



SLR-MJ – 301

Seat No.	
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**M.Sc. (Part – I) (Semester – I) Examination, 2016
ELECTRONICS SCIENCE (Paper – I) (CBCS) (New)
Control Theory**

Day and Date : Tuesday, 29-3-2016

Total Marks : 70

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

- Instructions :** 1) Q. (1) and (2) are **compulsory**.
2) Attempt **any three** from Q. 3 to Q. 7.
3) Use of nonprogrammable calculator is **allowed**.

1. A) Choose the correct alternative.

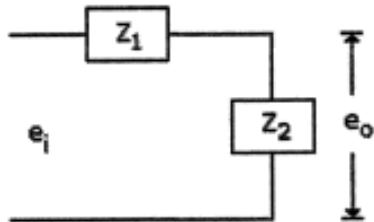
8

- 1) Transfer function of the control system depends on
 - a) system parameters alone
 - b) nature of the input
 - c) initial conditions of input and output
 - d) nature of the output
- 2) In open loop system
 - a) the control action depends on the size of the system
 - b) the control action depends on system variables
 - c) the control action depends on the input signal
 - d) the control action is independent of the output
- 3) Electrical time-constant of an armature-controlled dc servomotor is
 - a) equal to mechanical time-constant
 - b) smaller than mechanical time-constant
 - c) larger than mechanical time-constant
 - d) not related to mechanical time-constant
- 4) A control system in which control action is somehow dependent on output is known as
 - a) open loop system
 - b) closed loop system
 - c) semiclosed loop system
 - d) none of these

P.T.O.



- 5) Which of the following is an open loop control system ?
- a) Field controlled dc motor b) Metadyne
c) Stroboscope d) Microwave oven
- 6) _____ has the tendency to oscillate.
- a) Closed loop system b) Open loop system
c) Both a and b d) Semiclosed loop system
- 7) If the gain of the open loop system is doubled, the gain margin
- a) is not affected b) gets doubled
c) becomes half d) becomes one-fourth
- 8) For the system of the given figure the transfer function $H(S) =$



- a) $\frac{Z_2(s)}{Z_1(s)}$ b) $\frac{Z_2(s)}{Z_1(s)+Z_2(s)}$
c) $\frac{Z_1(s)}{Z_2(s)}$ d) $\frac{Z_1(s)}{Z_1(s)+Z_2(s)}$

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

6

- a) The Bode plot is a graphical representation of Gain margin versus Logarithmic frequency.
- b) In case of open loop control system recalibration is not required for maintaining the required quality of the output.
- c) The output of a feedback control system must be a function of reference and input.
- d) The commonly used frequency domain methods to sketch the frequency response is Nyquist plot.
- e) If the gain of the open loop system is doubled the gain margin becomes double.
- f) In signal flow graph the Masons gain formula is used to calculate the Transfer function of a system.



2. Attempt the followings. **14**
- a) Explain the time domain specifications. **5**
 - b) Write a note on tachogenerator. **5**
 - c) Explain in brief classifications of control systems. **4**
3. a) Consider the system with $G(S) = \frac{K}{S(S+2)(S+4)}$. Find whether $S = -0.75$ is on the root locus using angle condition. **8**
- b) Construct Routh array and determine the stability of the system represented by the characteristics equation $s^5 + s^4 + 2s^3 + 2s^2 + 3s + 5 = 0$. **6**
4. a) Explain the following terms. **8**
- a) Potentiometer error detector
 - b) Lead compensator.
- b) Derive an expression for transfer function of RLC circuit using suitable diagram. **6**
5. a) Explain the block diagram reduction rules with suitable example. **8**
- b) What is signal flow graph ? Explain in brief Mason's gain formula. **6**
6. a) Derive an expression for transfer function of dc Servomotor and represent in block diagram form. **10**
- b) Write a note on frequency response specifications. **4**
7. a) With neat diagram, describe on-off controller using dead zone and hysteresis characteristics. **8**
- b) Explain the PI control action and list advantages and disadvantages. **6**
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M.Sc. (Part – I) (Semester – I) Examination, 2016
ELECTRONICS SCIENCE (CBCS) (New)
Paper – II : Microprocessor and Microcontroller

Day and Date : Thursday, 31-3-2016

Max. Marks : 70

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

- Instructions :** 1) Answer **any 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 alternative :

8

- 1) The Intel 8086 is a _____ bit microprocessor.
a) 4 b) 8 c) 16 d) 32
- 2) In Intel 8086 _____ flag is set if the number of “1” bits in the low-order byte of the result is even.
a) CF b) AF c) PF d) DF
- 3) The PIC18F4550 microcontroller program memory can store upto _____ instructions.
a) 8096 b) 16384 c) 32768 d) 65536
- 4) An internal oscillator of PIC18F4550 microcontroller provides maximum _____ MHz clock frequency.
a) 1 b) 2 c) 4 d) 8
- 5) _____ PIC instruction needs to be executed to return from ISR.
a) RETURN b) RETI c) RETFIE d) RETLAT
- 6) PIC18Fxxxx microcontroller ISA is
a) RISC b) RISK c) CISC d) CISK
- 7) The Memory Endurance for EEPROM of PIC18Fxxxx is _____ erase/write cycles.
a) 10,000 b) 100,000 c) 1,000,000 d) 10,000,000
- 8) The program memory space of PIC18Fxxxx is _____ bits wide.
a) 8 b) 10 c) 12 d) 16



- B) State **true** or **false** : **6**
- 1) In 8086 Flag register is a part of Bus Interface Unit.
 - 2) The Intel 8086 has 8 bit bidirectional data bus.
 - 3) The PIC18F4550 microcontroller has onchip USB Serial Interface Engine.
 - 4) The size of return address stack of PIC18F4550 microcontroller is 31 addresses.
 - 5) The Master Clear Reset of PIC18Fxxxx is active HIGH.
 - 6) In PIC18Fxxxx, clearing a TRISA bit will make the corresponding PORTA pin an output.
2. A) Give features of PIC18Fxxxx microcontrollers. **5**
- B) Write a short note on I2C. **5**
- C) Explain any two 8086 assembler directives. **4**
3. A) Give a brief overview of 8086 addressing modes. **8**
- B) Explain shift and rotate instructions of 8086. **6**
4. A) With a neat diagram explain memory configuration of PIC18F microcontroller. **8**
- B) Write a program to clear RAM locations 20h-28h using indirect addressing. **6**
5. A) Interface LCD to PIC18FXXXX microcontroller and write a assembly language program to display message “Electronics Science”. **8**
- B) Give a brief overview of MPLAB IDE. **6**
6. A) What are the RESET and CLOCK sources supported by PIC18Fxxxx microcontroller ? Explain configuration of these sources. **10**
- B) Explain interfacing switch with PIC18F microcontroller ports. **4**
7. A) Explain thyristor firing using PIC18F microcontroller. **8**
- B) What is PICKit 3 ? Explain its function. **6**
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SLR-MJ – 303

Seat No.	
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M.Sc. – I (Semester – I) Examination, 2016
ELECTRONICS SCIENCE (New CBCS)
Paper – III : Communication System

Day and Date : Saturday, 2-4-2016
Time : 10.30 a.m. to 1.00 p.m.

Total Marks : 70

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

1. Objective questions. Choose correct alternative : **14**
- a) Choose correct alternative : **8**
- i) Envelop detection is concerned with the process of
- a) Mixing b) Heterodyning
c) Modulation d) Rectification
- ii) In FM, the amplitude of modulated frequency signal at all times remains
- a) Varying b) Dependent
c) Constant d) Variable
- iii) What is the highest percentage of modulation for AM ?
- a) 50% b) 75% c) 100% d) 80%
- iv) ASK is rarely used in modems because
- a) It shifts only between ON and OFF states
b) It is highly susceptible to noise
c) It takes care of amplitude only
d) None of the above

P.T.O.



