SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ - 332	Wednesday 16/11/2016	10.30 AM to 01.00 PM	Semiconductor Devices	HCT 1.1	

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

Total Marks: 70

Q.1 **A) Select the most correct alternative-** 06

1) Package fraction of a _____ structure is higher than the others.
   a) Simple cubic
   b) Body centered cubic
   c) Face centered cubic
   d) Diamond

2) Which type of material has impurities at the levels of several hundred to several thousand parts per million (ppm)
   a) Metallurgical grade Si
   b) Semiconductor grade Si
   c) Electronic grade Si
   d) Both (a) and (b)

3) _____ particles have a positive effective mass.
   a) Holes
   b) Electrons
   c) Holes and electron both
   d) Neutrons

4) What is the equilibrium hole concentration at 300 K, if Si sample is doped with As concentration of 10^{17} atoms/cm^3?
   a) 10^{17} cm^{-1}
   b) 300 cm^3
   c) 1.5×10^{20} cm^{-1}
   d) 2.25×10^3 cm^3

5) Junction between dissimilar semiconductors is _____
   a) homo junction
   b) heterojunction
   c) both homo and hetero junction
   d) junction tail

6) JFET is _____ controlled device.
   a) voltage
   b) current
   c) both voltage and current
   d) power

B) State whether following statements are true or false: 08

1) A unit cell allows lattice points not only at the corners, but also at the face center.
2) Number of electrons and holes are equal in extrinsic semiconductors.
3) Semiconductor materials at 0 K have the same structure as insulators with conduction and valence band.
4) Zener breakdown occurs at higher voltages compared to Avalanche.
5) Two-terminal devices designed to respond to photon absorption are called photodiodes.
6) Patterns corresponding to complex circuitry are formed on a wafer using etching process.
7) Schottky barrier devices are not suited for use in densely packed integrated circuits.
8) Haynes-Shockley experiment is used to measure the minority carrier mobility.

Q.2 Write brief notes on the following:
    a) Give a brief account of molecular beam epitaxy.   **05**
    b) Write a note on effective mass.   **05**
    c) What are rectifying contacts?   **04**

Q.3 a) 1) Calculate the areal density of Si atoms (number/cm^2) on the (100) plane.   **05**
       Also calculate the volume density of Si atoms (number of atoms/cm^3), the
       lattice constant of Si is 5.43 A.
      2) Calculate the maximum packing fraction and the radius of the atoms   **05**
       treated   as hard spheres (Si) with the nearest neighbors touching.

    b) Write a note on Cubic lattices.   **04**

Q.4 a) What are intrinsic and extrinsic materials?   **10**

    b) What is the law of mass action? Describe law of mass action for p-type and   **04**
       n-type semiconductors.

Q.5 a) What is a rectifier? Give the advantage of guard ring diffusion.   **10**

    b) Distinguish between diode and varactor diode?   **04**

Q.6 a) Derive an expression for current voltage characteristics of a FET.   **10**

    b) Comment on the threshold voltage of an ideal MOS.   **04**

Q.7 a) What is Fermi level and the Fermi Dirac distribution function? Draw and   **10**
       explain the Fermi-Dirac distribution function of intrinsic, n-type and p-type
       material.

    b) Explain Hall effect in brief.   **04**

Master of Science – I (Electronics Science)
Examination: Oct / Nov 2016 Semester – I (New CBCS)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ 333	Friday 18/11/2016	10:30 AM to 01:00 PM	Network Analysis & Synthesis	HCT 1.2	

Instructions:
1) Q.No.1 and 2 are compulsory.
2) Answer any three questions from Q.No.3 to Q.No.7.
3) All questions carry equal marks.
4) Use of non programmable calculator is allowed.

Q.1 A) Select correct alternatives: 06

1) Reciprocity theorem is valid only for ------------
   a) Linear circuits   b) Bilateral
   c) Active network   d) All of these

2) KVL works of the following the principle of --------------.
   a) Low of conservation of charge   b) Low of conservation of energy
   c) Both (a) and (b)   d) None of the above

3) Laplace transform of e^{at} is
   a) $1/(s + a)$ b) $1/(s - a)$
   c) a/s d) s/a

4) When $f < f_r$, impedance in a series resonance circuit is --------
   a) Capacitive   b) Inductive
   c) Resistive   d) Zero

5) The nodal method of circuit analysis is based on --------
   a) KVL and Ohm's law   b) KCL and Ohm's law
   c) KCL and KVL   d) All of the above

6) In a ----------- circuit, any linear n/w can be replaced by a voltage source in series with an impedance.
   a) Thevenin's
   b) Norton's
   c) Tellegan's
   d) Reciprocity

B) State True or false: 08

1) Laplace transform method can be used for solving first order differential equations.

2) In a parallel circuit, the current flowing through all the resistances will be the same and equal to the total current.

3) The Laplace transform of unit step signal is 1/s.

4) An element or number of elements connected between two nodes constitutes a branch.

5) The quality factor factor is defined as the ratio of the maximum energy stored to energy dissipated in one period.

6) The Tellegan's theorem is valid for the network which obeys Kirchoffs voltage and current laws.

7) Initial condition for a capacitor with voltage is open circuit.

8) For positive real function, the sum of two positive real functions is positive real.

Q.2 **Answer the following:**

   a) Explain variation of an impedance with frequency in a parallel resonant circuit.   **05**

   b) Explain waveform synthesis of a network in detail.   **05**

   c) Describe steps to be followed in nodal analysis.   **04**

Q.3 a) Explain mesh analysis with a suitable example.   **08**

   b) Explain the following properties of a Laplace transform.   **06**
1) Linearity
2) Time shifting theorem

Q.4 a) Derive an expression for bandwidth of a series RLC circuit.   **10**

   b) Determine the values of X_c and impedance at resonance for the circuit below.   **04**
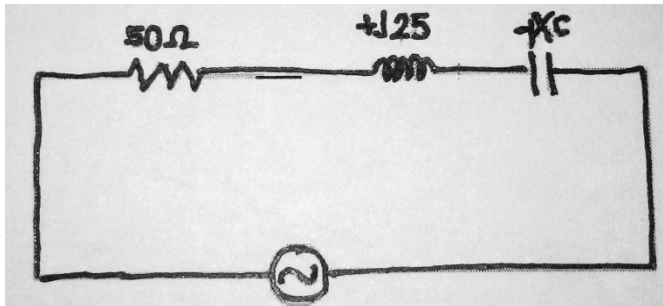
Q.5 a) Explain Thevenin's theorem. Obtain Thevenin's equivalent network for the terminals A and B below.   **08**
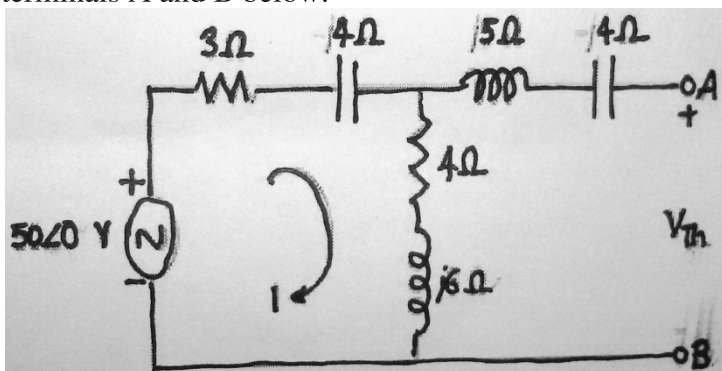
b) Calculate the current through 2Ω resistor for the network shown below.   **06**
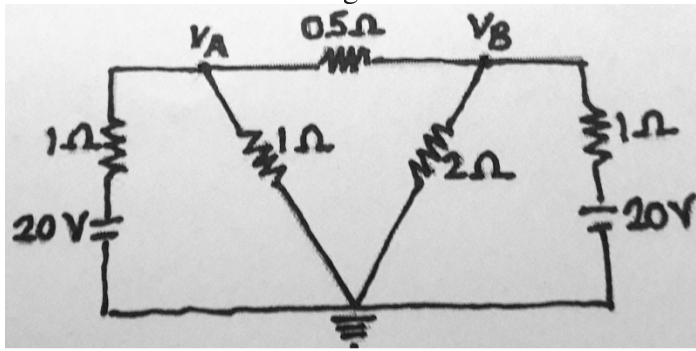
Q.6 **a)** Explain series and parallel combinations of capacitors and obtain voltage division in series circuit.   **08**

b) The Whether $F(s) = s^2 + 6s + 5/s^2 + 9s + 14$ is positive real function?   **06**

Q.7 **a)** Find the Z parameters for a network shown below.   **08**
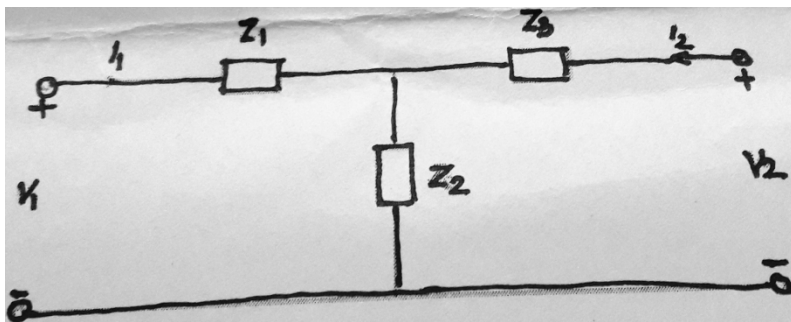
b) Explain short circuit admittance parameters.   **06**

Master of Science – I (Electronic Science)
Examination: Oct / Nov 2016 Semester – I (New CBCS)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ- 334	Monday 21/11/2016	10:30 AM to 01.00 PM	Communication Systems	HCT 1.3	

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

Total Marks: 70

Q.1 A) Choose correct alternative 08

1) A FM signal with a modulation index m_f is passed through a frequency tripler. The wave in the output of the tripler will have a modulation index of
   a) m_f b) $3m_f$
   c) $m_f/3$ d) $m_f/9$

2) A 400 W carrier is amplitude modulated with m = 0.75. The total power in AM is _____
   a) 400 W   b) 512 W
   c) 588 W   d) 650 W

3) Non-coherently detection is not possible for _____
   a) PSK   b) ASK
   c) FSK   d) Both a and c

4) Which of the following is the indirect way of FM generation?
   a) Reactance bipolar transistor modulator
   b) Armstrong modulator
   c) Varactor diode modulator
   d) Reactance FM modulator

5) If C is capacity of noisy channel, (bits/s), δf is bandwidth in Hz and S/N is signal to noise ratio, then _____

   a) $C = (\delta f) \log_2 \left[1 + \frac{S}{N}\right]$ b) $C = 2(\delta f) \log_2 \left[1 + \frac{S}{N}\right]$

   c) $C = \log_2 \left[1 + \frac{S}{N}\right]$ d) $C = (\delta f) \log_{10} \left[1 + \frac{S}{N}\right]$

6) If transmission bandwidth is doubled in FM, Signal to Noise Ratio is ____
   a) Doubled   b) Raised four times
   c) Decreased four times   d) Halved

7) Quantizing error occurs in _____
   a) TDM   b) FDM
   c) PCM   d) PWM

8) In a two tone AM system the two modulating frequencies are 2000 and 4000 rad/sec. If carrier frequency is 2 X 10^6 rad/sec, the frequencies of upper sidebands are ___
   a) 1.002 MHz and 1.004 MHz
   b) 1.001 MHz and 1.002 MHz
   c) 1.001 MHz and 1.004 MHz
   d) 1.002 MHz and 1.008 MHz

B) State whether following statements are true or false: **06**

1) For an ideal 3000 Hz channel, S/N ratio is 4.
2) In a single tone AM modulation, the transmission efficiency for m = 1 is 33.3%.
3) In a superheterodyne receiver, having no RF amplifier, the IF is 455 kHz. The image frequency at 1000 kHz is 545 KHz.
4) E and H field are perpendicular to each other.
5) A video monitor is exactly similar to TV receiver.
6) Audio tapes have two tracks each 2.5 mm wide.

