SLR-JK – 11

Seat No.	

M.Sc. (Part – I) (Semester – II) Examination, 2014
ELECTRONICS (Communication Science)
Paper – VII : Microwave Engineering

Day and Date : Thursday, 20-11-2014 Total Marks : 70
Time : 11.00 a.m. to 2.00 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) The term microwave frequency range is generally used for which of the following

a) 1 KHz to 100 KHz b) 101 KHz to 1000 KHz

c) 1 GHz to 300 GHz d) Above 10^9 GHz

2) According to IEEE microwave frequency bands, the frequency range of C and is

a) 1 GHz to 2 GHz b) 2 GHz to 4 GHz

c) 4 GHz to 8 GHz d) 8 GHz to 12 GHz

3) Which of the following is not a Maxwell's equation ?

a) $\nabla \times E = -\partial B / \partial t$ b) $\nabla \cdot D = \rho$

c) $D = \in E$ d) $\nabla \cdot B = 0$

4) The characteristics impedance of a rectangular waveguide is

a) 50Ω b) 75Ω c) 100Ω d) 300Ω

P.T.O.

5) If only the transverse electric field exists, the wave is called

a) TE wave b) TM wave

c) TEM wave d) All of the above

6) The two cavity klystron operates on the principle of

a) Velocity modulation

b) Current modulation

c) Velocity and Current modulation

d) None of the above

7) In the case of TWT, the microwave circuit is

a) non-resonant b) resonant

c) oscillatory d) none of the above

8) A microstrip line is also called as

a) open-strip line b) closed-strip line

c) mismatch line d) matched line

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

1) In TE waves, there is no component of electric field in the direct of propagation.

2) The electric and magnetic wave equations are derived from Maxwell's equations.

3) Impedance matching is desirable in transmission lines.

4) In waveguides, the electric and magnetic fields are confined to the space within the guide only.

5) The effect of velocity modulation produces bunching of the electron beam or current modulation.

6) The reflex Klystron overcomes the disadvantages of the two-cavity Klystron.

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

   a) What is wave polarization ? Explain.

   b) What are microwave tubes ? Explain.

   c) Explain the importance of matched loads.

   d) Explain briefly, the strip line attenuator.

3. a) Derive the TE mode field equations in a rectangular waveguide. **10**

   b) Write the Maxwell's equations in both integral and differential forms. **4**

4. a) Derive the equations for transmission coefficient and reflection coefficient. **10**

   b) Explain the terms line characteristic impedance and propagation constant. **4**

5. a) Discuss in detail, the various coaxial and stripline components. **10**

   b) Give an account on impedance matching. **4**

6. a) With neat diagram, explain the construction and working of waveguide attentuators. **8**

   b) Give an account on waveguide terminations. **6**

7. a) Discuss in detail, the principle of operation, construction and working of two-cavity Klystrons. **10**

   b) What is Gunn effect ? Explain. **4**

SLR-JK – 12

Seat No.	

M.Sc. (Part – I) (Semester – II) Examination, 2014
ELECTRONICS (Communication Science)
Paper No. – VIII : Microprocessors and Advanced Microcontrollers

Day and Date : Saturday, 22-11-2014 Total Marks : 70

Time : 11.00 a.m. to 2.00 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) The addressing mode of the instruction DEC BYTE PTR [BX + 2] is

a) Direct b) Register

c) Based indexed d) Register relative

2) In 8086 which of the following general purpose register cannot be used as base pointer or indexed register in the indirect memory access addressing modes.

a) BX b) SI c) CX d) DI

3) When used with coprocessors such as the 8087 NDP, the 8086 should be operated in

a) Minimum mode b) Maximum mode

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

4) What is the size of instruction queue in 8086 ?

a) 2 bytes b) 4 bytes c) 6 bytes d) 8 bytes

5) PIC16F877 devices have _____ bit program counter capable of addressing _____ program memory.

a) 8, 256 K × 8 b) 16, 64K × 8 c) 13, 8K × 14 d) 14, 8K × 13

P.T.O.

6) Before executing of ANDLW 0X5F the working registers contents were 0XA3. The contents after execution will be

a) 0X5F b) 0X03

c) 0XFF d) None of these

7) The reset vector and interrupt vector for PIC are

a) 0007H, 0004H b) 0004H, 0007H

c) 00H, 07H d) 0000H, 0004H

8) The timer used for capture, compare and PWM mode respectively are

a) Timer 0, Timer 1, Timer 2

b) Timer 2, Timer 1, Timer 0

c) Timer 1, Timer 1, Timer 2

d) Timer 2, Timer 1, Timer 1

b) Give True/False statement : **6**

1) The address bus for 8086 processor is 16 bits wide.

2) The number of the flags in the 8086 is nine.

3) A low priority processor cannot gain control of the system bus from a high priority processor unless the $\overline{\text{LOCK}}$ signal is asserted.

4) Interrupt flag bit get set when on interrupt condition occurs, regardless of state of its corresponding enable bit.

5) PIC16F877 has CISC type architecture.

6) The content of TRIS register decides the PORT functionality either as input or output.