- v) The PWM needs
 - a) More power than the PPM
 - b) More bandwidth than the PPM
 - c) More samples / sec than the PPM
 - d) None of the above
 - vi) CDMA technology is inherently resistant to
 - a) Interference
 - b) Jamming
 - c) Both (a) and (b)
 - d) Detection
 - vii) It is the transmission of digitally modulated analog signals (carrier) between two or more points in a communication system.
 - a) Digital modulation
 - b) Digital transmission
 - c) Data communication
 - d) Pulse modulation
 - viii) The technique that uses M different carrier frequencies that are modulated by the source signal are called
 - a) Multiplexing
 - b) Spreading
 - c) FHSS
 - d) DSSS
- b) State whether **true** or **false** :
- i) PPM can be generated from PWM signals.
 - ii) A frequency hopped system can use analog or digital carrier modulation.
 - iii) AM transmission power increases with frequency.
 - iv) The limiter stage of a FM receiver limits the overall bandwidth of the IF stage.
 - v) Pulse modulation is often used in telegraphy.
 - vi) PSK scheme conveys data by changing the phase of a frequency signal.



2. Attempt **any three** : **14**
- a) What are balanced modulators ? Discuss.
 - b) Discuss pulse modulation systems.
 - c) Explain the full duplex communication system.
 - d) Discuss the types of SS systems.
3. a) Describe the working of a FM transmitter. **10**
- b) Write a note on frequency doubler and frequency tripler circuit. **4**
4. a) Discuss the operation of an AM receiver. **10**
- b) Explain the working of a VCO circuit. **4**
5. a) Write the principle of delta modulation and explain with diagram, the working of delta modulator and demodulators. **10**
- b) Write a note on low pass and band pass signals. **4**
6. a) Describe in detail, the process of DPSK modulation and demodulation. **10**
- b) Write a note on simplex communication system. **4**
7. a) Discuss in detail with neat diagram, the working of CDMA systems. **10**
- b) Illustrate with diagram, the principle of frequency hopping. **4**
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Seat No.	
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**M.Sc. (Part – I) (Semester – I) Examination, 2016
ELECTRONICS (Communication Science) (Old – CGPA)
Paper – III : Communication Systems**

Day and Date : Saturday, 2-4-2016

Total Marks : 70

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

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

1. Objective questions : 14
- a) Select correct alternatives : 6
- 1) In a low level AM system, the amplifier modulated stage must be
- A) Linear devices B) Harmonic devices
C) Class C amplifier D) Non-linear devices
- 2) Phase Lock Loop (PLL) System is used for the detection of
- A) PM B) AM C) FM D) QAM
- 3) Indicate which of the following system is digital ?
- A) Pulse – Position Modulation
B) Pulse – Code Modulation
C) Pulse – Width Modulation
D) Pulse – Amplitude Modulation
- 4) A scheme in which several channels are interleaved and then transmitted together is known as
- A) Frequency-division multiplex
B) Time-division multiplex
C) A group
D) A subgroup



Q. 3 to 7. Long answer questions :

- 3. a) With a neat block diagram, describe the functional aspects of an AM receiver clearly bringing out the significance of each block. **10**
 - b) Differentiate low level amplitude modulation from high level modulation. **4**
 - 4. a) Explain demodulation of FM using balanced slope detector. **10**
 - b) Mention the merits and de-merits of FM detector. **4**
 - 5. a) Explain the sampling theorem for low pass signals and explain aliasing. **10**
 - b) Write a note on 'TDM'. **4**
 - 6. a) With a neat block diagram, explain the Differential Phase Shift Keying (DPSK). Illustrate the generation of differentially encoded sequence for the binary data 1100100010. **8**
 - b) For the binary bit sequence 10110100, draw the waveforms using **6**
 - i) Unipolar NRZ
 - ii) Unipolar RZ
 - iii) Polar NRZ
 - iv) Bipolar NRZ.
 - 7. a) Explain in detail the working of frequency hopped spread spectrum system. **8**
 - b) With suitable illustration explain the principle of direct sequence spread spectrum system. **6**
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Seat No.	
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M.Sc. (Part – I) (Semester – II) Examination, 2016
ELECTRONICS SCIENCE (New – CBCS)
Paper No. – V : Modern Antenna Design

Day and Date : Wednesday, 30-3-2016

Max. Marks : 70

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

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

1. A) Objective questions : 14
- a) Select correct alternatives : 6
- 1) For isotropic radiation the directivity is
a) 0dB b) 0.5dB c) 1dB d) None
 - 2) For a dipole located at origin along z axis, the vertical plan pattern is
a) Directional b) Dumbbell c) Both d) None
 - 3) The radiation resistance of a quarter wave monopole is
a) 72Ω b) 720Ω c) $72\text{K}\Omega$ d) None
 - 4) _____ is the measurement of a unilateral antenna properties of directivity.
a) Phase Angle b) Beamwidth
c) Antenna gain d) Bandwidth
 - 5) For an end fire array the maximum radiation is
a) Perpendicular to the array axis
b) Along the array axis
c) Other than a) and b)
d) None
 - 6) The power gain of the parabolic reflector with aperture diameter D is
a) $(D/\lambda)^2$ b) $6(D/\lambda)^2$ c) $70(D/\lambda)^2$ d) $60(D/\lambda)^2$



- B) State **true** or **false** : **8**
- 1) Radiation can be given by time varying current or accelerating charges.
 - 2) Directivity is proportional to the maximum radiation intensity.
 - 3) Effective length is more appropriate to linear antenna.
 - 4) Non-resonant antenna carries current of standing wave.
 - 5) Wire antenna are considered short only if their length is less than equal to $\lambda/2$.
 - 6) The range of the observation angle ϕ is 0 to 2π .
 - 7) Angle of elevation is the horizontal pointing angle of an antenna.
 - 8) In cassegrain feed the sub reflector is hyperboloid.
2. Answer the following : **14**
- a) What is meant by isotropic radiator ? **5**
 - b) Explain quarter wave monopole. **4**
 - c) Discuss Horn antenna. **5**
3. Answer the following : **14**
- a) Derive an expression for the current distribution of halfwave dipole. **8**
 - b) Write a note on YAGI-UDA antenna. **6**
4. Answer the following : **14**
- a) Explain directivity of an antenna. Determine the maximum directivity of the antenna and express the directivity as a function of directional angles θ and ϕ of,

$$W_{av} = a_r W_r = a_r A_0 \sin^2 \theta / r^2 (\text{W/m}^2).$$
 8
 - b) Explain the array of N-sources of equal amplitude and spacing-Broad side case. **6**
5. Answer the following : **14**
- a) Explain the principle of Pattern multiplication. **10**
 - b) Explain Direction of pattern maxima. **4**
6. Answer the following : **14**
- a) Explain the different types of lens antenna. **10**
 - b) What is Zoning ? **4**
7. Answer the following : **14**
- a) Give various causes of side lobes in the pattern of the dish antenna. **8**
 - b) Differentiate parabolic reflector and corner reflector. **6**
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Seat No.	
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M.Sc. (Part – I) (Semester – II) (New – CBCS) Examination, 2016
ELECTRONIC SCIENCE
Paper No. – VI : Microwave Engineering

Day and Date : Friday, 1-4-2016

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

Total Marks : 70

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

1. Objective questions : 14
- a) Select correct alternatives. 6
- i) The term 'microwaves' is generally used for which of the following frequencies.
- a) 1KHz to 100 KHz b) 100 KHz to 1000 KHz
c) 1 GHz to 300 GHz d) Above 10^9 GHz
- ii) Only the electric field is transverse to the direction of propagation and magnetic field is not transverse is called as
- a) TEM wave b) TE wave c) HE wave d) TM wave
- iii) The characteristic impedance of a rectangular waveguide is
- a) 50Ω b) 75Ω c) 100Ω d) 300Ω
- iv) Frequencies greater than 100 MHz cannot be used in conventional microwave tubes because
- a) Loading effect b) Transit time effect
c) Resistance increases d) BW increases
- v) In the case of TWT, the microwave circuit is,
- a) Resonant b) Non-resonant
c) Oscillatory d) None of the above
- vi) The reflex klystron is a
- a) Single cavity klystron b) Two cavity klystron
c) Multicavity klystron d) None of the above

P.T.O.