Q.2 Attempt the following: **14**

a) Differentiate between class A, class B and class C modulated power amplifiers.   **04**
b) Draw the block diagram of VCO and explain its operation.   **05**
c) With a neat diagram explain the operation of balanced modulator.   **05**

Q.3 A) Draw the block diagram of a high level modulated AM transmitter and explain each block.   **08**

B) Explain how an amplitude modulated signal be detected.   **06**

Q.4 A) Explain the process of multiplication of frequency with a neat circuit diagram.   **08**

B) How PLL can be employed as FM detector? Explain.   **06**

Q.5 A) Explain briefly about Delta modulation.   **08**

B) With a neat circuit diagram, explain how a PTM signal be generated?   **06**

Q.6 A) Differentiate between ASK, FSK and PSK.   **08**

B) Discuss the characteristics of PN sequences.   **06**

Q.7 A) What is frequency hopping spread spectrum? Explain in detail.   **08**

B) Explain how a DS signal can be tracked?   **06**

Master of Science – I (Electronics Science)
Examination: Oct / Nov 2016 Semester – I (New CBCS)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ – 335	Wednesday 23/11/2016	10:30 AM to 01:00 PM	Microcontroller & Interfacing	SCT 1.1	

Instructions:
1) Answer five questions.
2) Q.No.1 and 2 are compulsory.
3) Answer any three questions from Q.No.3 to Q.No.7.
4) Use of scientific calculator is allowed

Total Marks: 70

Q.1 A) Select the most correct alternative: 08

1) In 8051 _____ ports also serves as a bi-directional low-order address and data bus for accessing external memory.
   - a) PORT 0
   - b) PORT 1
   - c) PORT 2
   - d) PORT 3

2) _____ flag is not present in 8051.
   - a) Carry
   - b) Overflow
   - c) Zero
   - d) Parity

3) The internal RAM location 00H of 8051 can also be accessed as _____
   - a) Register R0 of bank 0
   - b) Direct memory address 00H
   - c) Indirect memory address 00H using @R1
   - d) All of these

4) In 8051 _____ pain is used while accessing External ROM.
   - a) PSEN
   - b) RD
   - c) WR
   - d) All of these

5) An 8 – bit ADC connected to 8051 and having 5V Vref can read analog inputs with approximately _____ precision.
   - a) 1 mV
   - b) 2 mV
   - c) 10 mV
   - d) 19.53 mV

6) _____ I/O pins are required to connect the 3x3 matrix keypad with 8051.
   - a) 3
   - b) 6
   - c) 9
   - d) 12

7) Cold junction compensation is required for _____ sensor.
   - a) LM35
   - b) Thermocouple
   - c) Thermistor
   - d) LDR

8) The second line of characters is addressed at _____ location in 16*2 LCD.
   - a) 00H-0FH
   - b) 20H-2FH
   - c) 80H-8FH
   - d) C0H-CFH

B) **State whether following statements are True or False:** 06
1) The serial port of 8051 is simplex.
2) The stack pointer of 8051 decrements before storing data on the stack.
3) The 8051 has bit-addressable area of 16 bytes.
4) The Reset pin of 8051 is active high.
5) The 8051 I/O port pins an drive LED directly.
6) The GPS module is used to connect the 8051 kit with GSM networks.

Q.2 **A)** Explain unconditional jump instructions of 8051. 05

B) Interface relay with 8051 05

C) Give specifications of IC LM35 04

Q.3 **A)** Draw and explain 8051 as a programmer model. 08

B) Give a brief overview of 8051 I/O ports. 06

Q.4 **A)** What is the need of timers and counters? Give any two applications of each. 08

B) Explain timer configuration in 8051 06

Q.5 **A)** Interface DAC0808 with 8051 microcontroller and write programs to generate square wave, sawtooth wave, triangular wave. 10

B) What is optocoupler? Give any two applications of optocoupler. 04

Q.6 **A)** Compare LM35, thermistor and a thermocouple 04

B) Explain with proper schematic diagrams the interfacing of LM35 and thermistor with the microcontroller. 10

Q.7 **A)** With a neat diagram explain interfacing of 16x2 LCD display with the microcontroller. Draw and explain waveforms for read/write control word and data to LCD. 08

B) Write a program to scroll following text on the LCD display, "Solapur University" 06

Master of Science – I (Electronics Science)
Examination: Oct /Nov 2016 Semester – I (Old CBCS)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ 337	Wednesday 16/11/2016	10.30 AM to 01.00 PM	Control Theory	I	

Instructions:
1) Question No. 1 and 2 is compulsory.
2) Attempt any three questions from Q. no. 3 to Q. no. 7
3) Use of non programmable calculator is allowed.

Total Marks: 70

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

1) The steady-state error of a feedback control system with an acceleration input becomes finite in a __
   a) type 0 system
   b) type 1 system
   c) type 2 system
   d) type 3 system

2) The impulse response of a LTI system is a unit step function, then the corresponding transfer function is __
   a) $1/s$
   b) $1/s^2$
   c) 1
   d) s

3) Peak overshoot of step-input response of an under damped second-order system is explicitly indicative of ____
   a) settling time
   b) rise time
   c) natural frequency
   d) damping ratio

4) In case of an open loop control system which of the following statement is true?
   a) Output is dependent of control input
   b) Output is independent of control input
   c) Only system parameters have effect on control output
   d) None of these

5) Routh Hurwitz criterion provides
   a) roots in right half of s plane.
   b) roots in left half of s plane.
   c) roots in right half of s plane and roots on imaginary axis.
   d) roots in left half of s plane and roots on imaginary axis.

6) When a unit step voltage drives a lag network the output
   a) remains constant at unit step value
   b) increase exponentially from zero to final value
   c) decrease exponentially from 1 to 0
   d) either (b) of (c) depending on values of R and C

7) The compensator of the given figure is a

   a) lag compensator   b) lead compensator
   c) lag-lead compensator   d) None of the above

8) For the system with the given figure, the transfer function H(s) can be represented as

  a) $\dfrac{Z_2(S)}{Z_1(S)}$ b) $\dfrac{Z_2(S)}{Z_1(S)+Z_2(S)}$

  c) $\dfrac{Z_1(S)}{Z_2(S)}$ d) $\dfrac{Z_1(S)}{Z_1(S)+Z_2(S)}$

B) State true/ false :   **06**
   1) Delay time is not the time domain specification.
   2) The commonly used frequency domain method to sketch the frequency response is Nyquist plot.
   3) If the gain of the open loop system is doubled the gain margin becomes double.
   4) The signal cannot travel along the direction of arrow only.
   5) Transfer function of a system is not used to calculate the output for any given input.
   6) In a control system the output of the controller is given to final control element.

Q.2 Attempt the following:
   A) Explain the classifications of control system.   **05**
   B) Explain in brief Masons gain formula.   **05**
   C) Briefly describe the frequency domain specifications.   **04**

Q.3 A) Consider the system with G(S) .H(S) = K/S(S+2). (S+4). Find whether S=-0.75   **08**
       is on the root locus using angle condition.

B) Determine the stability of the system represented by the characteristics equation using Routh's method. **06**

$$S^3+6S^2+11\ S+6=0$$

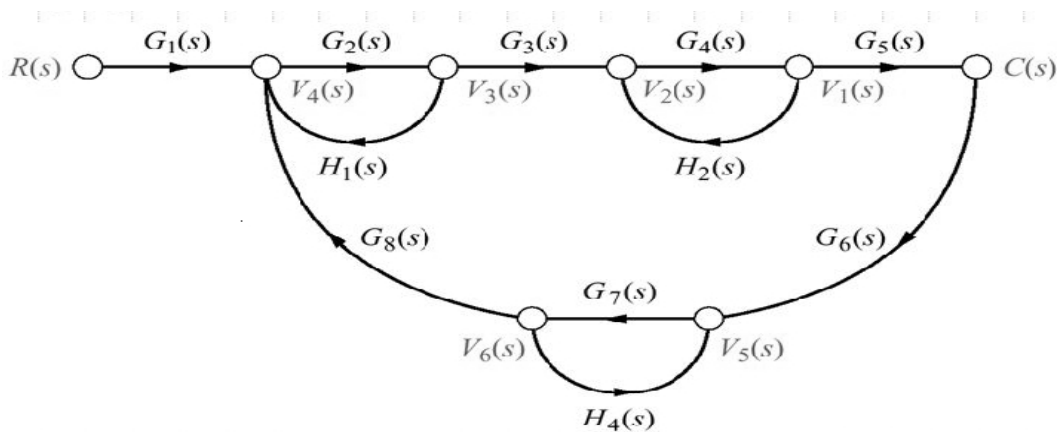**Q.4 A)** Derive an expression for unit step response of first order system. Draw the response. **08**

B) What is control system? Explain effect of feedback on system performance. **06**

