SLR-MM – 232

M.Sc. (Part – I) (Semester – I) Examination, 2015
ELECTRONICS SCIENCE (Paper – I) (CBCS) (New)
Control Theory

Day and Date : Monday, 16-11-2015   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) A system with gain margin close to unity or a phase margin close to zero is

      a) Highly stable   b) Oscillatory

      c) Relatively stable   d) Unstable

   2) The initial response to a system, when the output is not equal to input is called

      a) Transient response   b) Error response

      c) Dynamic response   d) Either of the above

   3) Polar plot of $G\,j(\omega) = 1\left[j\omega\,(1 + j\omega\tau\right]$

      a) Crosses the negative real axis

      b) Crosses the negative imaginary axis

      c) Crosses the positive imaginary axis

      d) None of the above

   4) Which of the following increases with the feedback ?

      a) System stability

      b) Sensitivity

      c) Gain

      d) Effects of disturbing signal

P.T.O.

5) From the noise point of view, bandwidth should

   a) Be Large

   b) Not be too large

   c) Should be as large as possible

   d) Should be infinite

6) The input to a controller is

   a) Error signal

   b) Desired variable value

   c) Sensed signal

   d) Servo-signal

7) A good control system has all the following features except

   a) Good stability

   b) Slow response

   c) Good accuracy

   d) Sufficient power handling capacity

8) The poles of a system $H(s) = S/(S + 1)(S - 4)$

   a) $- 1, 4$

   b) $1, 4$

   c) $- 1, - 4$

   d) Infinity

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

   a) The transient response of a system is mainly due to store energy.

   b) Zero initial condition for a system means system is at rest and no energy is stored in any of its components.

   c) Peak time is not the time domain specification.

   d) The commonly used frequency domain methods to sketch the frequency response is Polar plot.

   e) If the gain of the open loop system is doubled the gain margin becomes double.

   f) In case of signal flow graph the signal cannot travel along the direction of arrow only.

2. Attempt the following : **14**

   a) Explain Routh's criterion with its limitations. **5**

   b) Explain briefly the phase lead-lag compensator. **5**

   c) Mention the terms used in signal flow graph. **4**

3. A) Derive an expression for the orders of the system. **8**

   B) Using Routh criterion determine the stability of the system whose characteristics equation is **6**

   $S^4 + 8S^3 + 18S^2 + 16S + 5 = 0$.

4. a) Derive an expression for unit step response of second order control system. **8**

   b) What is transfer function ? Explain poles and zeroes of transfer function. **6**

5. a) Consider the system with $G(S).H(S) = K/S(S + 2).(S + 4)$ and $S = -0.75$ is on the root locus then determine at what value of k, $s = -0.75$ is one of the roots of $1 + G(S).H(S) = 0$. Use magnitude condition. **8**

   b) Consider unity feedback system with $G(S) = K/S$. Obtain its root locus. **6**

6. a) Explain the action of proportional controller with its advantages and disadvantages. **8**

   b) Explain feed-forward and feedback control action with suitable block diagram. **6**

7. a) Find the gain of the system represented by the following equations : **10**

   $$X_2 = t_{12} .X_1 + t_{32}.X_3;$$

   $$X_3 = t_{23}.X_2 + t_{43}.X_4;$$

   $$X_4 = t_{24}.X_2 + t_{34}.X_3 + t_{44}.X_4;$$

   $$X_5 = t_{25}.X_2 + t_{45}.X_4.$$

   Here input node is X_1 and output node is X_2.

   b) What is feedback ? Explain effect of feedback on sensitivity. **4**

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Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2015
ELECTRONICS SCIENCE (CBCS) (New)
Paper – II : Microprocessor and Microcontroller

Day and Date : Wednesday, 18-11-2015   Total 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 has a _____ instruction prefetch queue.

       a) 6   b) 8   c) 16   d) 32

    2) The Execution Unit of 8086 performs _____ operation.

       a) Instruction fetch   b) Address calculation

       c) Instruction execution   d) All of these

    3) The PIC18F4550 microcontroller has _____ KB SRAM.

       a) 1   b) 2   c) 4   d) 8

    4) The PIC18F4550 microcontroller has _____ bit ADC.

       a) 8   b) 10   c) 12   d) 16

    5) The Stack Pointer of PIC18F4550 microcontroller is initialized to _____
       after all Resets.

       a) 00000   b) 00007   c) 10000   d) 0FFFF

    6) I/O pin of PIC18Fxxxx can source maximum output current of _____

       a) 1mA   b) 1.6mA   c) 10mA   d) 25mA

    7) Internal oscillator block of PIC18Fxxxx provides upto _____ MHz clock.

       a) 4   b) 8   c) 12   d) 16

    8) All PIC18 devices include an _____ hardware multiplier as part of
       the ALU.

       a) 4 × 4   b) 4 × 8   c) 8 × 8   d) 8 × 16

P.T.O.

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

1) The Intel 8086 has 32 bit address bus.

2) In 8086 Segment registers and Instruction pointer are part of Bus Interface Unit.

3) An internal oscillator of PIC18F4550 microcontroller provides maximum 48 MHz clock frequency.

4) The PIC18F4550 microcontroller allows maximum 31 program calls or interrupts to occur.

5) The Master Clear Reset of PIC18Fxxxx in active LOW.

6) In PIC18Fxxxx, setting a TRISA bit will make the corresponding PORTA pin an input.

2. A) Write a short note on 8086 flags. **5**

B) Write a assembly language program to add 16 bit (DF3E + 58AB) number using PIC18FXXXX. **5**

C) Write a short note on PPI 8255. **4**

3. A) Explain 8086 branching and looping instructions with suitable examples. **8**

B) Explain the minimum mode configuration of 8086. **6**

4. A) What are the major features of PIC18Fxxxx microcontroller ? Give advantages of PIC18Fxxxx microcontrollers over the MCS-51 microcontrollers. **8**

B) Explain the Bit-Oriented Instruction of PIC microcontroller. **6**

5. A) Give a brief overview of parallel I/O ports of PIC18Fxxxx microcontroller. **10**

B) Write a program to blink LED connected to PORTB.0 of PIC microcontroller. **4**

6. A) What is the watchdog timer ? Explain how the watchdog timer of PIC microcontroller works. **8**

B) List and explain the RESET sources of PIC18Fxxxx microcontroller. **6**

7. A) Interface LCD with PIC microcontroller and write a program to display the word "Microcontroller" positioned at line number 2 in LCD. **8**

B) Give the features of CCP module of PIC18Fxxxx microcontroller. **6**

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Seat No.

M.Sc. (Part – I) (Semester – I) (CBCS) Examination, 2015
ELECTRONICS SCIENCE
Introduction to MATLAB and Lab VIEW (New) (Paper – IV)

Day and Date : Monday, 23-11-2015   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) 1) Which of the following symbol is used as a comment ?

      a) $ b) &

      c) @   d) %

   2) The elements of row vector are separated by _____

      a) Space   b) Commas

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

   3) Which one of the following command is correct for summation of all the elements in row/column ?

      a) $\sum$ {name of row/column}

      b) add{all elements}

      c) mean(name of row/column)

      d) sum(name row/column)

   4) Which file is used for interfacing between MATLAB and other language or program ?

      a) MEX file   b) MAT file

      c) Script file   d) Function file

   5) The _____ holds the G-source code of a LabVIEW VI.

      a) Front Panel   b) Block diagram

      c) Tools pallet   d) Control pallet

6) The ASCII characters in LabVIEW are called _____

   a) Strings   b) Boolean

   c) Numeric   d) Structure

7) In LabVIEW interfacing VISA stands for _____

   a) Virtual serial application

   b) Virtual internal system application

   c) Virtual instrument software architecture

   d) None of the above

8) One module is a _____ in LabVIEW.

   a) Group of homogeneous elements

   b) VI

   c) String

   d) None of the above

b) **True** or **false** :

1) If a semicolon is typed at the end of command the output of command is not displayed.