- b) State **true** or **false**. **8**
- i) The solution of Maxwell's equation involves three space variables in addition to the time variable.
 - ii) The knowledge of planar wave propagation is very important to understand the propagation of microwaves.
 - iii) Gunn diodes are negative resistance devices which are normally used as low power oscillator at microwave frequencies.
 - iv) In a two cavity klystron, the cavity closed to the cathode is known as the bunches cavity.
 - v) The effect of velocity modulation produces bunching of the electron beam or current modulation.
 - vi) The electromagnetic wave inside a waveguide can have an infinite number of patterns called as modes.
 - vii) TWT is used as broadband amplifiers in microwave applications.
 - viii) The passive elements used to control the amount of microwave power in a transmission line are called as attenuators.
2. Write short notes : **14**
- a) Wave propagation. **5**
 - b) Microwave tubes. **5**
 - c) Attenuators. **4**
3. a) Derive the wave equations with the help of Maxwell's equations. **8**
- b) Discuss wave polarization. **6**
4. a) With neat block diagram, explain the operation of a two-cavity klystron amplifier. **10**
- b) Compare reflex klystron and TWT. **4**
5. a) Describe the various types of waveguides with necessary equations. **10**
- b) Discuss the planar transmission lines. **4**
6. a) Derive the equations for losses in co-axial lines. **10**
- b) What are striplines ? Explain. **4**
7. a) With neat diagram, explain the construction and working of waveguide phase shifters. **8**
- b) What are standard mismatches ? Explain. **6**
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Seat No.	
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**M.Sc. (Part – I) (Semester – II) (New CBCS) Examination, 2016
ELECTRONIC SCIENCE (Paper No. – VII)
Advanced Microcontrollers**

Day and Date : Monday, 4-4-2016

Total Marks : 70

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

Instructions : 1) Q. 1 and 2 are **compulsory**.

2) Answer **any three** questions from Q. 3 to Q. 7.

3) **All** questions carry **equal** marks.

1. Objective questions : 14
- a) Select correct alternatives : 6
- 1) The AVR instruction LDS R0, \$ 1000 loads
 - a) Location \$ 1000 with the contents of SRAM register R0
 - b) Register R0 with the number 1000H
 - c) Register R0 with the contents of SRAM location \$ 1000
 - d) None of them
 - 2) At mega 16 is equipped with _____ bytes of EEPROM.
 - a) 512
 - b) 128
 - c) 64
 - d) 32
 - 3) _____ AVR timer can operate in the 16 bit mode.
 - a) Timer 0
 - b) Timer 1
 - c) Timer 2
 - d) All of these
 - 4) _____ is a Translation Table Base (TTB) register in ARM.
 - a) Register 0
 - b) Register 1
 - c) Register 2
 - d) Register 3
 - 5) ARM920T MMU specifies _____ KB mapping size for tiny pages.
 - a) 1
 - b) 4
 - c) 16
 - d) 64
 - 6) The ARM920T processor implements separate _____ instruction and _____ data caches.
 - a) 8KB, 8KB
 - b) 8KB, 16KB
 - c) 16KB, 8KB
 - d) 16KB, 16KB



- b) State **True** or **False** : **8**
- 1) Most of AVR instructions have fixed 32-bit format.
 - 2) AVR instruction SEN is used for setting a negative flag.
 - 3) AVR instruction LDI R0, \$FF is an example of indirect addressing mode.
 - 4) All the interrupts of AVR, call ISR from an address of 0004H.
 - 5) Internally, the ARM920T is clocked by FCLK.
 - 6) The instruction cycle times for the THUMB instruction are identical to that of the equivalent ARM instruction.
 - 7) SWI instruction is required for supervisor mode program to request unprivileged operations from user mode.
 - 8) Increasing the block size of cache memory reduces performance.
2. Write short notes : **14**
- a) Explain working of Analog Comparator of AVR microcontroller. **5**
 - b) Explain ARM and THUMB mode features. **5**
 - c) Write a short note on Barrel Shifter in ARM. **4**
3. a) With a neat diagram explain the architecture of AVR microcontrollers. **10**
- b) Draw and explain AVR reset circuit. **4**
4. a) Give a brief overview of AVR addressing modes. **10**
- b) Explain interrupt handling in AVR. **4**
5. a) With a neat diagram explain interfacing external SPI device (EEPROM) to AVR. **8**
- b) Give RISC features of ARM microcontroller. **6**
6. a) Give a brief overview of ARM programmer's model. **8**
- b) Write a short note on FIQ interrupt. **6**
7. a) Explain four forms of stack addressing in ARM with suitable examples. **8**
- b) What is memory hierarchy ? Explain working of virtual memory. **6**
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Seat No.	
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M.Sc. (Part – I) (Semester – II) (CBCS) (New) Examination, 2016
ELECTRONICS SCIENCE
Paper – VIII : Digital Design and VHDL Programming

Day and Date : Wednesday, 6-4-2016

Total Marks : 70

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

- Instructions :** 1) *Q. 1 and 2 are compulsory.*
2) *Answer any three questions from Q. 3 to Q. 7.*
3) *All questions carry equal marks.*
4) *Use of non-programmable calculator is allowed.*

1. A) Select the correct alternative : 14
- 1) Generics are specified only in _____ 8
- a) Entities b) Architecture c) Process d) All of these
- 2) The symbol used for signal assignment operator in VHDL is _____
- a) = b) := c) => d) ==
- 3) _____ includes signal and variable declarations.
- a) Entity b) Architecture c) Library d) All of these
- 4) In a VHDL code _____ statement is used in architecture having behavioural description.
- a) Process b) Case c) Generate d) Wait
- 5) _____ includes input and output ports declaration.
- a) Entity b) Architecture c) Library d) All of these
- 6) Constants are specified only in _____
- a) Entities b) Architecture c) Process d) All of these
- 7) The output Q_n of a JK flip flop is zero. It changes to 1 when a clock pulse is applied. The input J_n and K_n are respectively
- a) 1 and X b) X and 0 c) 0 and X d) X and 1
- 8) A four bit modulo-16 ripple counter used JK flip flop. If progression delay of each FF is 50 ms, then maximum clock frequency is equal to _____
- a) 20 MHz b) 5 MHz c) 10 MHz d) 4 MHz