Q.5 A) Simplify the block diagram for the figure shown below. **07**
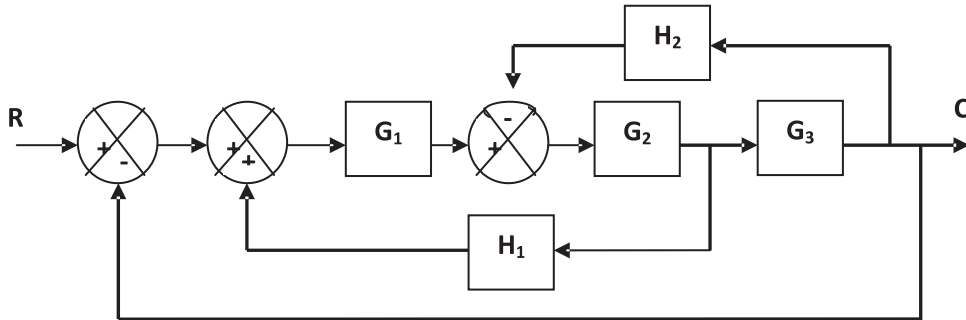
B) Find the transfer function, c(s)/r(s), for the signal flow graph shown in figure below. **07**

Q.6 A) Explain PID Controller in detail with suitable equations. **10**

B) Compare open loop and closed loop control system. **04**

Q.7 A) What is potentiometer error detector? How do you represent it in the form of block diagram? **08**

B) What is gear train? Derive an expression for motor torque. **06**

Date: 16/11/2016

Master of Science – I (Physics - Electronics Science) Examination: Oct / Nov 2016 Semester – I (Old CBCS)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ – 338	Friday 18/11/2016	10.30 AM to 01.00 PM	Microprocessor and Microcontroller	II	

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

Total Marks: 70

Q.1 A) Choose correct answer 08

1) The Intel 8086 can address upto _____ memory
   a) 8KB   b) 64KB
   c) 1MB   d) 8MB

2) The segment size of 8086 is _____
   a) 8KB   b) 16KB
   c) 32KB   d) 64KB

3) The operating frequency range of PIC18F4550 _____
   a) DC – 8 MHz   b) DC – 16 MHz
   c) DC – 24 MHz   d) DC – 48 MHz

4) The return address stack of PIC18F4550 allows any combination of up to _____ programs calls and interrupts to occur.
   a) 7   b) 15
   c) 31   d) 47

5) Maximum current sourced by all ports of PIC18Fxxxx microcontroller is _____mA.
   a) 20   b) 50
   c) 100   d) 200

6) The special function Registers of PIC18Fxxxx occupy the data memory space from _____
   a) 000 to 080h   b) 100h to 180h
   c) F00h to F80h   d) F60h to FFFh

7) In PIC18Fxxxx oscillator configuration XT refers to _____
   a) Crystal/resonator   b) High speed crystal/resonator
   c) External clock   d) Internal clock

8) The Memory Endurance for program memory of PIC18Fxxxx is _____
   eras/write cycles.
   a) 10,000   b) 100,000
   c) 1,00,000   d) 10,000,000

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

   1) The Intel 8086 is a 32 bit microprocessor
   2) In 8086 segment registers and Instruction pointer are part of Execution Unit.
   3) In PIC18Fxxxx, setting a TRISA bit will make the corresponding PORTA pin an output
   4) Internal Oscillator of PIC18Fxxxx can provide clock frequency of upto 16MHz
   5) Timer 0 of PIC18Fxxxx is 16 bit
   6) PIC18Fxxxx has 8 x 8 hardware multiplier as part of the ALU

Q.2 A) Write a short note on 8086 status register   **05**

   B) Give advantages of PIC18Fxxxx microcontrollers.   **05**

   C) Write a short note on PIC 8259   **04**

Q.3 A) With a suitable diagram explain internal architecture of 8086   **10**

   B) Explain arithmetic instruction of 8086   **04**

Q.4 A) With a neat diagram explain the architecture of the PIC18Fxxxx microcontroller.   **08**

   B) Explain Bit-oriented operations in PIC8Fxxxx microcontrollers with suitable examples.   **06**

Q.5 A) Explain the interrupt configuration of PIC18fxxxx microcontrollers   **08**

   B) Explain the sleep modes of PIC18Fxxxx microcontroller.   **06**

Q.6 A) What is IDE? Explain the steps in MPLAB IDE for PIC program development.   **08**

   B) Draw and explain the waveforms for sending data, sending command and checking busy status of smart LCD.   **06**

Q.7 A) Explain speed control of DC motor using PWM generated by PIC microcontroller.   **08**

   B) Explain relay and opto – coupler interfacing with PIC ports.   **06**

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ – 339	Monday 21/11/2016	10:30 AM to 01.00 PM	Communication Systems	III	

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

Total Marks: 70

Q.1 A) Choose correct alternative 08

1) Amplitude modulation causes the amount of transmitter power to ___
   a) Increase
   b) Decrease
   c) Remain the same
   d) Double

2) In FM, the change in carrier frequency is proportional to what attribute of the modulating signal.
   a) Angle
   b) Frequency
   c) Amplitude
   d) Tone

3) The process of impressing intelligence on the carrier is called____
   a) Modulation
   b) Detection
   c) Mixing
   d) Demodulation

4) Two binary values are represented by two different frequencies in ___
   a) ASK
   b) FSK
   c) PSK
   d) DPSK

5) The main advantage of TDM over FDM is that, it ____
   a) needs less power
   b) needs less bandwidth
   c) needs simple circuitry
   d) gives better S/N ratio

6) In CDMA, the bit rate of the digital data is called _____
   a) Chipping frequency
   b) Information rate
   c) Chip
   d) Epoch

7) What is the category of data transmission, if the binary pulse is maintained for the entire bit time?
   a) Return to zero
   b) Bipolar
   c) Non-return to zero
   d) Unipolar

8) DSSS technique expands the bandwidth of a signal by replacing each data bit with
   a) $n + 1$ bits
   b) $n - 1$ bits
   c) n bits
   d) both a & b

B) State whether following statements are true or false: 06

1) TDM system is more immune to inter channel cross-talk as compared to FDM systems.
2) The process of impressing information on the carrier is called mixing.
3) Mixer stage mainly determines a communication receiver's sensitivity.
4) BPSK stands for binary pulse shifting key.
5) In half duplex communication system, information is transmitted in both directions but the flow is only one way at a given time.
6) Frequency hopping is the easiest spread spectrum modulation to use.

Q.2 Attempt any three: 14

a) Explain the necessity of modulation in electronic communication system.
b) State and explain Sampling theorem.
c) Write a note on data formats.
d) Discuss the basic concepts of spread spectrum modulation.

Q.3 A) Describe the operation of an AM receiver and detector circuits. **10**

B) What is a PLL? Explain. **04**

Q.4 A) Draw the block diagram of low and high level modulated AM transmitters and explain their functioning. **10**

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

Q.5 A) With neat diagram, explain in detail, the pulse amplitude modulation and demodulation circuits. **10**

B) Write a note on generation of PTM. **04**

Q.6 A) Discuss FSK modulation and demodulation techniques in detail. **10**

B) Write a note on asynchronous transmission. **04**

Q.7 A) With neat block diagram, explain the working of a direct sequence spread spectrum (DSSS) transmitter and receiver. **10**

B) Write a note on applications of spread spectrum. **04**

Master of Science – I (Electronics Science) Examination: Oct / Nov 2016 Semester – II (New CBCS)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ - 341	Thursday 17/11/2016	10:30 AM to 01:00 PM	Modern Antenna Design	V	

Instructions:
1) Q.No.1 and 2 are compulsory.
2) Answer any three questions from Q.No.3 to Q.No.7.
3) All questions carry equal marks.

Total Marks: 70

Q.1 **Objective Questions.** 14

A) **Select correct alternatives:** 06

1) Radiation intensity is dependent of
   a) Distance *r*   b) Both
   c) Direction   d) None

2) Dipole antenna has maximum radiation in a plane
   a) Normal to the axis   b) Both
   c) Perpendicular to the axis   d) None

3) The radiation resistance of the dipole of the length λ /10 is
   a) 80Ω   b) 804Ω
   c) 720 Ω   d) None

4) ---------- is the meansurement of a unilateral antenna properties of directivity.
   a) Phase Angle   b) Antenna gain
   c) Beamwidth   d) Bandwidth

5) For linear uniform two elements array for d = λ / 2 and α = 0 the radiation pattern is
   a) Vertical figure of eight   b) Cardioids
   c) Horizontal figure of eight   d) Combination of A & B

6) --------- is the horizontal pointing angle of an antenna.
   a) Azimuth   b) Right angle
   c) Angle of elevation   d) Beam width

B) **State True or false:** 08
1) Lenses widely used in combination with horn antenna.
2) Electromagnetic radiator converts time varying voltage into wave in free space.
3) Resolution of antenna is equal to its twice power beam width.
4) Resonant antenna carries current of standing wave.
5) The vertical plane pattern of short dipoles and half wave dipole is dumbbell.
6) For the absence of the side lobes, the spacing of the elements of the binomial array must be greater than equal to λ / 2.
7) The antenna that can give pencil beam pattern is Yagi Uda.
8) Lens antennas are used at the frequencies above 3GHz.

Q.2   **Answer the following:**   14

  a)   Define the radiation resistance and explain its significance.   05
  b)   What is effective length? What is its significance in description the   05
     performance of linear antenna?
  d)   Define corner reflector antenna.   04

Q.3   **Answer the following:**   14
  a)   Derive expression for the retarded potentials.   08
  b)   What is meant by directivity? What is meant by antenna beam width?   06

Q.4   **Answer the following:**   14
  a)   Explain radiation mechanism of two wires. Discuss the types of lobes.   10
  b)   A short vertical grounded antenna is designed to radiate at 10 MHz. Calculate   04
     the radiation resistance if the effective height of the antenna is 50 m.

Q.5   **Answer the following:**   14
  a)   Write short notes on: 08
     i)   Broadside arrays
     ii)   EFA
  b)   Define the antenna efficiency. What are different losses associated with the   06
     antenna system?

Q.6   **Answer the following:**   14
  a)   Describe the parabolic reflector used at micro frequencies?   10
  b)   List the applications of helical antenna?   04

Q.7   **Answer the following:**   14
  a)   Explain the different types of lens antenna and list their important features.   08
  b)   Define reciprocity theorem as application to antenna.   06

Master of Science – I (Electronics Science)
Examination: Oct / Nov 2016 Semester – II (New CBCS)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ - 342	Saturday 19/11/2016	10:30 A.M to 1:00 P.M	Microwave Engineering	VI	

Instructions:
1) Q.No.1 and 2 are compulsory.
2) Answer any three questions from Q.No.3 to Q.No.7.
3) All questions carry equal marks.