2) A*B is valid if number of columns A and number of rows of B are different.

3) Simulink is a graphical presentation of various functions in MATLAB.

4) For loop is conditional loop.

5) Software part is removed in stream-lined development flow of GSD model.

6) Data flow of programming is visible in LabVIEW when highlight execution is start.

2. Write a note on :

1) 'Help feature' of MATLAB. **5**

2) MATLAB Command window. **5**

3) DAQ hardware. **4**

3. a) Write a program in MATLAB to find the number of values lying between 50 and 100 from a given data of 'n' numbers. Use for loop and if structure. Check the program with given data as :

   a) 65, 45, 30, 75 and 55

   b) 40, 51, 86, 96, 20 and 12. **10**

   b) Define 'while loop' of MATLAB. **4**

4. a) What is modular programming and role of subVI in modular programming ? **10**

   b) Build a VI for F to C and C to F conversion using case structure. **4**

5. a) Define the MATLAB operators and explain the types of operators in details. **10**

   b) Plot the curve in MATLAB given by equation $a = 10e^{-t}$ for $t = 0$ to 5. Show the grid lines on the plot. **4**

6. a) What is the tree palettes used for LabVIEW programming ? Explain all with suitable diagram. **10**

   b) Write a note on array of LabVIEW. **4**

7. a) Create a VI for spectrum analyzer for three different frequencies using DAQ card. Draw hardware configuration for it. **10**

   b) Explain various types of MATLAB files. **4**

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Seat
No.

M.Sc. (Part – I) (Sem. – I) Examination, 2015
ELECTRONICS (Communication Science) (Old-CGPA)
Paper – III : Communication Systems

Day and Date : Friday, 20-11-2015　　　　　　　　　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) Indicate which one of the following is not an advantage of FM over AM

      A) Better noise immunity is provided

      B) Lower bandwidth is required

      C) The transmitted power is more useful

      D) Less modulating power is required

   2) Phase Lock Loop (PLL) System is used for the detection of

      A) PM　　　　　B) AM　　　　　C) FM　　　　　D) QAM

   3) Quantization noise occurs in

      A) TDM　　　　B) PCM　　　　C) FDM　　　　D) WDM

   4) Time-division multiplex

      A) can be used with CPM only

      B) combines five group into a super group

      C) stacks 24 channels in adjacent frequency slots

      D) interleaves pulses belonging to different transmissions

5) Which of the following is not a common RZ code ?

A) RZ-unipolar   B) RZ-bipolar

C) RZ-M   D) RZ-AMI

6) The most common type of digital modulation scheme in FHSS system is

A) BPSK   B) M-ary PSK

C) BFSK   D) M-ary FSK

b) State **true** or **false**.   **8**

1) A SSB system is used for broadcasting applications.

2) Quadrature detectors are used to demodulate the FM signals.

3) FDM involves simpler instrumentation as compared to TDM.

4) In FSK, a binary 1 usually produces a higher carrier frequency than a binary 0.

5) The NRZ codes are one of the easiest methods to implement for encoding binary data.

6) In DPSK, the information in the two consecutive bits is used.

7) In spread-spectrum communication, the pseudorandom sequence cannot use pulses shorter than the message bit.

8) In fast-frequency hopping, the carrier frequency will not change or hop several times during the transmission of one symbol.

2. Write short notes :

a) With a neat block diagram, differentiate low level amplitude modulation from high level modulation.   **5**

b) Write a note on 'FDM'.   **5**

c) Mention the applications of spread spectrum with Code Division Multiple Access (CDMA).   **4**

Long answer questions :

3. a) With the help of block schematic representation, briefly describe the functions of different building blocks of a typical AM transmitter.   **10**

b) Explain briefly about class-C audio amplifier.   **4**

4. a) With a neat circuit diagram, explain the working of balanced slope detector of the FM wave. **10**

   b) Compare and contrast the performance and applications of the various types of frequency demodulators. **4**

5. a) With a neat block diagram, explain the delta modulation system and illustrate its quantization error.

   b) A binary data sequence is 011011. Sketch the waveforms for the following formats :

   i) RZ Unipolar

   ii) NRZ Bipolar. **14**

6. a) What are commonly used carrier modulation techniques used for transmission of digital transmission of digital signals ? Briefly describe each one of them. **8**

   b) Define PAM, PWM and PPM. Draw its relevant waveforms. **6**

7. a) Explain frequency hoop spread M-ary FSK with a neat block diagram and illustrate the slow frequency hopping. **8**

   b) What is spread spectrum communication ? What is its primary advantage ? What are the commonly used spread spectrum technique ? **6**

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M.Sc. (Part – I) (Semester – II) (New CGPA) Examination, 2015
ELECTRONICS (Communication Science)
Paper No. – V : Modern Antenna Design

Day and Date : Tuesday, 17-11-2015　　　　　　　　　　　　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** *from Q.* **3** *to Q.* **7**.
　　　　　　　3) **All** *questions carry* **equal** *marks.*

1. A) 1) If the frequency of an antenna is increased, then size of an antenna will　　**8**
　　　　a) Increase　　　　　　　　　b) Remain constant
　　　　c) Decrease　　　　　　　　　d) None of the above

　　　2) Retarded potential is generally indicated by
　　　　a) Square bracket　　　　　　b) Volume integration
　　　　c) Bracket　　　　　　　　　　d) None of the above

　　　3) Fresnel field region is also called _____ region.
　　　　a) Reactive near field　　　　b) Far field region
　　　　c) Radiative near field　　　　d) None of the above

　　　4) If, $W_{rad} = a_r A_0 \sin\theta$ (W/m²). Calculate the radiated power density.
　　　　a) π　　　　b) $\pi^2 A_0$　　　　c) $\pi/2$　　　　d) 4π

　　　5) Which of the following antenna is wire antenna ?
　　　　a) Dipole　　　b) Helix　　　c) Monopole　　　d) All of the above

　　　6) An Omni-directional pattern is a special type of _____ pattern.
　　　　a) Directional　　b) Bi-directional　c) Isotropic　　d) None of the above

　　　7) The trace of the received power at a constant radius is called the _____ pattern.
　　　　a) Field　　　　b) Power　　　c) Electric　　　d) Magnetic

　　　8) For radiation intensity with $U = A_0 \sin\theta$, directivity of an antenna is
　　　　a) 2.86　　　　b) 4　　　　c) 1.27　　　　d) 1.5

B) 1) The configuration of broadside array is fed by a twin-line which joins the
two dipoles. **6**

2) Paraboloidal reflectors is having wider scanning angle than the spherical
reflector because of symmetry.

3) End-fire-array has no side lobes.

4) Reflector antennas are preferred for gain greater than 20dB.

5) An underground antenna near the ground, exhibits half of its actual length.

6) Yagi uda array is a fixed frequency antenna.