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

a) Explain what are the advantages of the memory segmentation. Discuss various segment register in 8086.

b) Describe the function of the following pins and their use in 8086 based system.

i) LOCK ii) TEST

c) Explain different addressing modes used in PIC with suitable example.

d) Give the steps to be followed for doing A/D conversion in PIC16F877.

3. a) Explain the concept of interfacing memory with 8086 in minimum mode. Draw a neat sketch of interfacing memory and the processor. **8**

   b) Draw and explain bits from STATUS register of PIC. **6**

4. a) Explain in detail Timer 2 of PIC and its interrupt logic circuitry. **8**

   b) Write a assembly language program in 8086 for block transfer using string instructions. **6**

5. a) Draw and explain the timing diagram for 8086 maximum mode memory read cycle. **8**

   b) Draw interfacing of a switch and LED to PIC, when switch is closed the LED should turn ON. Write assembly language program for this. **6**

6. a) Explain CCPI module, how it is used for compare function along with Timer 1. **8**

   b) Draw and explain the interfacing of the clock generator 8284 with 8086. **6**

7. a) Draw and explain the interfacing of programmable interrupt controller 8259 to microprocessor 8086. **8**

   b) Explain program and data memory organization of PIC16F877. **6**

SLR-JK – 13

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2014
ELECTRONICS (Communication Science)
Communication System Design (Paper – IX)

Day and Date : Friday, 14-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

1. a) Select correct alternatives : **6**

i) Common channel signalling _____
A) Uses the speech or data path for signaling
B) Does not use the speech or data path for signaling
C) Needs no additional transmission facilities
D) Finds it difficult to handle signaling during speech

ii) As per Nyquist criterion the sampling rate is
A) 2fs B) (1/2)fs
C) (1/2fs) D) (2/fs)

Where fs is the signal frequency.

iii) The following concept refers to the use of radio channels on the same carrier frequency to cover different areas that are separated from one another by sufficient distances.
A) Cell splitting
B) Frequency reuse
C) Handoff
D) Cell geometry

iv) Anything which alters, modifies, or disrupts a signal as it travels along a channel between a source and a receiver is called as
A) Noise B) Crosstalk
C) Deterioration in receiver D) Interference

P.T.O.

v) The probability that a call will be blocked because no channel is available for it is
   A) Blocking service
   B) Quality of service
   C) Service error
   D) GoS

vi) The data transfer time for a fixed size file _____ in the IEEE 802.11 WLAN system operating at 2 Mbps as compared to that of at 1 Mbps.
   A) Increases by ten times
   B) Decreases by two times
   C) Decreases by ten times
   D) Increases by two times

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

i) The process of transferring an active call from one cell to another as the mobile unit moves from the first cell to the other cell without disconnecting the call is referred to as handoff.

ii) The Global System for Mobile (GSM) communications CDMA.

iii) Having fixed connections between every possible pair of telephones is physically impractical.

iv) The distance from the transmitter to the point where the sky wave first returns to the earth is called skip distance.

v) The channel capacity increases in presence of higher noise.

vi) 4G technology uses OFDM.

vii) Manchester coding solves the problem of clock synchronization.

viii) Sound transmission in TV is done with AM.

2. Write short notes on :

a) Line codes. **5**

b) Functional modeling of communication systems. **5**

c) Subsampling Receivers. **4**

3. a) "RF power, bandwidth and reliability are the three most impotent considerations while evaluating a wireless link" Elaborate and comment. **8**

   b) Explain importance of Encryption and data scrambling with at least one method used for each. **6**

4. a) With suitable block diagram explain the functioning of a digital Transmitter. What are advantages of using SSB modulation scheme ? **6**

   b) Discuss importance of Channel Assignment Strategies. Explain the fixed and dynamic strategies for Channel assignment with their advantages and limitations. **8**

5. a) Draw a neat diagram illustrating concept of cellular telephony. Explain the hand off process. Why sometimes calls are lost ? **8**

   b) Explain the functional architecture trade-offs in a communication system. **6**

6. a) Explain the FHSS technique and compare its performance with DSSS. **8**

   b) State and explain the Shanon's Channel capacity theorem and its implications in Mobile computing systems. **6**

7. a) Why a TV receiver sometimes show ghost images ? How these can be avoided ? **6**

   b) Explain the Delta modulation scheme with help of suitable diagrams. State advantages of the Delta modulation over conventional PCM. **8**

SLR-JK – 14

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2014
ELECTRONICS (Communication Science)
Satellite Communication (Paper – X)

Day and Date : Monday, 17-11-2014 Total Marks : 70
Time : 3.00 p.m. to 6.00 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 :

a) Select correct alternatives : **8**

1) The equation for Effective isotropic radiation power is given as
   a) Pr = PtGtGr/Lp b) Pr=PtGt/L
   c) Pr=PtGtGr/L d) None of the above

2) 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

3) The operational principal of propulsion system is based on
   a) Newton's second law b) Newton's third law
   c) Kepler's law d) None of these

4) DAMA stands for
   a) Demand Accesses Multiple Account
   b) Data Amount Master Access
   c) Demand Access Main Assignment
   d) Demand Assigned Multiple Access

P.T.O.