- B) State **true** or **false** : **6**
- 1) The number of state in FSM is infinite.
 - 2) Signal assignment is sequential outside a process and concurrent within a process.
 - 3) Variables are used for local data storage.
 - 4) PAL has programmable AND array and fixed OR array.
 - 5) Flip-flop is a 1 bit memory cell used for storing the digital data.
 - 6) All processes in architecture are executed concurrently.
2. Attempt the followings : **14**
- 1) Design parity generator using k map and draw its logic diagram. **5**
 - 2) Explain attributes with suitable example. **5**
 - 3) Comments on VHDL library. **4**
3. a) Design a PLA to realise the following three logic functions and show the internal connections.
- $$f_a (A, B, C, D) = A'B'D' + B'C.D' + A'.B.C.D$$
- $$f_b (A, B, C, D) = A'.B. + B'.C.D'$$
- $$f_c (A, B, C, D) = A'B'D' + B'.C'.D' + A'.B.C.D.$$
- 8**
- b) Write a VHDL code for 4 bit binary up counter. **6**
4. a) Design 4-bit johnsons counter using J-K flip flop with its timing diagram. **8**
- b) Explain the generate statement in VHDL with its unconditional form. **6**
5. a) What are the different types of data objects used in VHDL ? Explain each of them. **10**
- b) Explain PLD with its advantages. **4**
6. a) Design and draw a logic diagram of 1 : 4 demultiplexer using k map technique. **8**
- b) Write VHDL code for 3 : 8 decoder. **6**
7. a) Draw and describe the architecture of Altera Max 7000. **10**
- b) Give the implementation of $W = X + YZ$ in CPLD. **4**
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SLR-MJ – 313

Seat No.	
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M.Sc. I (Semester – II) Examination, 2016
ELECTRONICS (Communication Science)(Old) (CGPA)
Paper – V : Modern Antenna Design

Day and Date : Wednesday, 30-3-2016

Total Marks : 70

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

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

Objective Questions. 14

1. a) Choose the correct alternatives. 8

- 1) The standard antenna for reference is
 - A) isotropic antenna
 - B) half-wave dipole
 - C) dish antenna
 - D) Yagi-Uda antenna
- 2) For an ideal antenna, the radiation resistance is
 - A) Power gain
 - B) 1
 - C) 1.64
 - D) 1.5
- 3) The current distribution in half-wave dipole is
 - A) Sinusoidal
 - B) Constant
 - C) Triangular
 - D) Parabolic
- 4) The radiation resistance of a current element is _____
 - A) directly proportional to dl
 - B) directly proportional to $(dl)^2$
 - C) inversely proportional dl
 - D) inversely proportional $l/(dl)^2$
- 5) For end-fire array, the excitation phase is
 - A) zero
 - B) $\alpha = -\beta d$
 - C) $\alpha = \beta d$
 - D) 180°

P.T.O.



- 6) The advantage of uniform linear array is
- A) the required number of sources is one
 - B) SLR is small
 - C) number of side lobes are less
 - D) grating lobes are present
- 7) The spacing between folded dipole and reflector is
- A) λ
 - B) $\lambda/2$
 - C) $>\lambda/2$
 - D) $<\lambda/2$
- 8) For a loss-less and matched antenna, gain of the antenna over isotropic source is
- A) directivity
 - B) greater than directivity
 - C) less than directivity
 - D) not related to directivity

b) State **True/False** : **6**

- 1) Effective length of a wire antenna is always greater than the actual length (True/False)
- 2) The radiated fields of z-directed half-wave dipole consists of E_{θ} , E_r , H_{θ} terms. (True/False)
- 3) Radiation beam in broadside array is along the axis of the array. (True/False)
- 4) The sensitivity of Yagi-Uda antenna is more. (True/False)
- 5) Reflector is called primary antenna. (True/False)
- 6) For an ideal antenna, directivity and power gains are equal. (True/False)

2. Attempt following : **14**

- 1) Explain how the radiation mechanism is taking place in an antenna. **5**
- 2) Distinguish between end-fire array and broadside array. **5**
- 3) Write a note on Corner reflector antenna. **4**

3. A) Explain the following terms with respect to antenna : **8**

- i) Isotropic radiator
- ii) Gain
- iii) Beam width
- iv) Radiation pattern
- v) Radiation intensity

B) Derive relationship between maximum effective aperture and directivity. **6**



- 4. A) Obtain the expression for far field component and power radiated by small electric dipole antenna and hence find its radiation resistance. **8**
B) Show that the radiation resistance of $\lambda/2$ antenna is 73Ω . **6**
 - 5. A) What is an antenna array ? Derive an expression for array of 'N' isotropic sources. **10**
B) Explain the principle of pattern multiplication. **4**
 - 6. A) With a neat diagram explain the construction, working and applications of parabolic reflector with methods of feeding the antenna. **8**
B) Explain the salient features of Yagi-Uda and Folded antennas. **6**
 - 7. A) With a neat diagram explain the construction and working principle of Lens antenna and what are its applications. **8**
B) Explain how do you experimentally measure the gain of an antenna by using 'Direct comparison method'. **6**
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SLR-MJ – 314

Seat No.	
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M.Sc. – I (Semester – II) Examination, 2016
ELECTRONICS (Communication Science) (CGPA) (Old)
Paper – VI : Microwave Engineering

Day and Date : Friday, 1-4-2016

Total Marks : 70

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

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

1. a) Objective questions. 14
Select correct alternatives : 8
- 1) The main advantage of using microwaves for communication is
A) Large bandwidth B) Small bandwidth
C) Low power D) High power
- 2) Which one of the following sets of equations is independent in Maxwell's equations ?
A) The two curl equations
B) The two divergence equations
C) Both the curl and divergence equations
D) The two curl equations combined with the continuity equation
- 3) The transmission system using two ground planes is
A) Microstrip B) Elliptical waveguide
C) Parallel-wire line D) Stripline
- 4) Which of the following lines is non-radiating ?
A) Open wire B) Coaxial
C) Both (A) and (B) D) None of the above

P.T.O.



- 5) In a TWT, the amplitude of resultant wave travelling down the helix
- A) Increases exponentially B) Increases linearly
C) Decreases exponentially D) Is almost constant
- 6) The frequency of oscillation obtained from a klystron depends mainly on
- A) Resonant frequency of cavity B) Repeller voltage
C) Voltage of focusing electrode D) Characteristic of cathode
- 7) If a matched attenuator is connected between a $150\ \Omega$ resistive load and $50\ \Omega$ coaxial line the SWR will be
- A) More than 3 B) Less than 3
C) Equal to 3 D) Either (A) or (C)
- 8) A resistive microwave load with $Z_L = 150\ \Omega$ is connected to $50\ \Omega$ coaxial line. SWR is
- A) 1 B) 2 C) 3 D) 3.5

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

6

- 1) Displacement current density leads the conduction current density by 90° .
- 2) In a circular waveguide TE_{21} mode has lowest cutoff frequency.
- 3) Reflex Klystron oscillator the focusing electrode is at a high potential.
- 4) Standard mismatches are used to calibrated SWR and measuring equipments.
- 5) Microwave connector should have high SWR.
- 6) A microwave attenuator may be dissipative or reflective.