2. Write a note on :

1) Natural current distribution of thin linear wire atennas. **5**

2) Principal pattern. **4**

3) Scanning array. **5**

3. A) Obtain an expression for the power radiation and radiation resistances of
quarter wave monopole and half wave dipole. **10**

B) List out types of lens an antenna. **4**

4. A) Explain briefly the three cases of N-element uniform linear arrays. **10**

B) Mention the concept of scanning array. **4**

5. A) i) The radial component of the radiated power density is given by
$Wrad = a_r W_r = a_r \sin\theta /r^2$ (W/m^2). Determine the total radiated power.

ii) Find the total radiated power for $Prad = \oiint_\Omega U d\Omega$. Also find the radiation
intensity of an isotropic source. **10**

B) Write a note on f/D ratio of parabolic reflector. **4**

6. A) Give the brief explanation on types of horn antenna. **10**

B) What is cassegrain feed ? Explain with a suitable diagram. **4**

7. A) With the help of suitable diagram explain the beam-width of the dipole for
different length. **10**

B) Obtain the directivity of an antenna. **4**

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Seat No.

M.Sc. (Part – I) (Semester – II) (New- CGPA) Examination, 2015
ELECTRONICS (Communication Science)
Paper No. – VI : Microwave Engineering

Day and Date : Thursday, 19-11-2015   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. Objective questions :   **14**

   a) Select correct alternatives.

      1) Gunn diode is made up of _____.

         a) SiO_2 b) GaAs   c) GaP   d) GaAlS

      2) APC connector is called as sexless connector because _____

         a) Both the halves of matched pairs are identical

         b) Both the halves of matched pairs are non-identical

         c) Both the halves of matched pair are not

         d) None of the above

      3) TE_{11} is dominant mode of propagation in _____.

         a) Circular wave guide

         b) Rectangular wave guide

         c) Coaxial line

         d) Square wave guide

4) In microwave for high power applications, which of the following oscillator is used ?

   a) TWT
   b) Gunn diode
   c) Reflex klystron
   d) Klystron

5) The length of the microstrip is usually _____ to _____ wavelength

   a) $\frac{1}{2}$ to $\frac{3}{4}$
   b) $\frac{1}{2}$ to $\frac{2}{3}$
   c) $\frac{1}{4}$ to $\frac{3}{4}$
   d) $\frac{1}{4}$ to $\frac{1}{2}$

6) In a perfect insulator electromagnetic fields _____.

   a) Penetrate to any depth
   b) Do not penetrate
   c) Penetrate up to small depth
   d) Are short circuited

b) State **true** or **false** : 8

1) If reflection coefficient is zero, then there is no reflected voltage.

2) If the load matches the line impedance, then R = 0, the SWR is 0.

3) Coaxial cables are commonly available with characteristics impedance of 50 Ω to 70 Ω .

4) Normal component of electric and magnetic field are continuous across the boundary.

5) The intrinsic impedance of the free space is 377 Ω .

6) Twin lead wire is useful at microwave frequency.

7) TE_{11} mode is dominant mode in circular waveguide.

8) The total electric displacement through the surface enclosing a volume is equal to the total change within the volume.

2. a) Explain magnetic fields in magnetic material. 5

   b) Explain Coulombs law in electric field. 5

   c) Define : 4

   i) SWR   ii) Skin effect .

3. a) Sketch and explain working of Travelling Wave Tube (TWT). **8**

   b) Explain resistor type loads in coaxial cables. **6**

4. a) A rectangular waveguide has following characteristics **10**

   b = 1.5 cm, a = 3.0 cm, $\mu_R = 1$, and $\varepsilon_R = 2.25$.

   i) Calculate cut-off frequency for the TE_{10}, TE_{20} and TM_{11}.

   ii) Calculate λ_g and Z_0 at 4.0 GHz.

   b) Explain sinusoidal excitation of the transmission line. **4**

5. a) Explain in detail wave propagation in perfect insulators. **8**

   b) Write short note on open two wire line. **6**

6. a) Explain in brief rotary attenuator with suitable vector diagrams. **8**

   b) What are the boundary conditions ? Explain in detail. **6**

7. a) Sketch and explain APC 7 connector. **8**

   b) Explain the concept of baluns. **6**

Seat
No.

M.Sc. (Part – I) (Semester – II) (New-CGPA) Examination, 2015
ELECTRONICS (Communication Science)
Paper – VII : Advanced Microcontrollers

Day and Date : Saturday, 21-11-2015   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 form Q.* **3** *to Q.* **7**.
3) **All** *questions carry* **equal** *marks*.

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

   1) RISC stands for _____
      a) Reverse Instruction Source Coding
      b) Reduced Instruction Source Coding
      c) Reduced Instruction Set Computing
      d) Reduced Information Source Computing

   2) AVR is a _____ bit controller.
      a) 8   b) 16   c) 32   d) 64

   3) In AVR's I/O direct addressing operand address is contained in _____ bits of the instruction word.
      a) 4   b) 6   c) 8   d) 16

   4) _____ is not a conditional branch instruction of AVR.
      a) BRNE   b) BREQ   c) SBRC   d) RJMP

   5) _____ is not a register.
      a) PORTA   b) DDRA   c) PINA   d) None of these

   6) In ARM _____ mode is entered when a high priority interrupt pin is raised.
      a) IRQ   b) FIQ   c) ABORT   d) SYSTEM

   7) R13 of ARM is a _____
      a) Stack pointer   b) Link register
      c) Program counter   d) CPSR

   8) The output of "ADD r5, r5, r3, LSL r2" ARM instruction is _____
      a) $(r5 = r5 + r3 \times 2^{r2})$ b) $(r5 = r5 + r2 \times 2^{r3})$
      c) $(r3 = r5 + r5 \times 2^{r2})$ d) $(r2 = r5 + r5 \times 2^{r3})$

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

       1) AVR register file contains 32×16-bit general-purpose working registers.

       2) AVR RESET input is active low.

       3) AVR's "CP Rd, Rr" instruction copies contents of 'Rr' into 'Rd'.

       4) ARM instructions use 3-address format.

       5) ARM Software Interrupt (SWI) is the lowest priority exception.

       6) ARM's current operating processor status is present in SPSR.

2. Write short notes :

    a) List peripherals available with AVR microcontroller.   **5**

    b) List major features of ARM.   **5**

    c) Write a short note on RISC design philosophy.   **4**

3. a) Explain GPRs of AVR.   **8**

    b) Explain RESET and interrupt handling in AVR.   **6**

4. a) Explain following addressing modes of AVR : Direct Two Register Addressing, Direct Data Addressing, Data Indirect with Displacement.   **8**

    b) Write a program declaring input and output port in AVR.   **6**

5. a) Write a program to read switches connected to PORTA and Glow LEDs connected to PORTB when corresponding switch is ON.   **8**

    b) Explain bank switching in ARM.   **6**

6. a) Give a brief overview of ARM architecture.   **8**

    b) Explain ARM memory system and endianness.   **6**

7. a) Give a brief overview of THUMB instruction set (any eight).   **8**

    b) Explain in brief AVR family structure.   **6**

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Seat No.