Total Marks: 70

Q.1 Objective Questions. 14

A) Select correct alternatives: 06

1) According to IEEE microwave frequency bands, the frequency range of C-band is
   a) 1GHz to 2GHz
   b) 2GHz to 4GHz
   c) 4GHz to 8GHz
   d) 8GHz to 12GHz

2) Which of the following is not a Maxwell's equation,
   a) $\nabla \times E = -\partial B/\partial t$
   b) $\nabla.D = \rho$
   c) $D = \epsilon E$
   d) $\nabla.B = 0$

3) The dominant mode in a particular waueguide is the mode having the
   a) Lowest cut off frequency
   b) Middle frequency
   c) Highest cutoff frequency
   d) None of the done

4) One of the following modes cannot exist in a rectangular waveguide,
   a) TE mode
   b) TEM mode
   c) TM mode
   d) None of the above

5) The passive elements used to limit microwave power in a transmission line is called as
   a) Isolators
   b) Phase shifters
   c) Attenuators
   d) None of the above

6) The periodic fluctuations of current passing thru the n-type GaAs specimen was discovered by
   a) J. B. Gunn
   b) B.C. Reloach
   c) R.C. Johnston
   d) B.G. Cohen

B) State True or false: 08
1) In TM waves, there is no component of magnetic field in the direction of propagation.
2) A line terminated in its characteristic impedance has a standing waves ration of unity.

3) The reflex klystron over comes the disadvantages of the two cavity klystron.
4) The wave in the TWT is a propagating wave.
5) In waveguides, the electric and magnetic fields are confined to the space within the guide only.
6) The quality factor Q, of a microstrip line is very high which may be required for high quality resonant MICs.
7) Impedance matching is very desirable in transmission lines.
8) The Gunn diode is always operated in the negative resistance region.

Q.2	**Write short notes:**		**14**
	a)	Microwave Spectrum	**05**
	b)	Microwave tubes	**05**
	d)	Stripline attenuator	**04**

Q.3	**a)**	Derive the TE mode field equations in a rectangular waveguide.	**10**
	b)	Write the Maxwell's equations in both differential and integral forms.	**04**
Q.4	**a)**	With necessary diagram, explain the construction and working of a reflex klystron.	**10**
	b)	Explain the Gunn effect.	**04**
Q.5	**a)**	Discuss the various Co-axial and stripline components.	**10**
	b)	Give an account on impedance matching.	**04**
Q.6	**a)**	With neat Diagram, explain the construction and working of waveguide attenuators.	**10**
	b)	Write a note on waveguide terminations.	**04**
Q.7	**a)**	With neat sketch, explain the working of phase shifters.	**10**
	b)	Write a note on standard mismatches.	**04**

Master of Science – I (Electronic Science) Examination:
Oct / Nov 2016 Semester – II (New CBCS)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ – 343	Tuesday 22/11/2016	10.30 AM To 01.00 PM	Advanced Microcontrollers	VII	

Instructions:
1) **Q. no. 1 and Q. no 2 are compulsory**
2) **Attempt any three questions from Q. No.3 to Q. No. 7**
3) **All questions carry equal marks**

Total Marks: 70

Q.1 A) Select correct alternative   08

1) How many general purpose working registers are in AVR microcontroller?
   - a) 16*8 bit
   - b) 16*16 bit
   - c) 32*8 bit
   - d) 32*16 bit

2) AVR external interrupts are _____ by default
   - a) Rising edge triggered
   - b) Level triggered
   - c) Falling edge triggered
   - d) Undefined

3) AVR port output buffers can sink _____ current.
   - a) 500uA
   - b) 1.6 mA
   - c) 16 mA
   - d) 20 mA

4) AVR uses _____ instruction to put MCU into sleep modes.
   - a) IDLE
   - b) SLEEP
   - c) SWAP
   - d) HALT

5) ARM920T MMU specifies _____ KB mapping size for large pages
   - a) 1KB
   - b) 4KB
   - c) 16KB
   - d) 64KB

6) The ARM920T processor implements separate instruction and data caches each of _____ size.
   - a) 16KB
   - b) 64KB
   - c) 128KB
   - d) 1MB

B) State True of False   08
1) AVR is a CISC type microcontroller.
2) ATmega 16 is a 8-bit microcontroller.
3) The reset vector of AVR microcontrollers start at 1000H
4) AVR instructions have a variable size viz. 1-byte, 2-byte or 3-byte.
5) ARM 920T supports multiple operating system.
6) ARM 920T has a 7-stage pipeline.
7) ARM 920T Caches are independently lockable with granularity of 64 words.
8) The ARM920T processor has only one functional clock input called BCLK

Q.2 **Write short notes**   **14**
    A) Explain watchdog timer functionality in AVR.   **05**
    B) What are the benefits of THUMB mode?   **05**
    C) Write a short note on AVR Stack.   **04**

Q.3   A) List and compare features of AVR with other 8-bit microcontroller.   **08**
    B) Write a short note on AVR Status Register   **06**

Q.4   A) Explain interrupt system of AVR microcontroller.   **10**
    B) Write a short note on AVR register file.   **04**

Q.5   A) Write a program to generate square wave on PORTA pins of AVR.   **06**
    B) What is exception? Explain ARM exception processing.   **08**

Q.6   A) Draw and explain ARM920T functional block diagram.   **10**
    B) Write a short note on ARM program status register.   **04**

Q.7   A) What are the responsibilities of Memory Management Unit? Explain the   **08**
       concept of virtual memory.
    B) Explain any three load-store instructions of ARM.   **06**

Master of Science – I (Electronics Science) Examination: Oct / Nov 2016 Semester – II (Old CGPA)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ - 345	Thursday 17/11/2016	10:30 AM to 01:00 PM	Modern Antenna Design	V	

Instructions:
1) Q. No.1 and 2 are compulsory.
2) Answer any three questions from Q.No.3 to Q.No.7.
3) All questions carry equal marks.

Total Marks: 70

Q.1 Objective Questions. 14

A) Select correct alternatives: 08

1) An antenna behaves as a resonator circuit only when its length is:
   a) λ
   b) $\lambda/4$
   c) $\lambda/2$ or its integral multiple
   d) None of the above

2) The directivity of an isotropic antenna is ------------
   a) Zero
   b) Less than unity
   c) Unity
   d) Infinity

3) A half wave dipole produces
   a) A figure 'O' pattern
   b) A broadside pattern
   c) An end-fire pattern
   d) None of the above

4) Electrical length or effective length of an antenna.
   a) Greater than its physical length
   b) Smaller than its physical length
   c) Equal to its physical length
   d) None of the above

5) The simplest parasitic array comprises of
   a) Two elements
   b) Three Elements
   c) Five elements
   d) None of the above

6) In an end-fire array
   a) Maximum reception is along the axis
   b) Maximum reception is perpendicular to the axis
   c) Directional pattern is bi-directional
   d) None of these

7) Which one of the following terms does not apply to the Yagi-Uda array
   a) Good bandwidth
   b) Parasitic elements
   c) Folded dipole
   d) High gain

8) Which of the following antenna is best excited from a waveguide?
   a) Biconical
   b) Horn
   c) Helical
   d) Discone

B) State True or false: 06
   1) The radiation patterns of vertical and horizontal dipoles are identical.
   2) Effective area of an antenna is a function of frequency.
   3) Radiation beam in broadside array is along the axis of the array.
   4) Ideally, reflector size is infinitely large.
   5) Cassegrain feed is best suited for low noise receiver applications.
   6) Antenna gain is inversely proportional to beam width.

Q.2 Answer the following: **14**

   a) Discuss about the term "Radiation Patter".   **05**
   b) Write a short note on operation of Yagi - Uda array.   **05**
   d) Explain the principle of pattern multiplication   **04**

   Q.3 a) Explain the following terms with respect to antenna: **08**
        i)   Radiation intensity   ii)   Directivity
        iii)   Beam efficiency   iv) Gain
   b) What do you understand by effective height and radiation resistance of an   **06**
        antenna?

   Q.4 a) Obtain expressions for the far field and power radiated by a half wave   **08**
        antenna and calculate the radiation resistance of the antenna.
   b) Prove that radiation resistance of half wave dipole is 73Ω.   **06**

   Q.5 a) What is an antenna array factor? Derive an expression for array factor for   **10**
        end-fire array consisting of 'n' isotropic elements.
   b) Give the concept of 'Antenna array scanning.   **04**

   Q.6 a) Describe in detail the Cassegrain method of feeding a paraboloid reflector   **08**
        with the help of geometry of this feeding arrangement.
   b) With a neat diagram, explain the operation of a folded antenna.   **06**

   Q.7 a) Explain the principle of measuring the radiation pattern of the antenna.   **08**
   b) Write a note on pyramidal horn antenna with design equations.   **06**

Master of Science – II (Electronics-Communication Science)
Examination: Oct / Nov 2016 Semester – II (Old CGPA)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ – 346	Saturday 19/11/2016	10:30 A.M to 01:00 P.M	Microwave Engineering	VI	

Instructions:
1) Q.No.1 and 2 are compulsory.
2) Answer any three questions from Q.No.3 to Q.No.7.
3) All question carry equal marks.

Q.1   Objective Questions.   **14**
a) **Choose the correct alternatives.**   **08**

1) In conductor, the current density at a point
   a) is a scalar point function
   b) is a vector point function
   c) may be scalar or vector point function
   d) always tends to infinity

2) Microwaves are used for
   a) telephonic
   b) radio broadcast
   c) TV systems
   d) all of the above

3) Which of the following device uses a helix
   a) klystron amplifier
   b) klystron oscillator
   c) TWT
   d) both a & c

4) 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

5) In a circular waveguide with radius r, the dominant mode is
   a) TM_{01}
   b) TE_{01}
   c) TM_{11}
   d) TE_{11}

6) Points in the microwave system baseband signals either originate or terminate
   a) terminator
   b) terminal stations
   c) Terminating equipment
   d) terminal equipment

7) When the screw length is $\lambda_g/4$ in the waveguide, its nature is
   a) Capacitive
   b) Inductive
   c) Resistive
   d) None of the above

8) If a matched attenuator is connected between a 150Ω resistive load and 50Ω coaxial line the SWR will be
   a) more than 3
   b) less than 3
   c) equal to 3
   d) either a or c

B) State True or false/ justify / one line answer.   06

   1) At a conductor to conductor boundary, component of field tangent to the boundary is same in the two conductors.

   2) Maxwell's equation, from Ampere, in phasor form is
$$\nabla \times H = (\sigma + j\omega\varepsilon)E$$

   3) Reflex Klystron oscillator is essentially a low power device.

   4) In a circular waveguide TE_{21} mode has lowest cutoff frequency.

   5) A matched termination absorbs all the power incident on it.

   6) A coaxial line is a non – reading line.