5) _____ angles determine where to point an earth station so that it intercepts the satellite.
   a) elevation, Azimth b) inclination, Azimth
   c) both d) none

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 end
   d) All of the above

7) The time taken for a satellite to complete one orbit is called _____ period.
   a) Perigee b) Apogee
   c) Sideread d) None of these

8) In which of the following is transponder used for communication ?
   a) Single conversion b) Double conversion
   c) On-board controller d) All

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

1) Communication satellites will operate in the C band.
2) TTC subsystem is controlled by earth station.
3) VSAT stands for very small aperture terminal.
4) The time for one orbit is called the period.
5) MEO is placed in the range 400 to 1000 mi above the earth.
6) Satellite is a natural body moving around a celestial body.

2. Write a short note :
   a) Reference burst **5**
   b) FDMA **5**
   c) LEO and MEO. **4**

3. a) Derive the expression for up-link and down link design. **8**
   b) Briefly describe the three axis method of satellite stabilization. **6**

4. a) Compute the free space path loss in decibels for the following conditions :
   i) For a path length of 10 km and 4 GHz operating frequency.
   ii) Earth station transmitting antenna EIRP = 50 dBW, satellite antenna gain = 20 dB and received power at satellite = – 120 dBW. **8**

   b) Define noise figure and noise temperature. **6**

5. a) With a block diagram describe the working of each block of satellite subsystem. **8**

   b) Explain single and double conversion transponders. **6**

6. a) Explain : **8**
   i) Elliptical orbit
   ii) Molhiya orbit
   iii) Radiation effect.

   b) Compare between TDMA, FDMA and CDMA system. **6**

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

   b) Explain working of GPS system. **6**

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SLR-JK – 15

Seat No.	

M.Sc. (Part – II) (Semester – III) Examination, 2014
ELECTRONICS (Communication Science)
Digital Communication (Paper – XI)

Day and Date : Wednesday, 19-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N. B. *: 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 alternative : **6**

1) The total area under probability distribution is

a) 0 b) 1

c) constant d) infinity

2) The order of generator matrix is

a) n × k b) k × n

c) (n – k) × k d) (n – k) × n

3) In PCM system, output S/N increases _____ with bandwidth.

a) linearly b) exponentially

c) inversely d) randomly

4) Spectral density expresses

a) average voltage

b) average current

c) average power in a waveform as a function of frequency

d) none of these

5) Bandwidth requirement is more in

a) ASK b) FSK

c) PSK d) None of these

6) The maximum and minimum value of probability of an event is _____ and _____ respectively.

a) 1, 0 b) 0, 1 c) 0, ∞ d) ∞ and 0

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

1) All ergodic process are stationary but not all stationary process are ergodic.
2) Rate of transmission of information must be equal to or greater than channel capacity.
3) Equalization process is mainly used for minimizing cross talk.
4) An-ary signaling scheme require lower bandwidth compared to binary signaling schemes.
5) Error detecting and correcting capacity in linear block codes depends on minimum distance of code.
6) Eye diagrams are used to measure inter symbol interference of PCM.
7) Unit of information is bit in binary system.
8) Hartley Law states that amount of information is inversly proportional to the capacity of that channel.

2. Write short notes :

a) TDM-PCM telephone system. **5**

b) Frame synchronization. **5**

c) Types of random variable. **4**

3. a) Explain : (i) Stationarity (ii) Time average. (iii) Statistical average (iv) Ergodicity. **8**

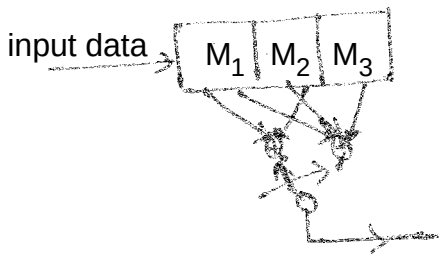
b) Draw the block diagram of DM. What are its disadvantages ? **6**

4. a) Compare ASK, FSK and PSK. **8**

b) A discrete source emits one of five symbols once every millisecond. The symbol probabilities are $\frac{1}{16}, \frac{1}{8}, \frac{1}{4}, \frac{1}{2}, \frac{1}{16}$ respectively. Find the source entropy and information rate. **6**

5. a) Why synchronization is required in communication system ? What are its types ? Explain any one type. **8**

   b) Find out the output code sequence for the following convolution encoder with input 1010. **6**



6. a) With block diagram explain working of ADM. Explain how the drawbacks of DM are overcome in ADM. **8**

   b) Calculate the capacity of a low pass channel with a astable bandwidth of 3000 Hz and S/N = 10^3 at the channel output. Assume the channel noise to be Gaussian and White. **6**

7. a) With block diagram explain working of PSK system. What are its advantages ? **8**

   b) Explain cyclic encoder. **6**

SLR-JK – 16

Seat No.	

M.Sc. – II (Semester – III) Examination, 2014
ELECTRONICS (Communication Science)
Internetworking and Data Communication (Paper – XII)

Day and Date : Friday, 21-11-2014 Total Marks : 70
Time : 3.00 p.m. to 6.00 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) Encryption takes place at which layer ?