M.Sc. (Part – I) (Semester – II) (New – CGPA) Examination, 2015
ELECTRONICS (Communication Science)
Paper – VIII : Digital Design and VHDL Programming

Day and Date : Tuesday, 24-11-2015   Max. Marks : 70

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

Instructions : 1) Q. **1** and **2** **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) Excitation table is used for designing

      a) Shift register   b) Counter

      c) Adder   d) Comparator

   2) $(1001)_{BCD} + (0110)_{BCD} = (?)_{BCD}$

      a) 1111   b) 10101   c) 15   d) None of these

   3) Product terms are the outputs of which type of gate within a PLD array ?

      a) XOR   b) OR   c) AND   d) Flip-flop

   4) Which device family is volatile ?

      a) MAX7000S   b) FLEX10K

      c) MAX+PLUSII   d) VHDL

   5) The assignment operator used to assign variable value is

      a) :=   b) <=   c) =>   d) =

   6) 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

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

1) 10 bit ripple counter has output frequency 10Hz if input frequency is 100Hz.

2) 22V10 PAL has 10 output pins.

3) MAX 7128 CPLD has 128 macro cells.

4) PLA has programmable AND plane and programmable OR plane.

5) Odd parity checkers are designed using EX-OR gates.

6) A 4 bit full adder requires 8 half adders.

7) Universal shift register is combinational logic circuit.

8) Race around condition occurs in JK flip flop.

2. Write a short note on : **14**

i) Attributes.

ii) VHDL design flow.

iii) Moore finite state machine.

3. a) Design 3-bit binary synchronous counter. **8**

b) Explain inertial and transport delay. **6**

4. a) Derive the state table and state diagram for sequential circuit shown below. **8**
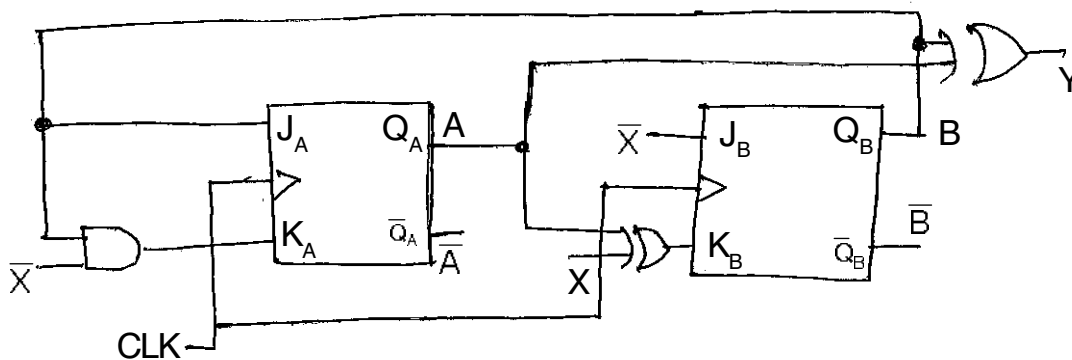
b) Write a short note on operator overloading. **6**

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

b) Compare behavioural and structural modeling. **6**

6. a) Draw the structure of FLEX 10K logic array block. Explain it. **8**

b) Write a short note on synthesis. **6**

7. a) Show the implementation of $f_1 = x_1 x_2$, $f_2 = \bar{x}_2 x_3$ in FPGA. **8**

b) Draw and explain 3-bit ripple counter. **6**

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SLR-MM – 245

Seat No.	

M.Sc. (Part – I) (Semester – II) (Old – CGPA) Examination, 2015
ELECTRONICS (Communication Science) (Paper – VI)
Microwave Engineering

Day and Date : Thursday, 19-11-2015   Total Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

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.*
            *4) **Use** of scientific calculator is **allowed**.*

1. Objective questions :   **14**

   a) Select correct alternatives :

   1) If $E_z \neq 0$ and $H_z \neq 0$, then it is referred as

      a) TEM wave   b) TE wave

      c) HE wave   d) TM wave

   2) The frequency range of microwaves is

      a) 1 GHz – 2 GHz

      b) 300 MHz – 300 GHz

      c) 0.3 GHz – 3 GHz

      d) 20 Hz – 20 KHz

   3) In Gunn diode, the current density, decreases with increase in electric field is called as

      a) –ve differential resistivity

      b) +ve differential resistivity

      c) Differential conductivity

      d) None of the above

4) Frequencies greater than 100 MHz cannot be used in conventional microwave tubes, because

    a) Load resistance effect   b) Transit time effect

    c) Increase in bandwidth   d) None of the above

5) In rectangular waveguide, one of the following mode cannot exist

    a) TM mode   b) TEM mode

    c) TE mode   d) HE mode

6) In a Smith chart, upper half of the chart is indicated as inductive reactance and lower half is indicated as capacitive reactance and is represented as

    a) $-jX, jX$ b) $jX, -jX$

    c) jX, jX d) None of these

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

1) The velocity of electron varies in accordance with RF input voltage is called current modulation.

2) As the frequency increases, directivity increases and bandwidth decreases. Hence the beam width of radiation 'θ' is proportional to $\lambda\!/\!_D$.

3) Single cavity reflex klystron can be used as local oscillator in microwave receiver.

4) Magnetron is not susceptible to frequency variation due to changes in load impedance.

5) The higher order mode interference is not encountered in normal operating frequency in conventional co-axial line because, lower cut-off frequency is very low.

6) The short circuit termination provides an adjustable reactive load at the desired point on a microwave transmission line.

7) When microwave propagates with phase remaining constant over a set of planes is called as plane waves.

8) The passive elements used to control the microwave power from one point to another on a transmission line is called an attenuator.

2. Write short notes :

   a) TE and TM waves. **5**

   b) Single cavity reflex klystron. **5**

   c) Sketch the APC-7 connector. **4**

3. a) Derive the wave equation with the help of Maxwell's equations. **8**

   b) Explain phase velocity and group velocity. **6**

4. a) With neat block diagram, explain the working principles of two-cavity klystron amplifier. **10**

   b) Explain Gunn effect. **4**

5. a) Describe various types of wave guides with necessary equations for rectangular configuration. **10**

   b) A rectangular waveguide of dimensions of 1 cm × 2.3 cm is excited in dominant mode at 9.375 GHz. Calculate the break down power. **4**

6. a) With neat sketch, explain the short circuit plunger. **10**

   b) Discuss the strip line attenuators. **4**

7. a) With neat diagram, explain the operation of waveguide phase shifters. **10**

   b) Briefly explain the adjustable short circuits in waveguides. **4**

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Seat
No.

M.Sc. (Part – I) (Sem. – II) (Old-CGPA) Examination, 2015
ELECTRONICS (Communication Science)
Paper – VIII : Microprocessors and Advanced Microcontrollers

Day and Date : Tuesday, 24-11-2015   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) Choose correct alternatives.   **8**

   1) Which one is the offset register to the code segment ?
      a) Instruction Pointer   b) Base Pointer
      c) Stack Pointer   d) Source Index Register

   2) How much memory space does the 8086 have ?
      a) 256 KB   b) 512 KB   c) 1 MB   d) 4 MB

   3) For string instructions in 8086, the by default pointer for ES is
      a) DI   b) SI   c) BP   d) SP

   4) In 8086 microprocessor the following has the highest priority among all types of interrupts
      a) NMI   b) TYPE 1   c) TYPE 255 d) OVER FLOW

   5) Interfacing LCD with PIC16F877 _____ data lines are used along with the _____ signals.
      a) 6, RS, EN   b) 5, RW, EN
      c) 9, RS, EN, RW   d) 8, RS, EN, RW

   6) The C and Z flag after execution of following code are

      MOVLW FFH

      ADDLW 01
      a) 1, 1   b) 0, 1   c) 0, 0   d) 1, 0

7) The stack memory for PIC16F877 is the part of
   a) Program Memory
   b) Data Memory
   c) Either program or data Memory
   d) Neither program nor data Memory

8) The CALL and GOTO instructions provides _____ bit address to allow branching within any _____ program memory space.
   a) 11, 2K   b) 13, 8K   c) 16, 64K   d) None of these

1. b) Give **true/false** statement. **6**

   1) Because of its pipelined architecture, the 8086 can execute several instructions at the same time.