Q.2 A) Answer in brief.   14

   1) Enumerate the basic advantages of microwaves and briefly discuss the typical application of microwaves.   05

   2) How waveguides are different from normal two wire transmission lines. Discuss the similarities and dissimilarities.   05

   3) Write a note on TEM to TEM transitions.   04

Q.3 a) Starting from Maxwell's equations device wave equation for rectangular wave guide.   08

   b) Write a short note about strip line transmission lines.   06

Q.4 a) With a neat diagram, explain the working of reflex klystron oscillator.   08

   b) Explain two valley model theory of Gunn diodes.   06

Q.5 a) Derive the wave equations for TM wave and obtain all the field components in a rectangular waveguides.   10

   b) Explain in brief about coaxial lines.   04

Q.6 a) Discuss in detail the design considerations and working of coaxial and stripline attenuators.   10

   b) Explain the construction and working of standard coaxial connector.   04

Q.7 a) List the types of waveguide phase shifters and discuss the working of one in detail.   10

   b) With a neat sketch describe the waveguide matching terminations.   04

Master of Science – I (Electronics Science) Examination:
Oct / Nov 2016 Semester – II (Old CGPA)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ – 347	Tuesday 22/11/2016	10.30 AM To 01.00 PM	Advanced Microcontrollers	VII	

Instructions:
1) Q. no. 1 and Q. no 2 are compulsory
2) Attempt any three questions from Q. No.3 to Q. No. 7
3) Q.1 should be answered on the question paper itself
4) Figure to the right indicate full marks
5) Use of nonprogrammable calculator is allowed

Total Marks: 70

Q.1 A) Choose a correct alternative 08

1) The ST X, R16 is an example of _____ addressing mode
   a) Data direct addressing
   b) I/O direct addressing
   c) Data indirect addressing
   d) None of these

2) _____ can be used as a RESET source in AVR
   a) Power-on reset
   b) External reset
   c) Watchdog reset
   d) All of these

3) Which of the following statement is not true about AVR?
   a) All the AVR pointers can be use with LPM/SPM operation
   b) AVR has four I/O ports
   c) Most of AVR instructions can execute in 1 CLK cycle
   d) None of these

4) Which of the following statement is true about AVR
   a) AVR has RISC architecture
   b) AVR supports fully static operation
   c) AVR has three data pointers
   d) All of these

5) AVR external interrupt cab be triggered by _____
   a) Low level signal
   b) Falling edge signal
   c) Rising edge signal
   d) All of these signal types

6) The address space in ARM is _____
   a) 2^{24}
   b) 2^{64}
   c) 2^{16}
   d) 2^{32}

7) In ARM, PC is implemented by using _____
   a) Cashes
   b) Heaps
   c) General purpose registers
   d) Stack

8) Which of the following provides fastest access
   a) Tightly coupled memory
   b) Hard disk
   c) On-board flash memory
   d) Register file

B) State True of False   06
1) Some of the AVR status flags are cleared by writing a logical '1' to them.
2) The AVR code memory has been recognized as 16 bit words.
3) The AVR stack pointer is decremented when the data is popped from the stack.
4) When the external SRAM is interfaced to AVR, ALE signal is used to demultiplex address/data bus.
5) ARM is not a superscalar processor.
6) ARM9 microprocessor have combination of RISC and CISC features.

Q.2   A) Explain SRAM data memory organization in AVR.   **05**
           B) Explain AMBA in ARM.   **05**
           C) Draw and explain status register format of AVR   **04**

Q.3   A) Explain the use of interrupts. List the interrupts sources of AVR **08**
           B) Explain the memory map and memory access instructions of AVR microcontroller **09**

Q.4   A) Explain port functionality of AVR. List alternate functions of AVR ports. **08**
           B) Write a short note on analog comparator of AVR   **06**

Q.5   A) Explain registers associated with ADC in AVR   **08**
           B) What is a Prescaler? Explain timer/counter prescaler used in AVR   **06**

Q.6   A) What are the different exception and how they are processed in ARM **08**
           B) Explain the register structure of the ARM processor.   **06**

Q.7   A) Explain the need for fast interrupt service and a normal interrupt service with their own stack operations in ARM. **08**
           B) Explain conditional code flags present in CPSR   **06**

Master of Science – I (Electronics - Communication Science)
Examination: Oct/Nov 2016 Semester – II (Old CGPA)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ - 348	Thursday 24/11/2016	10:30 A.M to 01:00 P.M	Digital Design and VHDL Programming	VIII	

Instructions:
1) Q.No.1 and 2 are compulsory.
2) Answer any three questions from Q.No.3 to Q.No.7.
3) All questions carry equal marks.
4) Use of non programmable calculator is allowed.

Total Marks: 70

Q.1 A) Select correct alternatives: 06

1) In a VHDL code ---------- statement is used in architecture having behavioural description.
   a) Process
   b) Case
   c) Generate
   d) Wait

2) ----------- is a logic circuit which generates the parity bits for even parity or odd parity.
   a) Parity generator
   b) Parity checker
   c) Comparator
   d) Adder

3) A MOD-2 counter followed by a MOD-5 counter is ----------.
   a) Same as MOD-5 counter followed by a MOD-2 counter
   b) A decade counter
   c) A MOD-7 counter
   d) None of these

4) Generics are specified only in -----------.
   a) Entities
   b) Architectures
   c) Process
   d) Library

5) Which among the following constraint/is/are involved in a state- machine description?
   a) State variable & clock
   b) State transitions & output specifications
   c) Reset condition
   d) All of the above

6) Which basic logic gates are cross coupled to construct a basic S-R-flip-flop?
   a) AND or OR gates
   b) AND or NOR gates
   c) NOR or NAND gates
   d) XOR or XNOR gates

B) **State True or false:** 08
1) The number of states in FSM in infinite.
2) Sequential system exhibits the necessity for the existence of at least one feedback path from output to input.
3) Bit-vector type is pre-defined in the standard package as one-dimensional array type comprising each element of BIT type?

4) QFP CPLD packaging can provide maximum number of pins on the package due to small size of the pins?
5) In delta delay, output follows any changes in input.
6) Every entity can have two architectures.
7) The fast carry or look-ahead carry circuits found in most 4 bit parallel-adder circuits is used to reduce propagation delay.
8) Decoder method of combination circuit implementation is widely adopted with maximum output functions and minimum requirement of IC_s.

Q.2 **Attempt the following:**
    a) Write a short note on generate statement. 05
    b) Explain the attributes of VHDL. 05
    c) Compare: Multiplexer and De-multiplexer 04

Q.3 **a)** Explain the following: 10
        1) Entity
        2) Architecture
        3) Library
    b) Explain the difference between variable and signal? 04

Q.4 **a)** Design 4-bit J Johnsons counter using J-K flip flop with its timing diagram. 08
    b) Implement the function using PLA. $f_1 = \sum m (1,2,3)$, $f_2 = \sum m (0,2,4,7)$ 06

Q.5 **a)** What is a decoder? Write the VHDL code for 3:8 decoder and draw its truth table also. 08
    b) Write the VHDL code for 4:1 multiplexer. 06

Q.6 **a)** Design parity generator using K map and draw its logic diagram. 08
    b) Explain operator overloading with a suitable example. 06

Q.7 **a)** Draw architecture of altera Flex10 K and explain in brief. 10
    b) Write a VHDL code for half adder. 04

Master of Science – II (Electronic- Communication Science)
Examination: Oct/Nov 2016 Semester – III (CGPA Pattern)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ 349	Wednesday 16/11/2016	2:30 PM to 05.00 PM	Digital Signal Processing	IX	

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

Total Marks: 70

Q.1 **A)** Select the most correct alternative- 08

1) A signal is said to be _____ if its normalized average power is non-zero and finite.
   a) Power signal
   b) Even
   c) Energy signal
   d) Odd

2) A system is said to be _____ system if output at any instant of time depends on present and past inputs. But the output does not depend on future inputs.
   a) Anti-causal
   b) Continuous
   c) Causal
   d) Discrete

3) A system in which output at any instant of time depends on input samples at the same time as well as at other times is called _____
   a) Static
   b) Causal
   c) Dynamic
   d) Anti-causal

4) Z-transform of delayed unit impulse function is _____
   a) Z^{-1}
   b) $Z^{(n-k)}$
   c) $Z^{(n+k)}$
   d) Z^{-n}

5) Z-transform of unit step function is _____
   a) Z/Z-1
   b) Z/Z-n
   c) Z/Z-(n+k)
   d) Z/Z-(n-k)

6) Inverse Z-transform of Z/Z-∝ is _____
   a) $\propto^{-n} u(n)$
   b) $\propto^{n} u(n)$
   c) $\propto^{-n} u(n-1)$
   d) $\propto^{n} u(n-1)$

7) Form the circular properties of DFT _____ shows that sequence is symmetric about the point zero on the circle.
   a) Circular folding
   b) Circular even
   c) Circular odd
   d) Circular advance

8) DFT of ∂ (n) is _____
   a) 1
   b) $e^{i2\pi kn}{}_0 / N$
   c) $e^{(-j2\pi kn)}{}_0 / N$
   d) None of these

B) State whether following statements are true or false: 06

1) In DFT the continues frequency spectrum X (ω) is replaced by Discrete Fourier Spectrum.
2) The result of circular convolution and liner convolution is same.
3) DTFT detail with infinite samples.
4) DFT of odd function is Odd and imaginary.
5) DFT of ∂ (n) is $e^{-j2\pi kn0}$.
6) Z-Transform of unit impulse is $X(Z) = Z^{-K}$

Q.2   Write brief notes on the following:

a) Find the fundamental period of the following signal   05
   $x (n) = 10 \sin (12\pi t) + 4 \sin (18\pi t)$

b) $x (n) = \{1,1,1,1,2\}$, sketch the signal x (n) u (n-1)   05
   $\uparrow$

c) Check whether the system is liner or not   04
   $y (n) = x (n) + n x (n + 1)$

Q.3 a) Find the liner convolution by tabulation method: 08
   $x (n) = (1, 2, 3, 1)$; $h (n) = (1, 2, 1, -1)$
        $\uparrow$ $\uparrow$

b) Prove that any arbitrary signal can be expressed as the sum of two signals, one of   06
   which is EVEN and other is ODD.