A) Application B) Data Link C) Session D) Presentation

2) The Network layer uses physical addresses to route the data to destination hosts.

A) Who knows B) True C) False D) Undecidable

3) Error detection and recovery takes place at what layer ?

A) Data Link B) Application C) Network D) Transport

4) What layer establishes, maintains and terminates communications between applications located on different devices ?

A) Transport B) Network C) Session D) Application

5) IP is implemented at which OSI model layer ?

a) Data Link B) Session C) Presentation D) Network

6) Which layer handles the formatting of application data so that it will be readable by the destination system ?

A) Transport B) Data Link C) Network D) Presentation

7) Packets are found at which layer of the OSI Model ?

A) Network B) Session C) Presentation D) Transport

8) Which layer translates between the physical (MAC) and logical address ?

A) Application B) Presentation C) Data Link D) Network

P.T.O.

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

1) An ISO OSI model has 7 layers.
2) IP means Information Protocol.
3) Leaky Bucket algorithm is used for congestion control.
4) Optical Fiber is an unguided medium.
5) Network layer is connected with Choke Packets.
6) Subnetting is used for extending networks.

2. Answer in brief : **14**

a) Compare TCP/IP and OSI model of protocols. **5**

b) What are computer networks ? Where are they used ? **5**

c) What is topology ? What are its types ? **4**

3. a) How is congestion controlled in TCP ? **10**

b) Give the IEEE standards for 802 LAN. **4**

4. a) List different HDLC Frame Formats and explain them. **10**

b) What is Multiple Access Protocol ? **4**

5. a) Give the condition involved in congestion control. **10**

b) Compare between Leaky Bucket and Token Bucket policies. **4**

6. a) What design issues are considered for Data Link Layer ? **8**

b) Compare between ARP and RARP. **6**

7. a) What is TCP ? Give its Header Format. **8**

b) Compare between ICMP and IGMP. **6**

SLR-JK – 17

Seat No.	

M.Sc. (Part – II) (Semester – IV) (Electronics) (Communication Science) Examination, 2014
BROADBAND COMMUNICATION (Paper – XIII)

Day and Date : Saturday, 15-11-2014 Total Marks : 70
Time : 3.00 p.m. to 6.00 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) The flow control in X.25 is the
   a) Sliding window mechanism b) ARQ mechanism
   c) Push-pull mechanism d) Switching mechanism

2) _____ series provides guidance for maintenance of the ISDN subscriber installation.
   a) I. 600 b) I. 500 c) I. 400 d) I. 300

3) Function group _____ includes the functions belonging to OSI layer 1.
   a) NT 2 b) NT 1 c) TE d) NT 3

4) The _____ is used for routing to and from the end users.
   a) VPC b) VCC c) Payload d) None of these

5) For control signaling a call control protocol has been defined in
   a) Q. 931 b) Q. 922 c) I. 320 d) I. 431

6) The _____ channel can be used for telemetry and alarms.
   a) B b) H c) D d) C

7) The B-ISDN data rate range is
   a) 150 Mbps to 400 Mbps b) 150 Mbps to 600 Mbps
   c) 150 Kbps to 400 Kbps d) 150 Kbps to 600 Kbps

8) The VPI of a user network interface is _____ bits length.
   a) 8 b) 10 c) 12 d) 16

B) Choose correct option **true**/**false** : **6**

a) ISDN architecture user protocol block is used exclusively for transfer of user information.

b) Logical connections in X.25 are referred as semipermanent circuits.

c) Analog switching uses FDM technique.

d) ISDN supports only for switched application.

e) ATM has variable packet size.

f) B-ISDN uses LAPB protocol at data link layer.

2. Solve **any three** : **(5+5+4)**

1) List the principles of ISDN.

2) Write a short note on frame switching.

3) Write a short note on output buffering/queing.

4) Explain in brief the different standards for ISDN.

3. a) Explain in detail the ATM cell format. **8**

b) With diagram explain B-ISDN architecture. **6**

4. a) Explain signal and system hierarchy of SONET. **8**

b) Describe ISDN reference points and functional groups. **6**

5. a) What is X.25 ? Explain virtual circuit and datagram. **8**

b) Explain in brief LAPF control protocol. **6**

6. a) Differentiate between frame relay and frame switching. **4**

b) Explain AAL types in brief. **10**

7. a) Explain transmission structure in ISDN. **8**

b) Explain in detail ISDN address. **6**

SLR-JK – 19

Seat No.	

M.Sc. (Part – II) (Semester – IV) Examination, 2014
ELECTRONICS (Communication Science)
Paper – XV : Fiber Optic Communication

Day and Date : Thursday, 20-11-2014 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Note** : 1) **All** questions carry **equal** marks.*
*2) Question **1** and **2** are **compulsory**.*
*3) Write **any three** questions from question no. **3** to **7**.*

1. Answer the following : **14**

A) Objective questions : **8**

1) If the mean optical power launched into an 8km length of fiber is 120 μ W, the mean optical power at the fiber output is 3 μ W. The attenuation loss is _____ dB.

a) 32 b) 1.6 c) 16 d) 40

2) The quantum efficiency is defined as the ratio of _____

a) r_e/r_p b) r_p/r_e

c) $r_e.r_p$ d) None of these

Where, r_e-No. of electrons collected, r_p-No. of photons incident.