2. Answer in brief :

14

- 1) State Maxwell's equations in integral and differential forms. 5
- 2) Explain the working of two-cavity Klystron oscillator. 5
- 3) Write a note on coaxial and stripline shifters. 4



- 3. a) Obtain expression for the total energy carried by electromagnetic wave. Explain vertical, horizontal, left hand and right hand circular polarizations. **10**
 - b) Briefly list the typical applications of microwaves. **4**
 - 4. a) With a neat diagram explain the construction and operation of helix type TWT and mention its microwave characteristics. **8**
 - b) Explain the working of reflex Klystron oscillator. **6**
 - 5. a) Obtain TM mode field equation in a rectangular waveguide. **8**
 - b) How are waveguide different from normal two wire transmission lines ? Discuss the similarities and dissimilarities. **6**
 - 6. a) Describe the basic concept of short-circuited and open circuited lines and find its expression for characteristic impedance. **10**
 - b) Write a note on Dielectric bead supports. **4**
 - 7. a) With necessary diagram explain the various types of waveguide attenuators and explain functioning of precision variable attenuator. **8**
 - b) Discuss about waveguide terminators and matched lodes. **6**
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**M.Sc. (Part – I) (Semester – II) Examination, 2016
ELECTRONICS (Communication Science)
Advanced Microcontrollers (CGPA) (Old)
(Paper No. – VII)**

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

Total Marks : 70

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

1. Objective type questions :

8

A) Choose a correct alternatives :

- 1) Constant byte address in AVR is specified by the contents of
 - a) X-register
 - b) Y-register
 - c) Z-register
 - d) None of these
- 2) The S bit in AVR is always an _____ operation between the negative flag N and two's complement overflow flag V.
 - a) AND
 - b) Exclusive-OR
 - c) OR
 - d) NAND
- 3) In the AVR the priority level of the different interrupt depend upon
 - a) its address
 - b) its data
 - c) both address and data
 - d) none of these
- 4) The direction of one port pin can be changed without unintentionally changing the direction of any other pin with the _____ instructions in AVR.
 - a) ST and LD
 - b) SBI and CBI
 - c) BLD and BST
 - d) ST and SBI
- 5) ARM processor is basically designed for
 - a) Main frame systems
 - b) Distributed systems
 - c) Mobile systems
 - d) Super computers
- 6) The additional duplicate register used in ARM machines are called as
 - a) Copied registers
 - b) Banked registers
 - c) Extra registers
 - d) Extential registers

P.T.O.



- 7) When building code for both ARM and Thumb state, which tool decides for each function call whether to use BL or BLX instruction ?
 a) The linker b) The compiler c) The assembler d) None of these
- 8) The ARM processor registers R_{13} , R_{14} and R_{15} architecturally used for special purposes. Which is the correct respective sequence of the special purpose register ?
 a) PC, LR, SP b) LR, PC, SP c) SP, LR, PC d) LR, SP, PC

B) State true or false :

6

- 1) AVR core will be kept in power-down sleep mode during period of low Vcc.
- 2) All the AVR pointers can be used with LPM/SPM operation.
- 3) The logical instructions can affect only two flags N and Z.
- 4) AVR UART interrupts have higher priority than the external interrupts.
- 5) ARM is not a superscalar processor.
- 6) All instructions in ARM are conditionally executed.

2. 1) Explain data indirect with post decrement addressing mode of AVR with suitable example. **5**
- 2) Explain control and status register associated with Analog comparator in AVR. **5**
- 3) List the features of the ARM processor. **4**
3. A) Explain with the help of neat diagram watchdog timer of AVR. **8**
- B) Explain the I/O Port B of AVR. How to program this port as input and as output. **6**
4. A) Interface 16×2 LCD to AVR and write a program to display "HELLO". **8**
- B) Explain AVR General Purpose Working Registers. **6**
5. A) Explain program and data addressing modes used in AVR with neat diagram. **8**
- B) Explain the concept of Watchdog timer in ARM. **6**
6. A) Explain any four arithmetical instructions related to ARM with suitable example. **8**
- B) Explain briefly Load – Store architecture in ARM. **6**
7. A) Explain interrupt structure in ARM. **8**
- B) Explain constant addressing using LPM instruction in AVR. **6**



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**M.Sc. (Part – I) (Semester – II) Examination, 2016
ELECTRONICS (Communication Science)
(Paper No. – VIII) (Old CGPA)
Digital Design and VHDL Programming**

Day and Date : Wednesday, 6-4-2016

Total Marks : 70

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

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

1. a) Select correct alternatives. 6
- 1) Which of the following is a computer language used to model digital circuits.
a) VHSIC b) ASIC c) VHDL d) C
 - 2) The block of a code which defines relationship between input, output and internal signals or variables in a VHDL design is
a) architecture b) package c) entity d) library
 - 3) Which VHDL data type has a value of '1' or '0' ?
a) signal b) bit c) std_logic d) integer
 - 4) Which device family is volatile ?
a) MAX7000S b) FLEX10K
c) MAX + PLUSII d) VHDL
 - 5) The VHDL editor is
a) graphics editor b) a C program editor
c) a text editor d) an I/O editor
 - 6) A PLD design file in Altera software in which digital design is entered as a schematic has extension
a) .gdf b) .vhd c) .pld d) .max
- b) State **true** or **false**. 8
- 1) Ripple counter is example of synchronous counter.
 - 2) Declaration of input and output is done in architecture body.
 - 3) MAX 7032 CPLD has 32 macro cells.



- 4) PLA has programmable AND plane and fixed OR plane.
- 5) During synthesis if – then logic is implemented using multiplexer.
- 6) The disadvantage of carry look ahead adder is its complexity.
- 7) Race around condition occurs in SR flip flop.
- 8) Excitation table of flip flop is used for calculating input of flip flop from present state and next state output.

2. Write a short note on : **14**
- i) Packages
 - ii) Arithmetic logic unit
 - iii) Simulation process.
3. a) A sequential circuit with two D flip flops A and B and inputs X and Y, and one output Z is specified by the following next state and output equations.
- $$A(t + 1) = X'Y + XA$$
- $$B(t + 1) = X'B + XA$$
- $$Z = B$$
- i) Draw the logic diagram of the circuit
 - ii) Derive the state table
 - iii) Derive the state diagram. **8**
- b) Write a short note on parity generator. **6**
4. a) Design a 3-bit binary synchronous down counter. **8**
- b) Explain function overloading with example. **6**
5. a) Draw a architecture of Xilinx 95XX CPLD. **8**
- b) Draw and explain 3-bit Johnson's counter. **6**
6. a) Write a VHDL code for 4 : 16 decoder using 2 : 4 decoder as a component. **8**
- b) Explain Moore and Mealy finite state machines. **6**
7. a) Implement the function using PLA. **8**
- $$f_1 = \sum m(1,5,7), f_2 = \sum m(5,6,7)$$
- b) Write a VHDL code for 4 : 1 multiplexer. **6**
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M.Sc. – II (Semester – III) Examination, 2016
ELECTRONICS (Communication Science) (New) (CGPA)
Paper – IX : Digital Signal Processing

Day and Date : Tuesday, 29-3-2016

Total Marks : 70

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

Instructions : 1) Q. 1 and 2 are **compulsory**.

2) Answer **any three** questions from Q. 3 to Q. 7.

3) **All** questions carry **equal** marks.

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

8

i) Unit Advance by one sample of a signal sequence is represented by _____

- a) Z^{-1} b) Z c) Z^{-2} d) Z^0

ii) Time down scaling of signal sequence causes _____ of signal.

- a) Expansion b) Compression c) Amplification d) Attenuation

iii) Aliasing or Fold-Over Error occurs when sampling frequency is _____ of signal frequency.

- a) Less than as that b) Twice as that
c) Twice or more that d) Four times that

iv) The _____ of two Discrete Fourier Transforms is equivalent to the circular convolution of sequences in the time domain.

- a) Addition b) Multiplication
c) Division d) Substraction

v) FIR Digital filters are linear _____ filter.