Q.4 a) Determine Z-transform of $x (n) = (\cos \omega_0 n) u (n)$ 08

b) Explain time shift property of Z-transform.   06

Q.5 a) Determine inverse Z-transform by partial fraction method.   08
   $X(Z) = 1/ (1-1.5Z^{-1} + 0.5Z^{-2})$ If
   i)   ROC : |Z| > 1
   ii)   ROC : |Z| > 0.5
   iii)   ROC: 0.5 < |Z| < 1.0

b) Obtain N-point DFT of exponential sequence.   06
   $x (n) = a^n u (n)$ for $0 \leq n \leq N-1$

Q.6 a) Explain cyclic property of twiddle factor.   08

b) Obtain the circular convolution by graphical method of the following: 06
   $x (n) = (1.5)^n$ $0 \leq n \leq 2$
   $y (n) = 2n-3$ $0 \leq n \leq 3$

Q.7 a) Explain in detail overlap and save method.   08

b) Explain the relationship between DFT and Z-Transform.   06

Master of Science – II (Electronic- Communication Science)
Examination: Oct / Nov 2016 Semester – III (Old CGPA)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ 350	Friday 18/11/2016	02:30 PM to 05.00 PM	Digital Communication	X	

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

Total Marks: 70

Q.1 A) Select the most correct alternative-   **06**

1) In PCM system, the number of quantization levels is 32 and the maximum signal frequency is 4 kHz. The bit transmission rate is _____
   a) 8 kbps
   b) 16 kbps
   c) 32 kbps
   d) 40 kbps

2) A source generates 4 messages the Entropy of the source will be maximum when ____
   a) all probabilities are equal.
   b) two of the probabilities equal 1 and two other are zeros
   c) the probabilities are ½, ¼ and ½
   d) the two of probabilities are ½ each and other two are zeros

3) The coding efficiency is given by _____
   a) 1/redundancy
   b) 1 + redundancy
   c) 1- redundancy
   d) None of these

4) If fm is modulating frequency than aliasing occurs, when Nyquist rate is ___
   a) 2 fm
   b) 3 fm
   c) 2.5 fm
   d) 1.2 fm

5) The phase difference between two possible transmitted signals in QPSK is ___
   a) π
   b) $\pi/2$
   c) $\pi/4$
   d) π/m

6) Which of the following gives maximum probability of error __
   a) ASK
   b) BPSK
   c) BFSK
   d) DPSK

B) State whether following statements are true or false: **08**

1) Channel capacity of a noise free channel having M symbols is given by 2^M.
2) Multiplexing techniques provide security in digital communication.
3) In an Eye diagram representation, more opening of the Eye indicates more distortion.
4) BW of BPSK is higher than BFSK.

5) The information rate is defined to be average number of bits of information/second.
6) Compared to binary signaling scheme Mary signaling scheme are more complex.
7) Tossing of a coin is the example of continuous random variable.
'Man bites dog' – This statement carries maximum information.

Q.2 Write Short notes:
   a) Adaptive Equalizer   05
   b) Adaptive delta modulation   05
   c) Stationarity and Ergodicity of random processes   04

Q.3 a) What is mutual information? Prove $I(X,Y) = H(X) - H(X/Y)$ 08

   b) Prove Bay's theorem.   06

Q.4 a) With block diagram explain working of PCM system. How does it differs 08
          with respect to DPCM.

   b) Find all code words for (6, 3) cyclic code for generator polynomial $g(x) =$ 06
      $1+x^2$.

Q.5 a) Apply the Huffman coding procedure for the following message ensemble. 08
          Calculate its efficiency.

$[X] =$	$[x_1$	x_2	x_3	x_4	x_5	x_6	x_7	$x_8]$
$[P] =$	$[1/4$	$1/8$	$1/16$	$1/16$	$1/16$	$1/4$	$1/16$	$1/8]$

   Assume M = 2

   b) Explain frame synchronization.   06

Q.6 a) Find all code vectrors for a (6, 3) linear block code for given generator matrix, 08
          draw encoder. Also write its parity check matrix.

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{bmatrix}$$

   b) What is information and entropy? Explain the characteristics of entropy.   06

Q.7 a) Explain M-ary PSK modulation in detail.   08

   b) Compare random variables.   06

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ – 351	Monday 21/11/2016	02:30 PM to 05:00 PM	Satellite Communication	XI	

Instructions:
1) Q.No.1 and 2 are compulsory.
2) Answer any three questions from Q.No.3 to Q.No.7.
3) All questions carry equal marks.

Total Marks: 70

Q.1 A) Select correct alternatives: 08

1) Kepler's third law states?
   a) $T^2 \, \alpha \, a^3$
   b) $T^3 \, \alpha \, a^3$
   c) $T^2 \, \alpha \, a^{\frac{3}{2}}$
   d) None of these

2) Apogee means -----------.
   a) The point smallest from earth
   b) The point nearest from earth
   c) The point Farthest from earth
   d) None of the above

3) Which of the following are Satellite Link parameters?
   a) Choice of operating frequency
   b) Propagation Consideration
   c) Both a and b
   d) None of the above

4) What is application of satellite systems?
   a) Whether forecasting
   b) Terrestrial communication
   c) Point to point communication
   d) None of the above

5) Mention the service of satellite systems.
   a) Broadcasting satellites services
   b) Signal transmission
   c) Information transmission
   d) None of the above

6) Which of the following factor is taken into account for satellite link design?
   a) Absorption of signal
   b) Various noise sources present
   c) Gain of transmitter and receiving antenna at both ends
   d) All of the above

7) For global communication. The minimum number of satellites needed is
   a) 1
   b) 3
   c) 7
   d) 11

8) The frequency band used by most satellite is
   a) UHF
   b) VHF
   c) SHF
   d) EHF

B) State True or false: 06
1) Inclination and Azimuth angles determine where to point an earth station so that it intercepts the satellite.
2) AOCS subsystem is controlled by earth station.
3) VSAT stands for very Demand Access Multiple Assigned.
4) DAMA stands for Demand Access Multiple Assigned
5) Absorption of signal is one of the factor taken into account for satellite link design.
6) MEO is placed in the range 400 to 1000 in above the earth.

Q.2 Write a short note:

a)	Reference burst	**05**
b)	Satellite Radio Broadcasting	**05**
c)	LEO and MEO	**04**

Q.3 a) Derive the expression for up-link and down link design. **08**

b) Define noise figure and noise temperature. **06**

Q.4 a) Satellite is in an elliptical orbit with a perigee of 1000 Km and an apogee of 4000 Km. Using a mean earth radius of 6378.14 Km. Find the period of the orbit in hours. Minutes and seconds also find eccentricity of the orbit. **08**

b) Briefly describe the three axis method of satellite stabilization. **06**

Q.5 a) With a block diagram describe the working of Telemetry. Tracking and Antenna of satellite subsystem. **08**

b) Explain single and double conversion. **06**

Q.6 a) Explain : **08**
   i) Elliptical orbit
   ii) Molhiya orbit
   iii) Radiation orbit

b) Compare between TDMA, FDMA and CDMA system. **06**

Q.7 a) Explain in detail 'Irridium'. **08**

b) Explain working of GPS system **06**

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ 353	Wednesday 16/11/2016	2:30 PM to 05.00 PM	Digital Signal Processing	IX	

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

Total Marks: 70

Q.1 A) Select the most correct alternative- 07

1) The signal sequence x(n-4) is _____ by 4 samples w.r.t. original signal sequence x(n)…
   a) Delayed
   b) Advanced
   c) Folded
   d) b and c

2) Reducing the sampling rate can also be referred as _____
   a) Folding
   b) Decimation
   c) Amplification
   d) Attenuation

3) The filter used in reconstructing an output signal from sampled signal is ___
   a) Band Pass
   b) High Pass
   c) Band Stop
   d) Low Pass

4) 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

5) DFT of $\delta(n)$ is _____
   a) $= 0$
   b) $= 1$
   c) < 1
   d) > 1

6) Window method of filter design is also called as _____ method.
   a) Fourier
   b) Inverse Fourier
   c) Discrete Fourier
   d) Fast Fourier

7) FIR Digital filter is designed with _____
   a) Adder
   b) Delay
   c) Multiplier
   d) All of the above

B) State whether following statements are true or false: **07**

1) The discrete time signal with period of 'N' is said to be periodic if x(n) > x(n+N).
2) The origin shifts with the folding of a signal sequence.
3) Static systems are memory-less systems.
4) Down Scaling of signal sequence w.r.t. amplitude causes amplification of a signal.
5) LTI system obeys superposition theorem.
6) ROC is always a connected region.
7) Digital filters are not suitable at very low frequency.

Q.2   Write brief notes on the following:

a) Block diagram of DSP system. **05**
b) State the merits of FFT algorithm over direct DFT **04**
c) Linearity and time reversal properties of Z-transform **05**

Q.3 a) State and explain Sampling Theorem. **06**

b) What is meant by linear convolution? Compute the linear convolution of the following sequences using graphical method:
x (n) = {1, 2, 1, 2} and h (n) = {2, 2, -1, 1} **08**

Q.4 a) Distinguish between Discrete Fourier Transform and Discrete Time Fourier Transform. Give the significance twiddle factor? **06**

b) What is a circular convolution? Find the circular convolution of two sequences using matrix method: x (n) = {0, 2, 1, 3} and h (n) = {1, 2, -1, -2} **08**

Q.5 a) Define Z-Transform. Obtain Z-transform and Region of Convergence of finite duration sequence: x (n) = {1, 2, 4, 5, 0, 6} **06**

b) Discuss Direct Form-I realization of a LTI system described by following difference equation.
y (n) = 3y (n-1) + 5y (n-2) + 4x (n) + 2x (n-1) + 6x (n-2) **08**

Q.6 a) Explain DIF algorithm of FFT implementation. **06**

b) Compute 4-point DFT of a sequence x (n) = {1, -1, 2, -2} using DIF algorithm. Draw respective diagram. **08**

Q.7 a) Explain the Impulse Invariant method of IIR digital filter design. **06**

b) Find H (z) by applying Impulse Invariant technique to H (s) = $5/(S^2 + 5s + 6)$ with T=1 sec **08**

Master of Science – II (Electronic Science)
Examination: Oct/Nov 2016 Semester – III (New CBCS)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ 354	Friday 18/11/2016	2:30 PM to 05.00 PM	Digital Communication	X	

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

Total Marks: 70

Q.1 A) Select the most correct alternative-   **06**

1) Non-uniform quantization leads to _____
   a) Reduction in transmission bandwidth
   b) Decrease in maximum SNR
   c) Increase in SNR for low level signals
   d) Simplification of quantization process

2) The practically used value of $\mu-law$ companding is _____
   a) 256   b) 255
   c) 87.6   d) 86.7

3) If dmin = 5, then it detects up to _____ and corrects up to _____
   a) 3, 2   b) 5, 4
   c) 4, 2   d) 2, 1

4) If bandwidth is 3000Hz and S/N = 10^3, then capacity of channel is _____
   a) 30, 000bits/sec   b) 30, 000bits/symbol
   c) 3, 000bits/sec   d) 3, 000bits/symbol

5) Which one of the following is widely used modulation technique?
   a) ASK   b) FSK
   c) PSK   d) None of the above

6) The bit rate of ADM is _____
   a) 8   b) 1
   c) 2   d) >2

B) State whether following statements are true or false: **08**

1) Shanon-heartly theorem indicates that a noiseless channel has an infinite capacity.
2) The best time to sample the received waveform is when the eye opening is largest.
3) The M-ary schemes conserve the channel bandwidth due to which it requires more power.
4) A random process is said to be ergodic if time averages not equal to ensemble averages.

