram for two input multiplexer.	08
	b) Describe the steps involved in silicon semiconductor technology.	06
Q.4	a) Explain the n-well process for fabrication of MOS device.	08
	b) Explain pseudo n-MOS inverter.	06
Q.5	a) Explain the DC characteristics of CMOS inverter.	08
	b) Write a note on Hierarchy.	06
Q.6	a) Describe the switching characteristics of CMOS.	08
	b) Write a note on Y - diagram.	06
Q.7	a) Explain the nMOS enhancement transistor in detail.	08
	b) Write a note on Views.	06

Seat No.	
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Set **P**

M.Sc. (Semester - III) (Old) (CBCS) Examination Oct/Nov-2017
Electronics

Advanced Digital Systems Design with VHDL

Day & Date: Saturday, 18-11-2017
Time: 02.30 PM to 05.00 PM

Max. Marks: 70

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

Q.1 A) Choose the alternatives given below.

08

- 1) The VHDL supports _____ design methodology.
 - a) Top-down
 - b) Bottom-up
 - c) Mixed
 - d) All of these
- 2) The meaning of '1' is _____ in Data Types STD_LOGIC_1164.
 - a) High
 - b) 1
 - c) Forcing 1
 - d) All of these
- 3) The _____ design process is included in front end design.
 - a) Design entry
 - b) Gate level netlist
 - c) Both a & b
 - d) None of these
- 4) The NAND and NOR operators are not _____.
 - a) Distributive
 - b) Associative
 - c) Cumulative
 - d) None of these
- 5) The component declaration declares the _____ of the component.
 - a) Name
 - b) Interface
 - c) Both a & b
 - d) None of these
- 6) The mode of ports in entity declaration are _____ types.
 - a) 2
 - b) 3
 - c) 4
 - d) None of these
- 7) The _____ value is assigned by <= assignment operator.
 - a) Variable
 - b) Signal
 - c) Constant
 - d) All of these
- 8) The FPGA architecture are based on _____ to generate logic functions.
 - a) LUT
 - b) Multiplexer
 - c) Macrocell
 - d) Both a & b

B) State True or False.

06

- 1) Simulation is a logical way of emulating the behavior of a circuit.
- 2) In architecture for an entity, all statements are concurrent.
- 3) The place and route tool belongs to back end design process.
- 4) The process statement is itself a concurrent statement.
- 5) The wait statement provides an alternate way to suspend the execution of a process.
- 6) The component declaration is appeared in the declaration part of entity.

Q.2	A) Attempt any two. (Short questions)	10
	a) Explain the entity using decoder.	
	b) Discuss capabilities and features of VHDL.	
	c) Discuss EDA tools for PLD design flow.	
	B) Explain the SPLD.	04
Q.3	a) State and explain the different types of architecture bodies for full adder.	09
	b) Write the VHDL code for 4 – bit shift register.	05
Q.4	a) Explain the process statement with the syntax. Explain any three statements.	09
	b) Write VHDL code for ALU using concurrent code.	05
Q.5	a) What do you mean by basic language element? Explain identifier and Data objects in detail.	09
	b) Write VHDL code for 8:1 Demultiplexer.	05
Q.6	a) Explain in detail classification PLD devices. Explain the architecture of FPGA.	09
	b) Write VHDL code for 4 – bit binary to gray code.	05
Q.7	a) Explain the packages and libraries for VHDL.	09
	b) Write VHDL code for decade counter.	05