- a) Amplitude and Phase b) Frequency and Phase
c) Frequency d) Phase



vi) Number stage in butterfly diagram of 32-point DIT-FFT are _____

- a) 5 b) 4 c) 3 d) 2

vii) For left sided finite duration sequence ROC is _____

- a) Entire Z-plane except $|Z| = 0$
 b) Entire Z-plane except $|Z| = \infty$
 c) Entire Z-plane except $|Z| = 0$ and $|Z| = \infty$
 d) Entire Z-plane

viii) Coefficients of a LTI system _____ with respect to time.

- a) Vary b) Remain constant
 c) Become Random d) Are Unpredictable

B) State whether the statements are **True** or **False** :

6

- i) A LTI system with the system function $H(z)$ is BIBO stable if and only if a ROC for $H(z)$ contains unit circle.
 ii) A Discrete Time signal is even if $x(-n) = x(n)$.
 iii) Linear convolution of two sequences is non-commutative.
 iv) Computational speed of DIT and DIF FFT algorithms is same.
 v) Region of convergence can contain the poles.
 vi) Digital filters cannot be designed for low frequency range.

2. Write brief notes on the following (**any three**) :

14

- a) Time variant and non-variant systems.
 b) Benefits of Digital Signal Processing.
 c) Z-transform of digital impulse.
 d) Comparison of FIR and IIR filters.

3. a) What is the significance of sampling of analog signal in DSP ?

4

- b) Explain and compute the linear convolution between the following sequences $x(n) = \{1, 2, 3, 4\}$ and $h(n) = \{-1, 2, 2, 1\}$ by Tabulation Method. Sketch the resultant convolution pattern.

10



4. a) Define and explain Discrete Fourier Transform. **4**
- b) State the steps of DIT-FFT algorithm and hence compute 8-point DFT of following sequence :
- $x(n) = \{1, 2, 3, 2, 1, 2, 3, 2\}$. **10**
5. a) Define Z-transform and obtain Z-transforms with ROC of finite duration sequence $x(n) = \{1, 4, 3, 6, 5\}$ **4**
- b) Realize the system in direct form – I described by the difference equation $y(n) = -0.2 y(n - 1) + 0.5 y(n - 2) + 3.8 x(n - 1) + 1.6 x(n - 2)$. **10**
6. a) State the steps of ‘Overlap and Save’ method of computing convolution. **4**
- b) Find linear convolution of following sequence by ‘Overlap and Save’ method : $x(n) = \{1, 1, -2, 2, 1, -3, -1, -1, 2, 1, 2, -1\}$ and $h(n) = \{1, 2\}$. **10**
7. a) Explain the steps involved in the IIR digital filter design using Impulse Invariant Technique. **4**
- b) Apply Impulse Invariant Technique to system with following transfer function and find $H(z)$. (Assume $T = 1$ sec.) $H(s) = \frac{2}{(s + 2)(s + 3)}$. **10**
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**M.Sc. (Part – II) (Semester – III) (New - CGPA) Examination, 2016
ELECTRONICS (Communication Science)
Digital Communication (Paper – X)**

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

Total Marks : 70

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

1. Objective Questions. 14
- a) Select correct alternatives. 6
- 1) In ADM the circuit used before integrator is
- a) Variable gain amplifier b) LPF
c) HPF d) Voltage divider
- 2) The information rate is defined to be
- a) Average number of bits of information/second
b) Total number of bits/second
c) Average information per message arrival
d) None of these
- 3) Channel capacity
- a) Restricts the rate at which information is transmitted
b) Gives the number of signals that can be transmitted simultaneously
c) Is not at all dependent upon the channel noise
d) None of these
- 4) BW of BPSK is _____ than BFSK.
- a) Higher b) Lower c) Equal d) None of these



- 5) A source generates 6 messages the Entropy of the source will be maximum when
- All probabilities are equal
 - One of the probabilities equal 1 and 2 other are zero
 - The probabilities are $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{2}$
 - The two of probabilities are $\frac{1}{2}$ each and other zero
- 6) Equalizers are used for
- frame synchronization
 - symbol synchronization
 - carrier synchronization
 - minimizing ISI

b) State **True** or **False**. **8**

- The phase difference between two possible transmitted signals in QPSK is $\pi/4$.
- In an Eye diagram representation, more opening of the Eye indicates no distortion.
- The early-late gate synchronizer technique used for a carrier synchronization.
- In PCM if the number of quantization levels is increased from 4 to 64, then the bandwidth requirement will approximately be three times.
- All ergodic processes are always stationary.
- ASK is widely used compared to PSK and FSK.
- Equalizers are used to minimize cost talk in communication system.
- Cyclic codes are the subclass of block codes.

2. Write short notes

- TDM-PCM telephone system. **5**
- Properties of convolution codes. **5**
- Binomial probability distribution function. **4**

3. a) Apply the Shannon Fanno coding procedure for the following message ensemble. Calculate its efficiency. **8**

$$[X] = [x_1 \quad x_2 \quad x_3 \quad x_4 \quad x_5 \quad x_6 \quad x_7 \quad x_8]$$

$$[P] = [1/4 \quad 1/8 \quad 1/16 \quad 1/16 \quad 1/16 \quad 1/4 \quad 1/16 \quad 1/8]$$

$$\text{Take } M = 3$$

- Explain the properties of random processes. **6**



4. a) Joint probability function of 2 discrete random variables. X & Y is given by **8**
- $$f(x,y) = cx^2y \quad \dots \dots x = 1,2 \quad y = 0,1,2$$
- $$= 0 \quad \text{otherwise}$$
- i) Find C ?
- ii) $P(X > 1, Y \leq 1)$?
- b) Explain any one ISI minimization method. **6**
5. a) What are the drawbacks of delta modulation ? How they are overcome in adaptive delta modulation ? **8**
- b) Compare BPSK and QPSK modulation. **6**
6. a) A quaternary source generates information with probabilities $p_1 = 0.1$, $p_2 = 0.2$, $p_3 = 0.3$ and $p_4 = 0.4$. Find the entropy of the system. What percentage of maximum possible information is being generated by this source ? **8**
- b) Compare discrete and continuous random variable. **6**
7. a) Implement syndrome calculator for the (7, 4) binary cyclic code generated by $g(x) = 1 + x + x^3$. Check the received vector 1000101 is correct or not ? **8**
- b) Explain Costa's loop method of carrier recovery. **6**
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Seat No.	
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M.Sc. (Part – II) (Semester – III) (New) (CGPA) Examination, 2016
ELECTRONICS (Communication Science)
Satellite Communication (Paper – XI)

Day and Date : Saturday, 2-4-2016

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

Total Marks : 70

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

1. a) Objective questions. Select correct alternative. 8
- 1) Tracking system is used
 - a) To collect data from different sensors and sends to the control earth station
 - b) For the determination of the current orbit and position of the space craft
 - c) For making changes in altitude and orbit correction
 - d) For controlling communication system
 - 2) In a circular orbit the speed of revolution is _____ while in elliptical orbit it depends on _____ of the satellite above the earth.
 - a) Variable, height
 - b) Constant, width
 - c) Constant, height
 - d) Increases, height
 - 3) The time taken for a satellite to complete one orbit is called _____ period.
 - a) Perigee
 - b) Apogee
 - c) Sidereal
 - d) None of these
 - 4) The ku band extends from
 - a) 12 to 14
 - b) 14 to 12
 - c) 4 to 6
 - d) 6 to 4
 - 5) Military satellites often operate in the band
 - a) 200 to 400 Mhz
 - b) 200 to 300 Mhz
 - c) 400 to 600 Mhz
 - d) 100 to 400 Mhz



- 6) In which of the following help for the determination of current orbit and position of spacecraft take place.
- Tracking
 - Command system
 - Telemetry system
 - None
- 7) The satellite system which provides global communication service is
- Intelsat
 - Iridium
 - Eulelsat
 - Both a) and b)
- 8) DAMA stands for
- Demand Accesses Multiple Accounts
 - Data Amount Master Access
 - Demand Access Main Assignment
 - Demand Assigned Multiple Accesses

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

6

- The 3 axes of satellite are pitch, map and roll.
- VSAT network make use of LEO Satellite.
- Satellite DTH system operates mainly in C band.
- EIRP means effective isotropic radiated point.
- In a circular orbit the speed if revolution is constant while in elliptical orbit it depends on height of the satellite above the earth.
- Small jet thrusters on a satellite are used to correct the satellite's attitude.