5) Coasts loop method is used for the symbol synchronization.
6) The (hamming) weight of a code vector is defined as the total number of nonzero components of C.
7) The parity check matrix can be used to verify whether a codeword C is generated by the matrix G.
   The hardware implementation of FSK is more complex than PSK.

Q.2 Answer the following:

a) Write a short note on inter symbol interference.   05
b) Explain power spectral density of stationary random processes.   05
c) What is BCH code?   04

Q.3 a) What are the advantages of M-ary signaling scheme over binary? Explain   10
M-ary PSK system with the help of a neat block diagram of transmitter and receiver.

b) A discrete source emits one of five symbols once every millisecond. The   04
symbol probabilities are 1/2, 1/4, 1/8, 1/16 and 1/16 respectively. Find the source entropy and information rate.

Q.4 a) A discrete memory less source emits following symbols with probability of   10
occurrence as shown below.

Symbol	S0	S1	S2	S3	S4	S5	S6
Probabilit y	0.25	0.25	0.125	0.125	0.125	0.0625	0.0625

Determine the Huffman code of each symbol and calculate code efficiency.

b) Write a short note on error correcting codes.   04

Q.5 a) The generator matrix for a (6, 3) block code is given below. Find all the code 08
vectors of this code.

$$G = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{bmatrix}$$

b) What is the need of quantizer in digital communication?   06

Q.6 a) With the help of neat block diagrams, explain the working of transmitter and 08
receiver of a pulse code modulation.

b) Write a short note on eye diagram.   06

Q.7 a) Explain what do you mean by matched filter? Derive an expression for   08
impulse response of a matched filter.

b) Explain the early late bit synchronizer.   06

Master of Science – I (Electronics Science) Examination:
Oct/Nov 2016 Semester – III (New CBCS)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ - 355	21/11/2016 Monday	02:30 PM to 05:00 PM	Satellite Communication	XI	

Instructions:
1) **Q.No.1 and 2 are compulsory.**
2) **Answer any three questions from Q.No.3 to Q.No.7.**
3) **All questions carry equal marks.**
4) **Use of nonprogrammable calculator is allowed.**

Total Marks: 70

Q.1 A) Select correct alternatives: 06

1) -------------- angle is an angle that the orbital plane makes with the equatorial plane.
   a) Elevation
   b) Azimuth
   c) Inclination
   d) Argument of perigee

2) When an earth station is in the northern hemisphere, and satellites is Se of the earth station, then the Azimuth angle is -----------
   a) $180°\alpha$
   b) $180° + \alpha$
   c) $180° - \alpha$
   d) α

3) EIRP is the product of --------- and ----------.
   a) Receiving power, gain of receiving antenna
   b) Transmitting power, receiving power
   c) Gain of transmitting antenna, gain of transmitting antenna
   d) Transmitting power, gain of transmitting antenna

4) A dish antenna is a type of --------- antenna.
   a) Patch
   b) Reflector
   c) Array
   d) Wire

5) Outage time of Ka-band is ----------- per year.
   a) 0.01%
   b) 0.1%
   c) 0.1-0.5%
   d) 0.5%

6) Change in the orbital plane is called ------------.
   a) Doppler shift
   b) Retrograde
   c) Transit outage
   d) Precession

B) State True or false: 08

1) Eccentricity of an ellipse is in between zero and one.

2) The first satellite successfully launched by US was Telstar-I.

3) Output power of a linear transponder is constant.

4) The Frequency band of DBS TV in ITU Region-1 is 10.7 – 12.75 GHz.

5) GPS constellation is designed for business links.

6) The ration of carrier to noise in inversely proportional to the ratio of gain to temperature of the system.

7) A VSAT earth station receiver system uses cassegrain antenna.

8) Elliptical orbit is a type of non-geo synchronous orbit.

Q.2 Answer the following:

a) Explain telemetry and monitoring system of a satellite.   05

b) Write down the Kepler's three laws of planetary motion.   05

d) What is Inclined orbit?   04

Q.3 Answer the following:

a) A satellite is an elliptical orbit with a perigee of 1000 km and an apogee of   07
4000 Km. Using a mean earth radius of 6378.14 Km, find the period of the
orbit in hours, minutes, and seconds and the eccentricity of the orbit.

b) Write down the three prototype models which give reliability to maintain the   07
space qualifications.

Q.4 Answer the following:

a) What AOCS sub-system? Give a brief account of spinner and three axis   08
stabilized satellite with a neat block diagram.

b) Write down the three prototype models which give reliability to maintain the   06
space qualifications.

Q.5 a) Satellite at a distance of 40000 km from a point on the earth's surface   05
radiates a power of 10W from an antenna with a gain of 17dB in the
direction of the observer. Find the flux density at the receiving point and the
power received by an antenna at this point with an effective area of 10m^2.

b) Explain satellite link design procedure.   05

c) Write a note on CDMA.   04

Q.6 a) Explain coverage and frequency considerations of NGSO satellite   06

b) Explain the three segments of GPS.   08

Q.7 a) What is DBS-TV? Explain digital DBS-TV.   08

b) Discuss the advantages of satellite communication. Give the brief   06
explanation of working of satellite communication.

Master of Science – II Electronics (Communication Science)
Examination: Oct / Nov 2016 Semester – III (New CBCS)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ – 356	Wednesday 23/11/2016	02:30 PM to 05:00 PM	Internetworking and Data communication	XII	

Instructions:
1) Q.No.1 and 2 are compulsory.
2) Answer any three questions from Q.No.3 to Q.No.7.
3) All questions carry equal marks.

Total Marks: 70

Q.1 A) Choose the correct alternatives 08

1) OSI stands for
   a) Open system information
   b) Operating system interface
   c) Optical service implementation
   d) None of the above mention

2) Which of the following are benefits of using a layered network model?
   a) It facilitates troubleshooting
   b) It breaks the complex process of networking into more manageable chuncks.
   c) It allows layers developed by different vendors to interoperate.
   d) All of the above

3) The layer of the OSI model, from the top down are :
   a) Physical, Data Link, Network, Transport, Session, Presentation, Application
   b) Application, Presentation, Session, Transport, Network, Data Link, Physical
   c) Application, Encryption, Network, Transport, Logical Link Control, Physical.
   d) Session, Presentation, Data Transport, MAC, Network, Physical

4) The OSI model has _____ layers
   a) 4
   b) 5
   c) 6
   d) 7

5) Which of the following are Transport layer protocols?
   a) CISC
   b) TCP & UDP
   c) HTTP & FTP
   d) ATM

6) Which of the following are considered to be the upper layer protocols?
   a) Application, Presentation & Session
   b) Application
   c) Application, Presentation, Session & Transport
   d) Application & Presentation

7) Flow control takes place at what layer?
   a) Transport
   b) Application
   c) Data Link
   d) Network

8) The _____ layer is responsible for carrying packets
   a) Network
   b) Dump
   c) Logical
   d) Sample

B) State True or false: 06
1) Bridges & Routers work on same principle.
2) Terrestrial Microwave is an unguided media.
3) Routing can be used from mobile hosts.
4) Congestion control can be done in virtual subnets & choke packets.
5) Domain name specification is website address
6) Sliding window is a Data Link protocol.

Q.2	a)	What is the 'channel allocation problem?	05
	b)	List the modes of operation of HDLC and elaborate on them.	05
	c)	Why do we need to establish layers in a protocol?	04

Q.3	a)	State the functions of each layer in an OSI model.	10
	b)	Compare between LAN and WAN	04

Q.4	a)	What is congestion in network? How is it controlled in TCP?	10
	b)	Compare between flow based and mobile host routing.	04

Q.5	a)	Explain the shortest path routing algorithm	10
	b)	Compare between flow based and mobile host routing.	04

Q.6	a)	State and elaborate on the design issues of physical later	08
	b)	Compare between TCP/IP and OSI model.	06

Q.7	a)	With block schematics explain the different types of modems.	08
	b)	Why do we need computer network? State the applications of computer networks.	06

Master of Science – II (Electronics – Communication Science)
Examination: Oct /Nov 2016 Semester – IV (New CGPA)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ- 359	Thursday 17/11/2016	02.30 PM to 05.00 PM	VLSI Design	XIII	

Instructions:
1) **Question No. 1 and 2 is compulsory.**
2) **Attempt any three questions from Q.no. 3 to Q. no. 7**
3) **Figures to right indicate full marks.**

Total Marks: 70

Q.1 A) Choose correct alternative.   **06**

1) The major disadvantage of custom design approach is:
   a) Smallest chip area
   b) Closest match of specification with customer requirement
   c) Longest time to market
   d) Lowest design cost.

2) For NMOS inverter minimum Pull up to Pull down ratio Z_{pu}/Z_{pd}:
   a) = 1
   b) = 4
   c) = 8
   d) = 2

3) The Dynamic power dissipation in CMOS inverter
   a) Remains always zero
   b) Is some value independent of frequency
   c) Decreases with increasing frequency
   d) Increases with increasing frequency

4) As clock input in a D-latch goes high
   a) The Q output will be high
   b) The latch becomes transparent
   c) The Q output will be Low
   d) The latch goes in storage mode.

5) In a ripple carry adder the each Full adder
   a) Waits till the carry bit is calculated from the previous full adder
   b) Completes operation simultaneously
   c) Has no propagation delay
   d) Does not have sum and carry outputs

6) The correct order of design steps is
   a) Schematic entry, logic Synthesis, Simulation, Implementation
   b) Logic Synthesis, Schematic entry, Simulation, Implementation
   c) Simulation, Schematic entry, Logic Synthesis, Implementation
   d) Schematic entry, Logic Synthesis, Implementation, Simulation

B) State true/ false : **08**
  1) The standard cells are fixed-height, variable-width cells.
  2) Logical effort is a technique to estimate delay in a CMOS circuit.
  3) A transmission gate uses CMOS transistor only.
  4) EEPROM should be removed from the board for reprogramming
  5) Synchronous clocking does not allow design automation
  6) PSoC or programmable system-on-chip is offered by Cypress
  7) Super MOS circuits decrease effect of channel length modulation
  8) An analog-to-digital converter is a mixed-signal circuit.