3) Intrinsic losses are due to _____

a) Fiber structure, b) Bubbles in fiber

c) OH-ions in fiber d) Both b) and c)

4) If light is incident on air-core boundary by an _____ angle, the light is remains inside the core and is transfer by means of reflection.

a) Acceptance angle b) Critical angle

c) N.A. d) Refraction angle

5) For no dispersion in fiber, the condition for bit rate (Bt) is _____

a) $Bt = \frac{1}{2T}$ b) $Bt > \frac{1}{2T}$

c) $Bt < \frac{1}{2T}$ d) $Bt \leq \frac{1}{2T}$

Where, 2T-pulse duration.

P.T.O.

6) When a layer of material with particular band gap energy is sandwiched between layers of material with a higher energy band gap a _____ is formed.
   a) Diode b) Transistors
   c) Heterojunction d) Double heterojunction

7) In Semiconductor laser, the energy radiated (Eg) is equals to _____
   a) hf b) hc/λ
   c) Both a) and b) d) $1/2mc^2$

8) The responsivity (R) for photo detector is defined as _____
   a) $R = \frac{Po}{Ip}$ b) $R = \frac{hf}{Po}$ c) $R = \frac{Ip}{Po}$ d) $R = \frac{\eta}{Po}$

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

1) Laser has larger line-width than LED.
2) In optical fiber communication, the attenuation is usually expressed in decibels per unit length (i.e. dB km^{-1}).
3) The alignment losses are due to lateral, longitudinal and angular misalignment.
4) The quantum efficiency is defined as the ratio of r_e/r_p where, r_e-No. of electrons collected, r_p - No. of photons incident.
5) The disadvantage of optical fiber communication is that power required is less.
6) The optical carrier frequency is in the range of 10^{23} to 10^{26} Hz.

2. Answer the following : **14**
   a) Write a note on – fiber guided weapons system. **5**
   b) Explain bending loss in optical fiber. **5**
   c) Write a note on population Inversion. **4**

3. Answer the following questions : **14**
   a) When the mean optical power launched into an 8 km length of fiber is 120 μ W, the mean optical power at the fiber output is 3 μ W. Determine : a) The overall signal attenuation or loss in decibels through the fiber assuming there are no connectors or splices ; b) The signal attenuation per kilometer for the fiber. c) The overall signal attenuation for a 10 km optical link using the same fiber with splices at 1 km intervals, each giving an attenuation of 1 dB ; d) The numerical input/output power ratio in (c). **10**
   b) Explain Different Modes in optical fiber. **4**

4. Answer the following questions : **14**

   a) A photodiode has a quantum efficiency of 65% when photons of energy 1.5×10^{-19} J are incident upon it. (a) At what wavelength is the photodiode operating ? (b) Calculate the incident optical power required to obtain a photocurrent of 2.5 μ A when the photodiode is operating as described above. **8**

   b) Explain quantum efficiency and responsivity of optical detectors. **6**

5. Answer the following questions : **14**

   a) Explain liquid phase optical fiber formation technique. **8**

   b) Explain extended beam connector with neat diagram. **6**

6. Answer the following questions : **14**

   a) Explain principal of laser in details. **8**

   b) Explain Edge emitting LED. **6**

7. Answer the following questions : **14**

   a) Explain Avalanche photodiode. Draw electric field region. **8**

   b) Explain Coupling of optical fiber with LED. **6**

SLR-JK – 1

Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2014
ELECTRONICS
(Communication Science)
Paper – 1 : Control Theory (New)

Day and Date : Friday, 14-11-2014 Total Marks :70
Time : 11.00 a.m. to 2.00 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 alternative from the following : **8**

1) Bandwidth of system gets affected by _____ feedback.
   a) Positive b) Negative
   c) Both (a) and (b) d) Neither (a) nor (b)

2) Signal flow graph is applicable to _____control system.
   a) Linear feedback b) Non-linear feedback
   c) Non-linear d) Any

3) Signal representing the sudden shock is _____
   a) Step b) Impulse c) Ramp d) Sinusoid

4) The order of the system is the same as the highest power of 's' in the _____of transfer function.
   a) Numerator b) Denominator c) Peak d) Mean

5) If closed loop poles are located in left half of s-plane then system is _____
   a) Stable b) Unstable
   c) Marginally stable d) Marginally unstable

6) In force-voltage analogy the mass is represented by _____

a) Voltage b) Current

c) Inductance d) Capacitance

7) Controller with a proportional term and an integral term is called _____ controller.

a) PI b) P c) PD d) PID

8) When two blocks are connected in series, the transfer functions are to be _____

a) Added b) Subtracted

c) Multiplied d) Divided

B) State a whether following statements are **true** or **false** : **6**

1) The transfer function of a system is the ratio of the Laplace transform of the input variable to the Laplace transform of the output variable.