2. Answer the following :

- Explain the concept of synchronization in TDMA network. 5
- What are the different types of codes in GPS ? 5
- Explain the term : 4
 - Preamble
 - Reference burst.

3. a) What are Kepler's three laws of planetary motion ? Also explain the parameter to describe the satellite orbit. 8

- List the advantages and disadvantages of satellite system. 6



- 4. a) With the help of block diagram explain telemetry, tracking and command (TT and C) sub system of satellite. **8**
 - b) With the help of block diagram explain the working of transponder. **6**
 - 5. a) What is system noise temperature ? How does it affect the C/N and G/T ratio ? **10**
 - b) Calculate the noise temperature of 4 GHz receiver system having the following gain and noise temperatures.
 $T_{in} = 25k, T_{rf} = 50k, T_m = 500k, T_{if} = 1000 k, G_{rf} = 23dB, G_m = 0dB,$
 $G_{if} = 30 dB.$ **4**
 - 6. a) What is meant by one way and two way implementation with respect to VSAT network architecture ? **8**
 - b) Explain in brief the block diagram of DBS-TV receiver. **6**
 - 7. a) Write a note on orbital considerations and frequency considerations. **8**
 - b) Satellite Radio Broadcasting. **6**
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SLR-MJ – 325

Seat No.	
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M.Sc. (Part – II) (Semester – IV) (New CGPA) Examination, 2016
ELECTRONICS (Comm. Science)
Paper – XIII : VLSI Design

Day and Date : Wednesday, 30-3-2016

Total Marks : 70

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

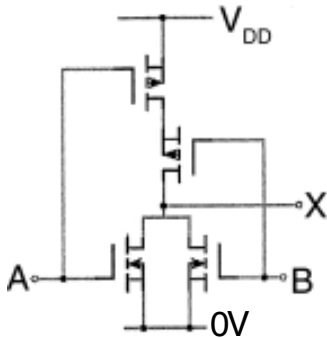
- Instructions:** 1) Q. (1) and (2) are **compulsory**.
2) Answer **any three** questions from Q. 3 to Q. 7.
3) **All** questions carry **equal** marks.

1. Objective questions : 14
- a) Select correct alternatives : 6
- i) Which of the following is an abstraction level of design next to Logic level
A) Behavioural B) Register Transfer
C) Circuit D) Process
- ii) Field Programmable Gate Array does not contain which of the following :
A) CLB B) IOB
C) PSM D) PIB
- iii) The Pull-up transistor in NMOS inverter is
A) p-Channel Depletion mode type
B) n-Channel-Depletion mode Type
C) n-Channel Enhancement mode type
D) p-Channel Enhancement mode type
- iv) The DC Voltage Transfer Characteristics of inverter have two inflation points, which have
A) $dV_o/dV_{in} < -1$
B) $dV_o/dV_{in} = -1$
C) $dV_o/dV_{in} > -1$
D) $dV_o/dV_{in} = 0$

P.T.O.



v) The logic gate represented by the following circuit is



- A) A two input CMOS NOR gate
 B) A two input CMOS OR gate
 C) A two input CMOS NAND gate
 D) A two input CMOS AND gate
- vi) A _____ differential amplifier is particularly well suited for battery operation due to its low power consumption.
 A) BiFET B) BiMOS C) CMOS D) BJT

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

8

- i) Most CMOS circuits operate from a single supply voltage of from 5 to 15 V.
- ii) Static power consumption of a CMOS inverter is negligible.
- iii) The main advantage of CMOS is its fast switching capability
- iv) Dynamic RAM stores information by charging or discharging capacitors.
- v) The longest propagation delay time in an adder is the time it takes the carry to propagate through the full adders.
- vi) Spartan-6 is a Xilinx FPGA family.
- vii) Mismatch in impedance causes reflections and clock timing errors.
- viii) Parasitic capacitance is an unavoidable and usually unwanted capacitance that exists between the parts of an electronic component.



2. Write short notes :	14
a) DC and transient characteristics of CMOS inverter.	5
b) Super buffers-Driving large capacitance loads.	5
c) Data path logic cell.	4
3. a) Discuss implementation strategies of digital ICs and compare their performance.	10
b) What is the power delay trade-off ?	4
4. a) What is a super buffer ? Discuss the design considerations of a super buffer and state its applications.	8
b) Explain the detailed design process for high speed adders multipliers.	6
5. a) Why antifuse technology is preferred over SRAM based Technology for FPGAs ?	8
b) How is a Sequential Logic Cell designed ? Explain with example of a Shift register.	6
6. a) State important features of Cypress PSoC. How they can be used for mixed signal programmable designs ?	8
b) Discuss gain boosting techniques in analog amplifiers.	6
7. a) Compare analog and digital Multipliers.	8
b) Explain the schematic entry-logic synthesis process of digital IC design.	6



Seat No.	
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**M.Sc. (Part – II) (Semester – IV) Examination, 2016
ELECTRONICS (Commn. Sci.) (New – CGPA)
Paper – XIV : Mobile Communication**

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

Total Marks : 70

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

1. Objective questions :

a) Select correct alternatives :

6

- 1) _____ range covers maximum geographical range of all.
 - a) Transmission
 - b) Detection
 - c) Interference
 - d) Handover
- 2) In a FHSS time spent on each channel is _____ time.
 - a) dwell
 - b) channel
 - c) hop
 - d) stay in
- 3) Dwell time in a GSM handoff depends upon _____
 - a) Propagation
 - b) Interference
 - c) Distance
 - d) All of above
- 4) Wireless LAN has advantages like _____
 - a) Safety and Security
 - b) Restrictions
 - c) Quality of service
 - d) Flexibility
- 5) Which of the following is a permanent IP address that is assigned to a mobile node ?
 - a) Foreign agent
 - b) Home agent
 - c) Both a) and b)
 - d) None of these
- 6) The mechanism used in M-TCP is
 - a) Splits TCP connection in to two
 - b) Splits TCP connections, choke sender
 - c) Snoop data
 - d) Snoops data and acknowledgement