   2) Executing the instruction STD will affect only the string instructions.

   3) The process of monitoring an external status bit and repeating the loop if not ready is called polling.

   4) Literal values use in the ANDLW and GOTO instructions are in the Range $0 \leq K \leq 255$.

   5) bsf STATUS, RPO after execution of this instruction PIC will select a BANK 1.

   6) In a PIC the subroutine ends with retfie.

2. Attempt **any three** : **14**

   a) How does 8086 convert a logical address to physical address ? Explain with an example.

   b) What are the two modes of 8086 ? List out the various signals generated by the CPU in these two modes respectively.

   c) Explain and give necessity of Brown out reset and Watch Dog Timer in embedded system.

   d) Explain logical instructions related to PIC.

3. a) Draw the functional block diagram of 8288. Explain the command and control signals of 8288. **8**

   b) Explain the following instructions of PIC16F877. **6**
      i) btfss
      ii) sleep.

4. a) Interface 16×2 LCD to PIC16F877 and write a program to display 'HELLO' on it. **8**

   b) Explain the ICWs (Initialization Command Words) of PIC 8259. **6**

5. a) With neat block diagram explain PWM mode. How to vary PWM period and duty cycle ? **8**

   b) Explain the various interrupts of microprocessor 8086. **6**

6. a) Draw the neat interfacing diagram of coprocessor 8087 with 8086. **8**

   b) Compare SPI and 12C bus. **6**

7. a) Determine what should be loaded in Postscaler, Mainscaler and Prescaler in case of Timer2 to get delay of 2ms and also initializations required of T2CON and PR2 for each of three crystal frequencies 4MHz, 10 MHz and 20 MHz. **8**

   b) Draw and explain the timing diagram for 8086 minimum mode memory write cycle. **6**

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Seat No.

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

Day and Date : Monday, 16-11-2015   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 form Q. **3** to Q. **7**.
  3) **All** questions carry **equal** marks.

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

   i) Sampling theorem states that the sampling frequency _____

      a) must be same as that of signal frequency

      b) must be smaller than signal frequency

      c) can be smaller or greater than signal frequency

      d) greater than or equal to twice of signal frequency

   ii) 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) Folded and then Delayed

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

      a) Band Pass   b) Low Pass

      c) Band Stop   d) Band Pass

   iv) Time up scaling of signal sequence causes _____ of signal.

      a) Compression   b) Expansion

      c) Attenuation   d) Amplification

   v) FIR Digital filter are linear _____ filter.

      a) Amplitude and Frequency   b) Phase

      c) Frequency   d) Amplitude

P.T.O.

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

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

vii) For two 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) Filter design by Window method is also called as _____ method.

    a) Fourier   b) Inverse Fourier

    c) Discrete Fourier   d) Fast Fourier

B) State whether the statements are **True** or **False** :   **6**

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

    ii) ROC must be connected region.

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

    iv) $y(n) = x^2(n) + 5x(n) + 3$ represents a dynamic system.

    v) A discrete Time Signal is odd if $x(-n) = -x(n)$.

    vi) Digital systems are quite flexible than analog systems.

2. Write brief notes on the following **(any three)** :   **14**

    a) Casual and non-casual systems.

    b) DSP system in canonical form.

    c) Two properties of Z-Transform.

    d) Comparison between analog and digital filters.

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

    b) What is linear convolution ? Compute the linear convolution of following sequences by Tabular method.   **10**

    $x(n) = \{1, 1, -1, 2, 1\}$ and $h(n) = \{1, -3, -2, 1\}$.

4. a) State and explain linearity and periodicity properties of Discrete Fourier Transform. **4**

   b) What is FFT ? Construct three-stage butterfly diagram for 8-point DIF-DFT of x (n). **10**

5. a) Define Z-Transform and obtain Z transforms and ROC of finite duration sequence x (n) = {1, 2, 5, 4, 3}. **4**

   b) Realize the system in Direct form–I by the following difference equation y (n) = 2 y (n − 1) − 6 y (n − 2) + 3 x (n − 1) + 4 x (n −2). **10**

6. a) State the steps of 'Overlap and Add' method of computing convolution. **4**

   b) Find linear convolution by 'Overlap and Add' method of following sequence x (n) = {1, 2, −1, 1, 2, −2, −3, −1, 1, 1, 2, −1} and h (n) = {2, 1}. **10**

7. a) Explain the steps involved in the IIR digital filter design using Bilinear Transform Technique. **4**

   b) Apply Bilinear Transform Technique to system with following transfer function and find H(z). (Assume T = 1 sec)

   $$H(s) = \frac{2}{(s+1)(s+2)}.$$ **10**

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Seat
No.

M.Sc. (Part – II) (Semester – III) Examination, 2015
ELECTRONICS (COMMUNICATION SCIENCE) (New CGPA)
Paper – X : Digital Communication

Day and Date : Wednesday, 18-11-2015

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**

1) The main advantage of DM over PCM is
   a) Less bandwidth
   b) Less power
   c) Simple circuity
   d) Better S/N ratio

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

3) The coding efficiency is given by
   a) 1 + redundancy
   b) 1/redundancy
   c) 1 – redundancy
   d) None

4) Pulse stuffing is used in
   a) Synchronous TDM
   b) Asynchronous TDM
   c) Any TDM
   d) None of the above

5) In QAM, both identities are varied
   a) Amplitude and phase
   b) Frequency and phase
   c) Bit rate and phase
   d) Baud rate and phase

6) The early-late gate synchronizer technique is used for
   a) Carrier synchronization
   b) A symbol synchronization
   c) Frame synchronization
   d) None of these

b) State **True** of **False** : **8**

1) All stationary process are always ergodic.

2) Self synchronization methods extract a local carrier reference as well as timing information from the received waveform.

3) In an Eye diagram representation, more opening of the Eye indicates no distortion.

4) Compared to Binary signaling scheme, M-ary signalling scheme requires a lower bandwidth.

5) The scrambling and descrambling processes are used to minimize ISI.

6) The information rate is defined to be average number of bits of information/ second.

7) Tossing of a coin is the example of discrete random variable.

8) For carrier recovery the costa's loop technique can be used.