2) The time constant is indicative of how fast the system tends to reach the final value.

3) As the order of the system increases, the accuracy of the system increases.

4) In signal flow graph the gain of dummy node is five.

5) Root locus technique is applicable to single as well as multiple loop system.

6) Tachogenerators are used as transducers where rotational speed is converted into proportional dc or ac voltage.

2. Write short notes on the following :

1) Rules used in block diagram reduction **5**

2) Principle of PI controller **5**

3) Comparison between open loop and closed loop control systems. **4**

3. a) Discuss the time response of first order system to step input signal. **8**

b) Explain in brief effect of feedback on control system performance. **6**

4. a) Find the gain of the system represented by the following equations by Meson's Gain Formula. **8**

$x_2 = t_{12}\, x_1 + t_{32}\, x_3$

$x_3 = t_{23}\, x_2 + t_{43}\, x_4$

$x_4 = t_{24}\, x_2 + t_{34}\, x_3 + t_{44}\, x_4$

$x_5 = t_{25}\, x_2 + t_{45}\, x_4$

(x_1 is the input node is and x_5 is output node.)

b) Explain the components of signal flow graph with suitable example. **6**

5. a) Consider the system with $G(S)H(S) = \dfrac{k}{S(S+2)(S+4)}$ **8**

Find whether $s = -0.75$ is on the root locus or not using angle condition.

b) By Routh-Stability criteria find the stability of system with characteristic equation $s^3 + 6s^2 + 11s + 6 = 0$. **6**

6. a) Obtain gain margin and phase margin for the open loop transfer function using Bode plot. **8**

$$G(S)H(S) = \frac{10}{S(0.1S+1)(0.01S+1)}.$$

b) Derive expression for steady state response of a system to sinusoidal input. **6**

7. Explain the working of following and represent them in block diagram form :

a) AC Tachogenerator. **8**

b) Potentiometer Error Detector. **6**

SLR-JK – 2

Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2014
ELECTRONICS (Communication Science)
Microprocessor and Microcontroller (Paper – II) (New)

Day and Date : Monday, 17-11-2014 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

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

1) To use a timer of PIC18F as an event counter we must set the _____ bit in T0CON register.

a) PSA b) T0CS
c) T0SE d) T0PS1

2) PIC18F microcontroller has maximum number _____ banks.

a) 18 b) 04
c) 20 d) 16

3) In PIC18F MCLR is an _____ pin.

a) Input b) Edge trigger interrupt
c) Output d) Tristate logic

4) If ROR instruction is executed 3 times and RLR instruction is executed 2 times then content of AX is _____ (Assume initial content of AX is 01H).

a) 08H b) 04H
c) 02H d) 01H

5) DS = 100H Offset = 4000H then physical address is_____

a) 2000H b) 3000H
c) 4000H d) 5000H

P.T.O.

6) POP instruction is equal to _____

a) RET b) JMP

c) CALL d) None of the above

7) MN/$\overline{MX}$ is connected to Vcc 8086 microprocessor is in _____ mode.

a) Maximum b) Normal c) Minimum d) Ideal

8) PIC 18F is_____ bit microcontroller.

a) 8 b) 16 c) 32 d) None of above

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

1) CONFIG1H register is used as timer selection in PIC 18F.

2) The brown-out reset voltage allow us to set the minimum voltage for Vdd. If it falls below the threshold, the CPU will go into the reset and stop all activity.

3) Intrasegment indirect addressing mode in 8086 microprocessor content of BP is replaced by the effective branch address.

4) Maximum instruction format length of 8086 microprocessor is 06 byte long.

5) Using PICkit3, we must remove the PIC18F chip from the system and place it into the programmer.

6) The advantage of memory segmentation in 8086 microprocessor is to permit a program and/or its data to be put into different areas of memory each time the program is executed.

2. Attempt the following : **14**

a) Explain PSW of the 8086 microprocessor. **5**

b) Explain shift instructions in 8086 microprocessor. **4**

c) Differentiate between RISC and CISC architecture. **5**

3. a) How to configure the ports as an input or output of PIC18F Microcontroller ? Write an assembly language program for running LED to PORTC. **10**

b) Explain rotate instructions of 8086 microprocessor. **4**

4. a) Explain minimum system configuration of 8086 microprocessor with suitable pin diagram. **10**

   b) Explain advantages of segmented memory in 8086 microprocessor. **4**

5. a) List all the major interrupts in PIC18. Explain the steps to enable the interrupts. **8**

   b) Explain following instruction. **6**

      i) MOVWF

      ii) BNN

      iii) COMF

      iv) BSF.