- b) State **True** or **False** : **8**
- 1) Traffic load intensity across entire trunked radio system is measured in Mbps.
 - 2) Cellular system with small cell has advantage of less transmission power.
 - 3) A disadvantage of SDMA is that it requires guard space.
 - 4) Infrastructure networks provide access to other network.
 - 5) Frame control field in IEEE 802.11 MAC data frame is of two bytes.
 - 6) IS 95 is a Bluetooth standard.
 - 7) A network mobility supporting ATM switch is NMA.
 - 8) In a mobile IP, a tunnel usually ends at foreign agent.
2. Write a note on :
- a) Explain handoff strategies. **4**
 - b) Explain services provided by wireless data transmission. **5**
 - c) Power management Policy in IEEE 802.11 in infrastructure mode. **5**
3. Long answer questions :
- a) Explain Architecture of GSM with services and features. **10**
 - b) Discuss advantages of CDMA. **4**
4. Long answer questions :
- a) Compare infrastructure network and Adhoc network. **8**
 - b) What are the different options available for PHY realization of WLAN. **6**
5. Long answer questions :
- a) With suitable diagram explain general architecture of HiperLAN2. **8**
 - b) What were the design goals of Bluetooth ? **6**
6. Long answer questions :
- a) Explain the concept of tunneling and Encapsulation for mobile IP. **8**
 - b) Write a note on dynamic host control protocol. **6**
7. Long answer questions :
- a) Compare Mobile TCP, Snooping TCP, Mobile TCP and Traditional TCP in detail with advantages and disadvantages. **10**
 - b) List the services for WATM. **4**
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SLR-MJ – 327

Seat No.	
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**M.Sc. (Part – II) (Semester – IV) (New CGPA) Examination, 2016
ELECTRONICS (Communication Science)
Paper – XV : Fiber Optic Communication**

Day and Date : Monday, 4-4-2016

Max. Marks : 70

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

- Instructions :** 1) Q. (1) and (2) are **compulsory**.
2) Answer **any three** questions from Q. (3) to Q. (7).
3) **All** questions carry **equal** marks.
4) **Use of scientific calculator is allowed.**

1. Objective questions. 14
- a) Select correct alternatives. 6
- i) In spontaneous emission process the atom return to ground or lower energy state in
- a) Predefined way b) Randomly
c) Uniformly d) All the above
- ii) $n_1 \sin \phi_1 = n_2 \sin \phi_2$ is
- a) Snells law b) Newtons law
c) Aperture law d) None of these
- iii) In optical fiber the calorimetric methods are used to measured
- a) Impuring in manufacturing process
b) Attenuation loss
c) Scattering loss
d) None of these
- iv) FET preamplifier is a
- a) Current control device
b) Voltage control device
c) Impedance control
d) All of these

P.T.O.



- v) Fresnel reflection at a fiber-fiber connection can be reduce to a very low level through use of _____ in the gap between the jointed fibers.
- a) An index matching fluid b) Insulator
c) Amplifier d) Impedance
- vi) A photodiode has a quantum efficiency of 70% when photon of energy 1.8×10^{-19} J are incident upon it, then the responsivity of photodiode is
- a) 0.694 b) 0.723 c) 0.369 d) 0.623

b) State **true** or **false** of below statements : **8**

- 1) The tracing helical path through fiber gives changes in direction of $2r$ at each reflection, where r is radius of fiber is known as skew ray.
- 2) When the angle of refraction is 90° and refracted ray emerges parallel to interface between dielectric the angle of incidence must be less than 90° . This limiting case is known as acceptance angle.
- 3) When optical signal travel along the fiber, it broaden due to Dispersion loss.
- 4) Attenuation per KM is expressed in Decibel per KM.
- 5) The LED can operate at lower current density than Laser.
- 6) Response time of detector is order of msec.
- 7) The fundamental step for manufacturing of optical fiber is variation in refractive index of fiber.
- 8) The BER of optical receiver normally varies between 10^{-4} to 10^{-8} .

2. Write short notes :

- a) Explain mechanical splice technique with neat sketch. **5**
- b) Compare linear and non linear scattering mechanism in optical fiber. **5**
- c) Write a short note on photo transistor. **4**

3. a) A multimode graded index fiber exhibits total pulse broadening of $0.1 \mu s$ over a distance of 15 KM. Estimate **8**

- i) The maximum possible bandwidth on the link assuming no intersymbol interference.
- ii) The pulse dispersion per unit length.
- iii) The bandwidth length product for fiber using dispersion.

b) Write a note on dispersion modified single mode fiber. **6**



- 4. a) Briefly explain the liquid phase deposition technique for preparing optical fiber. **8**
b) Write a note on Requirement of cable design structures. **6**
 - 5. a) Explain different characteristics of any two injecting laser. **8**
b) Explain following terms with reference to detector. **6**
 - i) Quantum Efficiency
 - ii) Responsivity.
 - 6. a) Derive the rate equation for laser diode. **6**
b) A planar LED is fabricated from gallium arsenide which has a refractive index of 3.6. **8**
 - i) Calculate the optical power emitted into the air as a percentage of internal optical power for the device when the transmission factor at the crystal-air interface is 0.68.
 - ii) When the optical power generated internally is 50% of the electric power supplied, determine the external power efficiency.
 - 7. a) Explain any one method for fiber dispersion measurement. **8**
b) Explain any one method used to measure fiber refractive index. **6**
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Seat No.	
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M.Sc. (Part – II) (Semester – IV) (New CGPA) Examination, 2016
ELECTRONICS (Communication Science)
Paper No. – XVI : Communication Protocols

Day and Date : Wednesday, 6-4-2016

Max. Marks : 70

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

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

1. A) Select the correct alternative :

8

- 1) _____ system is based on analog radio transmission and circuit switched techniques.
i) 1 G ii) 2 G iii) 2.5 G iv) 3 G
- 2) Flex Ray is more reliable and faster than _____ protocol.
i) CAN ii) LIN iii) I²C iv) All of above
- 3) TRAU is
i) Transportation and Access Unit
ii) Trans-coding and Rate Adaptation Unit
iii) Transceiver Association Unit
iv) Traffic flow Acknowledged to User
- 4) In the non-transparent mode of IP internetworking model, the _____ is gets IP address directly from _____ .
i) GGSN, an external DHCP ii) GGSN, PDN
iii) MS, GGSN iv) MS, SGSN
- 5) _____ has a control layer that is responsible for handling the signalling multimedia session.
i) TACs ii) GPRS iii) UMTS R5 iv) EDGE
- 6) Mobile ad-hoc network has
i) instant infrastructure ii) disaster relief
iii) remote areas iv) all of the above



- 7) IS-95 is based on _____ technology.
 i) DS-CDMA ii) TDMA iii) FDD iv) GMSK
- 8) GSM frequency band for all over the world is
 i) 1900 MHz ii) 900 MHz
 iii) 1800 MHz iv) 900 MHz and 1800 MHz
- B) State **True** or **False** : **6**
- 1) LIN protocol is mainly intended to support the control of mechatronic.
 - 2) BCCH channel is continuously active with dummy burst substituted when there is no information to transmit.
 - 3) Border gateway connects inter PLMN and intra PLMN.
 - 4) Cellular phone network requires home agent, tunnels and default router.
 - 5) HLR is temporary database to which the subscriber currently registers.
 - 6) GSM roaming is more difficult than GPRS.
2. a) How the security is maintained in GSM network ? **5**
 b) What are the advantages of I²C ? **4**
 c) Define user equipment of UMTS. **5**
3. a) With block diagram describe two different frame formats of Bluetooth. **10**
 b) Explain the functionality of PCU in detail. **4**
4. a) Sketch and explain the architecture of GSM network. **10**
 b) Explain VoIP services in brief. **4**
5. a) Explain GPRS attachment and detachment procedure with pictorial presentation. **10**
 b) List different applications of GPRS. **4**
6. a) What are the two major projects of 3G ? Give the brief explanation on following technology,
 1) CDMA-2000 **10**
 2) WCDMA.
 b) What is PDP context ? **4**
7. a) What is the motivation behind dynamic source routing compared to other routing algorithms ? How does a dynamic source routing handle routing ? **10**
 b) Define destination sequenced distance vector. **4**
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