2. Write short notes : **14**

a) Properties of convolution codes **5**

b) QAM (Quadrature Amplitude Modulation) **5**

c) Random variables. **4**

3. a) Apply Shannon Fano coding procedure for the following message ensemble. **8**

Assume M = 2. Find its efficiency and Redundancy

[X] = [x1, x2, x3, x4, x5, x6, x7, x8]

[P] = [0.04, 0.08, 0.12, 0.08, 0.2, 0.08, 0.2, 0.2]

b) Explain M-ary signaling scheme. List the advantages of M-ary over binary signaling scheme. **6**

4. a) In a factory 4 machine A1, A2, A3 and A4 produce 10%, 20%, 30% and 40% of the items respectively. The % of defective items produced by them is 5%, 4%, 3%, 2% respectively. An item selected at random is found to be defective. What is the probability that it was produced by machine A2 ? **8**

b) What is the need of scrambler and unscramble and how it works ? **6**

5. a) Explain different types of synchronization. Explain Mth power loop method of carrier recovery technique. **8**

   b) With block diagram explain DPCM system. **6**

6. a) Justify error present or not in received code vector R = 1111010, data = 1101

   and $G = \begin{bmatrix} 1 & 0 & 0 & 0 & : & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & : & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & : & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & : & 1 & 1 & 1 \end{bmatrix}$ **8**

   b) With block diagram explain working of Delta Modulation. **6**

7. a) Calculate the bandwidth of the picture (video) signal in a television. The following are the available data. **8**

   i) Number of distinguished brightness levels = 10

   ii) The number of elements per picture frame = 3,00,000;

   iii) Picture frames transmitted per second = 25; and

   iv) S/N required = 25 dB.

   b) Compare analog and digital modulation. **6**

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Seat No.

M.Sc. (Part – II) (Semester – III) Examination, 2015
ELECTRONICS (Communication Science)
Satellite Communication (Paper – XI) (New – CGPA)

Day and Date : Friday, 20-11-2015   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 form Q. **3** to Q. **7**.
                          3) **All** questions carry **equal** marks.

1. Objective questions :   **8**

   A) Select correct alternatives :

   1) A television (TV) transmission is an example of which type of transmission ?

      a) Simplex   b) Half duplex

      c) Full duplex   d) None of the above

   2) INTELSAT stands

      a) International Telecommunications Satellite

      b) India Telecommunications Satellite

      c) Inter Telecommunications Satellite

      d) None of the above

   3) Kepler's first law states

      a) The path followed by a satellite around the primary will be an sphere

      b) The path followed by a satellite around the primary will be a circle

      c) The path followed by a satellite around the primary will be an ellipse

      d) None of the above

   4) The orbital period in seconds

      a) $P = \pi/n$ b) $P = 2\pi/n^2$

      c) $P = 2\pi/n$ d) None of the above

5) Ascending node means _____
   a) The point where the orbit crosses the equatorial plane going from south to north
   b) The point longest from earth
   c) The point closest approach to earth
   d) None of the above

6) The down link frequency in the C band transponder is
   a) 6 GHz   b) 14 GHz
   c) 4 GHz   d) 11 GHz

7) The carrier to noise ratio for a satellite depends upon
   a) Effective isotropic radiated power
   b) Bandwidth
   c) Free space path losses
   d) All of them

8) The multiple access technique suitable only for digital transmission is
   a) TDMA   b) Both a) and b)
   c) FDMA   d) Packet access

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

1) Application of satellite system is terrestrial communication.

2) The maximum distance between earth satellite in an elliptical orbit is apogee.

3) Forces act on satellite in an orbit are centrifugal and centripetal.

4) Tracking system is used to collect data from different sensors and sends to the control earth station.

5) The part of satellite subsystem make a help to satellite to move in orbit is propulsion subsystem.

6) The satellite system which provides global communication service is iridium.

2. Write a short note :
   a) Solar power system.   **5**
   b) FDMA.   **5**
   c) Geostationary satellite.   **4**

3. a) Briefly describe Attitude and Orbit Control System (AOCS). **8**

   b) Describe the spin stabilized satellites. **6**

4. a) 12 GHz receiver consists of an RF stage with G_1 = 30dB and noise temperature T_1 = 20K, a down converter with gain G_2 = 10dB and noise temperature T_2 = 360K and an IF amplifier stage with gain G_3 = 15dB and noise temperature T_3 = 1000K. Calculate the effective noise temperature, individual noise figure of the three stages and overall noise figure of the system. Take reference temperature to be 290K. **8**

   b) Explain the terms angle of inclination and angle of elevation with neat diagram. **6**

5. a) Derive the expression for up-link and down-link design. **10**

   b) Launches and launch vehicles. **4**

6. a) Explain the term : **8**

     i) C-band and Ku band

     ii) delay and throughput considerations.

   b) Explain radio and satellite navigation. **6**

7. a) Explain in detail 'Teledesic'. **8**

   b) Explain the working of VSA T hub master control station. **6**

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Seat
No.

M.Sc. – II (Semester – III) (CGPA) (New) Examination, 2015
ELECTRONICS (Communication Science)
Paper – XII : Internetworking and Data Communication

Day and Date : Monday, 23-11-2015   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) Choose the correct alternatives :   **8**

   1) FTP server listens to connections on port _____

      A) 19 and 20   B) 20 and 21

      C) 21 and 22   D) 20 and 22

   2) Which of the following operations can be performed by using FTP ?

       i) Connect to a remote host

       ii) Select directory

      iii) Define the transfer mode

      iv) List file available

      A) i and ii only   B) i, ii and iii only

      C) ii, iii and iv only   D) All i, ii, iii and iv

   3) A _____ is a set of information that is exchanged between a client
      and web browser and a web server during an HTTP transaction.

      A) infoset   B) clientinfo

      C) cookie   D) transkie

4) Match the following HTTP status code to their respective definitions.

  i) 400   a) OK

 ii) 500   b) Not found

 iii) 200   c) Continue

 iv) 100   d) Internal server error

 A) i-b, ii-d, iii-a, iv-c   B) i-a, ii-b, iii-c, iv-d

 C) i-b, ii-c, iii-a, iv-d   D) i-b, ii-a, iii-c, iv-d

5) Unspecified address _____ of IPV6 address is equivalent to the IPV4 unspecified address 0.0.0.0.

 A) (::1)   B) (::)   C) (::0)   D) (1::)

6) A simple cabling method, known as the _____ topology allows about 30 computers on a maximum cable length of about 600 feet.

 A) Ring   B) Bus   C) Star   D) Mesh

7) The _____ layer is responsible for resolving access to the shared media or resources.

 A) Physical   B) Mac sub layer C) Network   D) Transport

8) A WAN typically spans a set of countries that have data rates less than _____ Mbps.

 A) 2   B) 1   C) 4   D) 100

b) Say **True** or **False** :   6

1) In addresses for class B networks, the first 16 bits specify a particular network and the last 16 bits specify a particular host.

2) An adaptive routing scheme is designed to enable switches to react to changing traffic patterns on the network.

3) The IPV4 address is a logical address because it is assigned at the Internet layer.

4) The data link provides a well defined service interface to the network layer, determining how the bits of the physical layer are grouped into frames.

5) A distributed data processing configuration in which all activities must pass through a centrally located computer is called as spider network.

6) The network management signals are used for the maintenance, troubleshooting and overall operation of the network.