6. a) Explain the difference between Harvard architecture and Von-Neumann architecture with the help of suitable diagram. **8**

   b) Write a program for generation of triangular wave to PORTD. **6**

7. a) Explain structure of PORTB and different associated register and PORT B initialization of PIC18F Microcontroller. **8**

   b) How to interface the optoisolator with PIC18F Microcontroller ? **6**

SLR-JK – 3

Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2014
ELECTRONICS (Communication Science) (New) (Paper – III)
Communication Systems

Day and Date : Wednesday, 19-11-2014 Total Marks : 70
Time : 11.00 a.m. to 2.00 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) 1) The transmitted power in an FM system is _____ **8**

a) Dependent on the number of sideband

b) Dependent on the carrier power and sidebands

c) Always constant

d) None of the above

2) The carrier amplitude after AM varies between 4V to and 1V, then depth of modulation is given by _____

a) 60% b) 40%

c) 10% d) 50%

3) In AM transmission _____ modulation index signal is called over modulated signal.

a) m = 1 b) m > 1

c) m < 1 d) m = 0

4) For an FM signal frequency of deviation of 10kHz if maximum deviation allowed is 25kHz, then percentage of modulation is _____

a) 10% b) 25%

c) 30% d) 40%

P.T.O.

5) For carrier signal of 1MHz and modulating signal of 2 kHz, the frequency range occupied by the AM signal is _____

a) 900 kHz to 1000 kHz

b) 998 kHz to 1002 kHz

c) 1000 kHz to 1002 kHz

d) 900 kHz to 950 kHz

6) In FM system, if the maximum value of deviation is 75 kHz and maximum modulating frequency is 10kHz, then bandwidth of system is _____

a) 170 kHz b) 185 kHz

c) 200 kHz d) 180 kHz

7) The PAM signal can be detected by _____

a) Band-pass filter b) Low-pass filter

c) High-pass filter d) Band-stop filter

8) If the input and VCO frequency are close enough, then PLL is said to be in _____ state.

a) Locked b) Free running

c) Ideal d) Capture

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

1) Using TDM, both analog and digital signals can be transmitted.

2) FM receiver can function with a lower sensitivity.

3) A.M. is non-linear modulation system.

4) Figure of merit is always unity, in SSB-SC.

5) PWM signal can be generated with free running multivibrator.

6) For spreading the two side band filter method can be used.

2. Attempt the following :

a) Explain the transmission modes of signals. **5**

b) Explain the FM frequency band **5**

c) Explain the AM detector. **4**

3. A) Explain the generation of PTM signal and demodulation of PTM signal. **8**

   B) Explain the generation of PAM signal. **6**

4. A) Explain in detail the indirect method of FM generation with suitable block diagram and vector diagram. **8**

   B) Explain the delta modulation with suitable waveforms. **6**

5. A) Explain TDM system their multiplexing of signal in detail and how to reduce the crosstalk in TDM based system. **8**

   B) Explain the filter method for SSB generation. **6**

6. A) What is the need of quantization of signal and explain quantization of signal in detail. **8**

   B) Explain the amplitude shift keying (ASK). **6**

7. A) Explain the frequency hopping spread spectrum (FHSS) and state the applications of FHSS. **10**

   B) Explain the dual slope FM detector. **4**

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SLR-JK – 4

Seat No.	

M.Sc. – I (Semester – I) Examination, 2014
ELECTRONICS (Communication Science) (New)
Paper – IV : Introduction to MATLAB and LabVIEW

Day and Date : Friday, 21-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

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

1) An M-File with a set of valid MATLAB commands is called _____ file.

a) Function File b) MAT File
c) Script File d) MEX File

2) The elements of a matrix can be specified or accessed by specifying their respective row and column numbers is called _____

a) Line continuation
b) Matrix manipulation
c) Matrix subscripts
d) None of the above

3) Prototype is _____ centric process in GSD.

a) Software
b) Hardware
c) Software and hardware
d) None of the above

4) _____ can be a group of data of different types in LabVIEW.

a) An array b) A cluster
c) A structure d) All of the above

P.T.O.

5) LabVIEW _____ syntax is similar to the MATLAB language syntax.
   a) Math script Node b) Formula Node
   c) Formula function d) Match pattern
6) The element of an MATLAB array in a cell is _____
   a) All the same b) Different type
   c) Either same or different d) None of above
7) _____ functions are visible only to the functions in their parent folder of MATLAB.
   a) nested b) private
   c) sub-function d) inline
8) _____ of LabVIEW executes only one sub-diagram from multiple sub-diagram depending on the input value passed to the structure.
   a) Case structure
   b) Flat sequence structure
   c) Stacked sequence structure
   d) Timed structure

b) **True** and **false** : **6**

1) Appending a row or column in which a single element or a few elements are entered in a matrix, MATLAB creates the matrix of proper dimensions to accommodate the entered elements.
2) Arithmetic operations on matrices are done on element-by-element basis.
3) The first function in the file of is called primary function in MATLAB.
4) 'for' loop is conditional loop.
5) The LabVIEW tools palette is available on both the front panel and the block diagram window.
6) Unbundle function of LabVIEW is assembling cluster function.