Q.2   Write short note on the following:
  A) Linear Voltage – Current Converters **05**
  B) Schematic entry and Logic Synthesis **05**
  C) Transmission gates **04**

Q.3   Answer the following:
  A) Explain the ASIC design flow. **10**
  B) Why array based implementation of digital ICs is preferred? **04**

Q.4   Answer the following:
  A) Draw neat diagram of CMOS inverter and explain the VTC. How is the noise margin estimated and optimized? **08**
  B) Explain the detailed design process for n-bit SIPO and SISO shift registers. How is it converted into ring oscillator? **06**

Q.5   Answer the following:
  A) Explain the Lay out design of a CMOS gate. Estimate the area associated with a 2-input NAND gate. **08**
  B) How is a Combinational Logic Cell designed? Explain with example of a digital multiplexer. **06**

Q.6   Answer the following:
  A) State important feature of SPARTAN 6 FPGAs. How is it programmed? **08**
  B) How does the Analog and Mixed Signal design distinguish from the Digital design? Which one of them is more complex? Why? **06**

Q.7   Answer the following:
  A) How are the thermal and humidity sensors interfaced to ASICs? **10**
  B) Explain operation of Nyquist rate A/D converters. **04**

Master of Science – II (Electronics-Communication Science)
Examination: Oct / Nov 2016 Semester – IV (New CGPA)

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ - 360	Saturday 19/11/2016	2:30 P.M to 5:00 P.M	Mobile Communication	XIV	

Instructions:
1) Questions No.1 and 2 are compulsory
2) Attempt any 3 questions from Q.No.3 to Q. No. 7.
3) All questions carry equal marks.

Q.1 A) Choose the correct alternative given in the bracket. 06

1) Find odd man out from group- AMPS, UMTS, CDMA, BPRN
   - a) AMPS
   - b) UMTS
   - c) CDMA
   - d) BPRN

2) A GSM super frame consists of ---------- multiframes.
   - a) 51
   - b) 26
   - c) 1236
   - d) 2,715,648

3) Which of below is a standard for WPANSs?
   - a) IEEE 802.11
   - b) IEEE 802.3
   - c) IEEE 802.15
   - d) WATM

4) DHCP protocol is based on ---------- model.
   - a) Agent discovery
   - b) Agent solicitation
   - c) Client server
   - d) All of above

5) In a typical MAC if a station sense the carrier and start sending immediately if the medium is idle, it follows.
   - a) p persistent CSMA
   - b) 1 persistent CSMA
   - c) Non persistent CSMA
   - d) CSMA/CA

6) Full rate channels of GSM carry data at -----------
   - a) 11.4 kbps
   - b) 2.4 kbps
   - c) 200 kbps
   - d) None of these

B) State either True/ False 08
1) A CDMA phone is an example of adhoc device.
2) In a GSM system, mobile stations & base station subsystems from RSS.
3) Universal Frequency Reuse is property of CDMA.
4) In ARFCN, letter 'A' means Adaptive.
5) Maximum paging channels on a forward CDMA link are eight.
6) Infrared technology simple, cheap and no licenses are required.
7) A network mobility supporting ATM switch is RS.
8) In a mobile IP, a tunnel usually ends at FA.

Q.2 **Write a short notes on the following:** **14**
    a) Compare wired and wireless networks **05**
    b) Why cells are hexagonal **04**
    c) Snooping TCP **05**

Q.3 **Long answer questions:**
    a) With suitable example explain frequency reuse and discuss relationship **08**
    between number of users, no of cells per cluster and number of clusters.

    b) With suitable example show how user capacity increases by decreasing **06**
    cluster size. What is trade off for this?

Q.4 **Long answer questions:**
    a) With suitable diagram explain signal processing in a GSM system. **08**

    b) What are the different features of IS 95? **06**

Q.5 **Long answer questions:**
    a) With suitable block diagram explain forward CDMA channels signal **08**
    processing.

    b) Describe infrastructure architecture for WLAN. **06**

Q.6 **Long answer questions:**
    a) With suitable diagrams explain IEEE 802.11 MAC frame. **08**

    b) Explain indirect TCP. **06**

Q.7 **Long answer questions:**
    a) Draw & explain link manager protocol in a Bluetooth. **08**

    b) Draw and explain in short-a generic WATM reference model. **06**

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ – 361	Tuesday 22/11/2016	02.30 PM To 05.00 PM	Fiber Optic Communication	XV	

Instructions:
1) Q. no. 1 and Q. no 2 are compulsory
2) Attempt any three questions from Q. No.3 to Q. No. 7
3) All questions carry equal marks.
4) Use of scientific calculator is allowed.

Total Marks: 70

Q.1 A) Select correct alternative 06

1) The laser source provides the signal that is.
   a) Coherent in light source   b) Possible to modulate at frequency
   c) Low divergence beam   d) All the above

2) The first step for preparation of fiber is.
   a) Ultra pure material powder   b) Conventional glass refining technique
   c) Impure fiber preparation   d) All the above

3) The optical carrier frequency is in the range of
   a) 10^{13} to 10^{16} Hz   b) 10^{14} to 10^{16} Hz
   c) 10^{13} to 10^{17} Hz   d) 10^{11} to 10^{16} Hz

4) Intermodal Dispersion occur in
   a) Single mode fiber   b) Multimode fiber
   c) Single mode graded index fiber d) None of these

5) Microscopic meandering of the fiber core axis, known as
   a) Microbending   b) Linear Bending
   c) Non linear bending   d) Circular bending

6) In optical fibers the Cut-Back technique is used to measured
   a) Spectral loss   b) Dispersion loss
   c) Absorption loss   d) None of these

B) State True of False of below statements 08

1) Material absorption is a loss mechanism related to the material composition and the fabrication process for the fiber.
2) Meridional ray which passes through the cross section of fiber.
3) Photon energy is inversely proportional to wavelength.
4) Insertion loss is to measure the diameter of optical fiber
5) A permanent joint formed between two individual optical fibers in the field or factory is known as a Fiber splice.
6) The typical best bandwidth length product for single mode step index fiber is 100MHZ KM
7) The most common on-line measurement techniques uses fiber image projection (shadow method) for the measurement of outer diameter of fiber. SBS (stimulated Brillouin scattering) is mainly a backward process.

Q.2 **Write short notes**
A) Explain fiber alignment and joint loss?   05
B) Explain the principle of PIN photodiode?   05
C) Explain briefly cut-off wavelength measurement method?   04

Q.3 A) Using the simple ray theory of light, describe the mechanism for the transmission   08
of light within an optical fiber?
B) An optical fiber has a numerical aperture of 0.20 and a cladding refractive index   06
of 1.59 determine the acceptance angle for the fiber in water has a refractive
index of 1.33.

Q.4 A) Briefly writes about step index and graded index fiber?   08
B) Explain the requirement of optical cable design   06

Q.5 A) Explain the concept of double heterojunction LED with neat sketch?   08
B) A P-N photodiode has a quantum efficiency of 60% at a wavelength of $0.9 \mu m$ 06
calculate

    1. Its responsitivity at $0.9 \mu m$
    2. Received optical power if mean photocurrent is 10^{-6} A.

Q.6 A) The radiative and nonradiative recombination lifetime of the minority carries in   08
the active region of a double heterojunction LED are 60ns and 100 ns
respectively. Determine the total carrier recombination lifetime and power
internally generated within the device when peak emission wavelength is 0.87 at
a drive current of 40mA
B) Explain the different advantages and disadvantages of LED as compare to laser?   06

Q.7 A) Briefly explain how Numerical Aperture is measured in optical fiber?   08
B) Write a short note on receiver noise?   06

SLR No.	Day & Date	Time	Subject Name	Paper No.	Seat No.
SLR – SJ – 362	Thursday 24/11/2016	2:30 P.M to 5:00 P.M	Communication Protocols	XVI	

Instructions:
1) Q. 1 and 2 is compulsory.
2) Attempt any three from Q. 3 to Q.7
3) Figures to the right indicate full marks.

Total Marks: 70

Q.1 A) Rewrite the sentences after choosing correct answer from the given alternatives. **08**

1) I^2C is used for communication between _____.
   a) Microcontroller and peripherals
   b) Computer and peripherals
   c) Different nodes in automobiles
   d) Elements in motor vehicles

2) OMC provides _____.
   a) Mobility management
   b) Call set-up
   c) Network monitoring and control
   d) All application

3) APN is the text format name of _____.
   a) Internet
   b) WAP
   c) Home network
   d) All of above

4) Two plane of GPRS protocol architecture are _____ and _____.
   e) GGSN, SGSN
   f) SNDCP, BSSGP
   g) User, control
   h) CER, PER

5) Which of the following is a supplementary service?
   a) Call waiting
   b) Ring back tone
   c) Call barring
   d) Online gaming

6) BSC communicates BTS through _____.
   a) G_b
   b) G_i
   c) A_{bis}
   d) G_d

7) UMTS development is under _____.
   a) 2G
   b) 2.5G
   c) 3GPP
   d) 3GPP2

8) MANET stands for _____.
   a) Mobile Ad-hoc Network
   b) Mobility anchor point Network
   c) Multiple Access Node for Extended Terminal
   d) None of the above

B) **State True or False:** 06
1. IS-95 provides different path for voice and data transmission.
2. Customer Edge Router performs the border gateway functionality for GPRS operator's networks.
3. In the GSM network, if the terminal is under observation from the network for possible problem, are called black listed terminals.
4. Disadvantage of RS-232 is that, you need to purchase an RS-422 port or converter.
5. Release 99is the first version of UMTS.
6. Data rate of fast moving users is up to 144 kbps.

Q.2	**A)**	Write a note on flex ray protocol.	**04**
	B)	Explain the addressing mechanism of IEEE 802.11.	**05**
	C)	What is HLR and it's functioning in GSM?	**05**

Q.3	**A)**	Draw various frame formats of GSM protocol and explain them in detail.	**10**
	B)	Give brief explanation over iGSM.	**04**

Q.4	**A)**	With suitable diagram explain network architecture of GPRS.	**10**
	B)	What is GPRS detach procedure? List two modes of the same.	**04**

Q.5	**A)**	How is data transferred to external PDN through GPRS network?	**10**
	B)	Draw and explain Bluetooth architecture.	**04**

Q.6	**A)**	**Discuss following terms related to UMTS:**	**10**
		1. Node-B	**07**
		2. RNC	
	B)	List various advantages of IMT – 2000.	**04**

Q.7	**A)**	Explain in detail three categories of ad-hoc routing protocol.	**10**
	B)	Discuss sequence number and damping in DSDV.	**04**