2. a) State the modes of operation of HDLC. **5**

   b) State the Layers in TCP/IP and OSI Model. **5**

   c) Compare between Network Layer and Transport Layer of OSI Model. **4**

3. a) What are the design issues for Network Layer of OSI Model ? **10**

   b) In which layer of OSI is error detection and correction done ? How is it carried out ? **4**

4. a) List the design issues of each layer of TCP/IP Model. **10**

   b) With a block schematic explain a modem. **4**

5. a) Compare between Guided and Unguided Media of Physical Layer. **10**

   b) Compare between LANs and WANs. **4**

6. a) List and explain any 2 Routing Algorithms. **8**

   b) What are bridges ? How do they work ? **6**

7. a) How is congestion control in virtual circuit subnets carried out ? **8**

   b) How are computer networks categorized ? **6**

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M.Sc. (Part – II) (Semester – III) Examination, 2015
(Old-CGPA)
ELECTRONICS (Communication Science)
Paper – X : Digital Communication

Day and Date : Wednesday, 18-11-2015   Max. Marks : 70

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

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. A) Select correct alternatives.   **6**

    1) The probability that a continuous random variable takes on a particular value is

      a) zero   b) one   c) infinity   d) random

    2) In DM system, the granular noise occurs when the modulating signal

      a) increases rapidly   b) remains constant

      c) decrease rapidly   d) is variable

    3) The entropy of a message source generating 4 messages with probabilities 0.5, 0.25, 0.125 and 0.125 is

      a) 1 bit/message   b) 1.75 bits/message

      c) 3.32 bits/message   d) 5.93 bits/message

    4) QPSK requires _____ bandwidth compared to BPSK.

      a) infinite   b) double   c) half   d) same

    5) 'Early-late gate' detection method used for

      a) Carrier synchronization   b) frame synchronization

      c) symbol synchronization   d) none of these

    6) Cyclic codes form a subclass of linear block codes which is not

      a) systematic   b) non systematic

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

B) State **true** or **false**. **8**

   1) The binomial distribution technique is used for continuous random variable.

   2) All stationary process are always ergodic.

   3) Eye diagram is used to measure distribution present in PCM system.

   4) QAM is example of M-ary signaling scheme.

   5) System having probability of error of 10^{-5} is better than system having probability of error 10^{-4}.

   6) If a random process is ergodic then it is also stationary.

   7) Arithmetic average and statistical average is same.

   8) For each $(k \times n)$ generator matrix G_1 these exists an $k \times n$ parity check matrix H.

2. Write short notes :

  a) Characteristics of entropy. **5**

  b) QAM. **5**

  c) Matched filter receiver. **4**

3. a) Calculate the bandwidth of the picture (video) signal in a television. The following are the available data. **8**

   i) number of distinguishable brightness levels = 10

   ii) the number of elements per picture frame = 3,00,000

   iii) picture frames transmitted per second = 30

   iv) S/N required = 30 dB.

  b) Compare types of random variables. **6**

4. a) Apply the Huffman coding procedure for the following message ensemble, with M = 2. **8**

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

$$[P] = \left[\frac{1}{4} \quad \frac{1}{8} \quad \frac{1}{16} \quad \frac{1}{16} \quad \frac{1}{16} \quad \frac{1}{4} \quad \frac{1}{16} \quad \frac{1}{8}\right]$$

  b) With block diagram explain working of ADM. **6**

5. a) Compare ASK, FSK and PSK schemes with respect to bandwidth, power requirement and equipment complexity. Which scheme is preferred for high speed data transmission ? Why ? **8**

   b) Explain frame synchronization. **6**

6. a) The generator matrix of (6, 3) block code is given below. Find all code vectors of this code. **8**

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

   b) Explain working of correlation receiver. **6**

7. a) What is equalization ? Explain any one technique of equalization. **8**

   b) With diagram explain working of cyclic encoding using (n – k) bit shift register. **6**

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Seat No.

M.Sc. (Part – II) (Semester – III) (Old CGPA) Examination, 2015
ELECTRONICS (Communication Science)
Paper – XII : Internetworking and Data Communication

Day and Date : Monday, 23-11-2015   Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

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

2) Attempt **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 number of layers in ISO-OSI reference model

         a) 5   b) 7

         c) 6   d) None of the mentioned

      2) The functionalities of presentation layer includes

         a) Data compression   b) Data encryption

         c) Data description   d) All of the mentioned

      3) Delimiting and synchronization of data exchange is provided by

         a) Application layer   b) Session layer

         c) Transport layer   d) Link layer

      4) In OSI model, when data is sent from device A to device B, the 5th layer to receive data at B is

         a) Application layer   b) Transport layer

         c) Link layer   d) Session layer

5) In Internet protocol stack, when data is sent from device A to device B, the 5th layer to receive data at B is

    a) Application layer   b) Transport layer

    c) Link layer   d) Session layer

6) In the OSI model, as a data packet moves from the lower to the upper layers, headers are

    a) Added   b) Removed

    c) Rearranged   d) None of the mentioned

b) State **true** or **false**.   **8**

1) Routing can be used for mobile hosts.

2) Terrestrial microwave is an unguided media.

3) Sliding windows is a datalink protocol.

4) Star topology has a central hub.

5) Network layer translates between physical and logical addresses.

6) Transport layer deals with flow control.

7) Hamming code does error correction.

8) 'Shortest path' is a routing algorithm.

2. Write short notes.   **14**

a) Unguided media for network transmission.   **5**

b) Need for computer networks.   **5**

c) Layered reference model.   **4**

3. a) Explain the elementary data link protocol in detail. **10**

   b) What is the basic concept used in working of cellular telephony ? **4**

4. a) Elaborate on the use of terrestrial microwave and satellite communication as unguided media used in physical layer. **10**

   b) Explain the design issues of layers in the ISO-OSI model. **4**

5. a) Compare and contrast between leaky bucket algorithm and Token bucket algorithm. **10**

   b) What is sub-netting ? How is it carried out ? **4**

6. a) State briefly the IEEE standard 802 for LANs. **8**

   b) Explain the header format of IP. **6**

7. a) Explain the leaky bucket algorithm for congestion prevention. **8**

   b) Compare between ARP and ICMP protocols. **6**

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Seat No.	

M.Sc. (Part – II) (Semester – IV) (CGPA) Examination, 2015
ELECTRONICS (Communication Science)
Paper XIII : Broadband Communication

Day and Date : Tuesday, 17-11-2015   Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

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

     1) _____ provide a streamlined transport facility for higher-layer protocols that are connection oriented.

         a) AAL type 1   b) AAL type 2

         c) AAL type 3/4   d) AAL type 5

     2) Narrowband ISDN provides end to end communication using

         a) circuit switching   b) packet switching

         c) frame relay   d) all

     3) The _____ constitutes a routing field for the network.

         a) Virtual path identifier

         b) Virtual channel identifier

         c) Payload type

         d) Generic flow control

     4) Frame relay operates in _____ layer.

         a) Data link   b) Physical

         c) Physical and data link   d) Physical data link and network

     5) For the frame-switching bearer service the LAPF control which is the full _____ protocol.

         a) Q. 922   b) Q. 921   c) Q. 931   d) Q. 932

     6) Voice signals are digitized using

         a) FM   b) TDM   c) PCM   d) None

7) An ISDN is a network, in general evolving from a
   a) Telephony IDN   b) PSPTN
   c) CSPTN   d) B-ISDN

8) _____ has the exclusive task of supporting ISDN signaling.
   a) Control protocol block   b) User protocol block
   c) Both a) and b)   d) None of these

B) Choose correct option **true/false** :   **6**
   a) Max size of ISDN address is of 45 digits.
   b) Frame relay service used over high speed H channel.
   c) Frame mode call control protocol has two alternatives for call control.
   d) In ATM Virtual path reduces processing time.
   e) AAL 2 has constant bit rate information.
   f) Switching element is the basic building block in ATM switching.

2. Answer **any three** :   **(5+5+4)**
   1) What are the typical functions for interworking between ISDN and non-ISDN networks ?
   2) Draw the structure if I series standards for ISDN.
   3) Explain primary and basic channel structure.
   4) Define – VPC, VPI, VCC, VCI.

3. a) Explain different broadband services.   **8**
   b) Draw and explain the functional architecture of BISDN.   **6**

4. a) Explain BISDN protocol reference model.   **8**
   b) Explain the Analog and digital switching.   **6**

5. a) Explain transmission of ATM cells in detail.   **8**
   b) What are the different switching performance characteristics ?   **6**

6. a) Explain ISDN architecture in detail.   **10**
   b) Explain user network interface for B-ISDN.   **4**

7. a) Explain Input and Output queuing switching system for ATM.   **8**
   b) Explain AAL-3/4 protocol.   **6**

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Seat
No.

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

Day and Date : Monday, 16-11-2015   Total Marks : 70
Time : 10.30 a.m. to 1.00 p.m.

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

1. A) Choose the most correct alternative :   **6**

   1) The first differential in Cauchey integral theorem should be _____
      a) Continuous   b) Infinity
      c) Zero   d) Constant

   2) If f(z) is not analytic at Z_0 but is analytic at some point in every neighborhood of Z_0, then Z_0 is called a _____ of the function f(z).
      a) Singularity   b) Pole
      c) Zero   d) Residues

   3) If A is an orthogonal matrix then
      a) A^{-1} exists   b) A^{-1} is equal to A^T
      c) Both a) and b) are true   d) Only a) is true

   4) The differential equation $y'' - 2y' + 5y$ is
      a) Homogeneous   b) Linear
      c) Constant coefficients   d) All of a), b) and c) hold

   5) The Fourier expansion coefficient, a_0, for $f(x) = x^2$ in the interval $-\pi \le x \le \pi$ is _____

      a) $\pi^2/3$ b) $-2\pi^2/3$ c) $2\pi/3$ d) $-2\pi/3$

   6) The value of integral $\int_{-\pi}^{\pi} \cos mx \cos nx \, dx$ for m, n > 0 _____

      a) $2\pi i$ b) 2π c) -2π d) $-2\pi i$

P.T.O.

B) State **True** or **False** :   **8**

1) $f(z) = e^{\frac{1}{z}}$ has non-isolated essential singularity at z = 0.

2) Every matrix possesses a unique inverse.

3) [3] is a diagonal matrix.

4) $f(x) = \sin^{-1} x$ has Fourier series expansion.

5) Laplace transform of $f(t) = te^{at}$ is $\dfrac{1}{(s-a)^2}$.

6) Term by term integration of a convergent Fourier series is not valid.

7) The operation of multiplying f(t) by e^{-st} and integrating from t = 0 to ∞ is called Fourier Transform.

8) Laplace transform of (5 sin 3t) is $\dfrac{15}{s^2 + 9}$.

2. Attempt the following :

A) Find the solution of $\dfrac{d^2y}{dx^2} + y = 0$, satisfying y(0) = 1 and $y\left(\dfrac{\pi}{2}\right) = 2$.

B) Show that Eigen values of Hermitian matrix are real.

C) Classify the singulrites and calcuate residue for $f(z) = \dfrac{1}{z^2 - 1}$.   **(5+5+4)**

3. A) Applying Calculus of residues prove that $\displaystyle\int_0^\pi \dfrac{dx}{1 + k \cos x} = \dfrac{2\pi}{\sqrt{1 - k^2}}$ for $-1 < k < 1$.

B) For the matrix $A = \begin{bmatrix} 2 & 1 & 3 \\ 3 & 1 & 2 \\ 1 & 2 & 3 \end{bmatrix}$ verify the result $(Adj.A)^{-1} = \dfrac{A}{|A|}$.   **(8+6)**

4. A) Illustrate the Cayley-Hamilton theorem for the matrix A where

$A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$.

B) Determine whether the following differential equation is exact or not hence solve $(2x - y + 1)dx + (2y - x - 1)dy = 0$.   **(8+6)**

5. A) Find a cosine series of period 2π to represent sinx in $0 \le x \le \pi$.

   B) Evaluate the integral applying residue theorem $\displaystyle\int_0^{2\pi} \frac{d\theta}{3 - 2\cos\theta + \sin\theta}$.   **(8+6)**

6. A) Find the Fourier transform for the box function f(t) where

   $$f(t) = \begin{cases} 1, & -a \le t \le a \\ 0, & \text{Otherwise} \end{cases}.$$

   B) Find the second linearly independent solution of $xy'' - (x + 1)y' + y = 0 \ (x > 0)$ while one solution is e^x.   **(6+8)**

7. A) Give First and Second Shifting Theorems. Apply them to evaluate Laplace transforms of

   i) $f(t) = \begin{cases} \cos\left(t - \dfrac{2\pi}{3}\right), & t > \dfrac{2\pi}{3} \\ 0, & t < \dfrac{2\pi}{3} \end{cases}$

   ii) $f(t) = e^{4t} \cosh 5t$.

   B) Find inverse Laplace transform of $F(s) = \dfrac{s+1}{s(s + 2)}$.   **(8+6)**

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Seat No.

M.Sc. – I (Semester – I) (C.G.P.A.) (Old) Examination, 2015
ELECTRONICS (Communication Science)
Instrumentation (Paper – II)

Day and Date : Wednesday, 18-11-2015   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) Choose correct alternatives :   **8**

      1) A transducer converts

         a) Mechanical energy into an electrical energy
         b) An electrical energy into mechanical energy
         c) One form of energy into another form
         d) All of the above

      2) In strain gauges, which of the following varies in accordance with the input signal

         a) resistance   b) capacitance
         c) inductance   d) none of the above

      3) A tachometer is used to measure

         a) temperature   b) pressure   c) displacement   d) rpm

      4) A thermocouple is

         a) an active transducer   b) a passive transducer
         c) a mechanical transducer   d) none of the above

      5) An instrumentation amplifier uses

         a) CE amplifiers   b) CC amplifiers
         c) Operational amplifiers   d) Power amplifiers

      6) pH of water is

         a) 14   b) 7   c) – 14   d) none of the above

7) The lock-in amplifier is
   a) an all pass filter amplifier
   b) low pass filter amplifier
   c) band pass filter amplifier
   d) high pass filter amplifier

8) A sample and hold circuit is normally placed between
   a) Signal source and ADC
   b) Signal source and DAC
   c) Multiplexer and demultiplexer
   d) ADC and DAC

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

1) Optical transducers convert _____ energy into electrical energy.

2) Sound is converted into an electrical signal by _____

3) _____ is used to study energy distribution of signal as a function of frequency.

4) The multiplexer used in DAS has _____ input and _____ outputs.

5) Quality factor is measured by _____

6) In UPS, _____ is converted in to an ac voltage.

2. Attempt **any three** : **14**
   a) Discuss the resistance transducers.
   b) Explain the measurement torque with example.
   c) What is phase sensitive detection ? Explain.
   d) What is signal conditioning ? Explain.

3. a) Explain the principle and operation of digital multimeter. **10**
   b) Write the factors on which the selection of a transducer depends. **4**

4. a) With neat diagram, explain working of an instrumentation amplifier. **10**
   b) Discuss the characteristics of an instrumentation amplifier. **4**

5. a) Describe the principle and operation of a logarithm amplifier. **10**
   b) Write a note on V to I converter. **4**

6. a) With neat block diagram, explain the working of a DSO. **10**
   b) What is proximity detector ? Explain. **4**

7. a) Discuss the various standard interface systems. **10**
   b) Write a note on static signal conditions. **4**

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