2. Answer the following :

a) Explain matrix manipulations. **5**

b) Explain arithmetic operations on arrays in MATLAB. **4**

c) Explain modular programming of LabVIEW. **5**

3. a) Explain various types of branches control structures of MATLAB. **10**

   b) Draw and explain command window of MATLAB. **4**

4. a) Give the brief explanation on software environment of LabVIEW with suitable diagram. **10**

   b) Explain the importance of image processing in IMAQ for LabVIEW software. **4**

5. a) Give the brief explanation on function subprograms of MATLAB. **10**

   b) What are M-files ? Describe the types of M-Files. **4**

6. a) Define signal conditioning and give the brief explanation on types of signal conditioning. **10**

   b) Draw and explain some of common string functions of LabVIEW. **4**

7. a) 1) Write a program to find the average of any given 10 numbers using 'For' statement check the program with following values :

      3, 5, 14, 5, 6, 4, 10, 23, 45, 2.

      2) Write a note on 'if-else' structure of MATLAB. **10**

   b) Define stand-alone application of LabVIEW. **4**

SLR-JK – 6

Seat No.	

M.Sc. (Electronics) (Communication Science) (Semester – I) Examination, 2014
INSTRUMENTATION (Paper – II) (Old)

Day and Date : Monday, 17-11-2014 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

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

1) If a voltmeter is connected, like an ammeter in series to the load
   a) The measurement reading will be too high
   b) Almost no current will flow in the circuit
   c) The meter will burn
   d) An instantaneously high current will flow

2) Lissajous figure is used in CRO for
   a) Phase measurement
   b) Frequency measurement
   c) Amplitude measurement
   d) None of the above

3) The function of a shunt in an ammeter is to
   a) Increase the instrument resistance
   b) Bypass the current
   c) Reduce the voltage drop across the instrument coil
   d) Increase the current flowing through the instrument coil

4) LVDT is a _____ transducer.
   a) Variable resistance
   b) Variable self-inductance
   c) Variable mutual inductance
   d) Variable inductance

5) Variation in resistance in strain gauge is because of _____
   a) Pizo-resistive effect b) Dimensional effect
   c) Structural defect d) a) and b)

6) Which of the following temperature sensor exhibits linear characteristics ?
   a) RTD b) Thermocouple
   c) Thermistor d) Radiation pyrometer

7) Distortion in signal can be measured by using _____
   a) Spectrum analyser b) Distortion meter
   c) CRO d) a) and b)

8) DAS are preferred due to their _____ at low cost per channel.
   a) Low accuracy
   b) High accuracy
   c) Accuracy is not issue in using DAS
   d) It improves the stability

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

1) Metallic strain gauge is _____ transducer.
   (passive / active)

2) The voltmeter must have _____ input impedance for accurate measurement of voltage.
   (high / low)

3) Instrumentation amplifier exhibits very high _____
   (CMRR / PSRR)

4) Isolation amplifier eliminate measurement errors caused by _____
   (grounded loops / extension wire)

5) PH electrode exhibits very _____
   (high impedance / high admittance)

6) Strain gauge is resistive sensor its _____ varies with change in dimension.
   (resistance / capacitance)

2. A) What is difference between transducer and sensor ? Explain with example. **5**

   B) Explain the working principle of piezoelectric transducer. **5**

   C) Distinguish between a passive transducer and an active transducer giving one example in each case. **4**

3. A) Discuss in detail instrumentation amplifier. **8**

   B) Explain the term inverse transducer. **6**

4. A) Draw the block diagram of digital voltmeter and explain it in brief. **8**

   B) Explain the working of digital frequency meter. **6**

5. A) Discuss peak detector circuit in detail. **6**

   B) With diagram explain the V-I and I-V converter in detail. **8**

6. A) What is data acquisition system ? Explain it in brief. What are advantages and disadvantages of data acquisition system ? **8**

   B) What are different temperature sensors ? Explain any one in brief. **6**

7. A) With neat block diagram explain spectrum analyser. **7**

   B) With neat diagram explain in detail Q meter. **7**

SLR-JK – 8

Seat No.	

M.Sc. (Part – I) (Semester – I) Examination, 2014
ELECTRONICS (Communication Science)
Communication Systems (Paper – IV) (Old)

Day and Date : Friday, 21-11-2014 Total Marks : 70

Time : 11.00 a.m. to 2.00 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. Objective questions : **[14]**

A) Choose correct alternatives : **8**

1) An on-line, real-time data transmission system is most likely to require a circuit that is _____
   a) simplex b) semiduplex
   c) duplex d) time-shared

2) The minimum sampling frequency is called _____
   a) Carlson frequency b) Pulse sampling rate
   c) Nyquist sampling rate d) None of these

3) Which of the following pulse systems requires higher bandwidth ?
   a) PAM b) PDM c) PPM d) None of these

4) In a low level AM system, amplifiers following the modulated stage must be _____
   a) Linear devices b) Harmonic devices
   c) Class – C amplifiers d) Nonlinear devices

5) When the modulating frequency is doubled, the modulation index is halved, and the modulating voltage remains constant. The modulation system is _____
   a) A. M. b) Phase modulation
   c) Frequency modulation d) Delta modulation

P.T.O.

6) Pulse-width modulation may be generated
   a) By differentiating pulse – position modulation
   b) With a monostable multivibrator
   c) By integrating the signal
   d) With a free- running multivibrator

7) Which of the following gives maximum probability error ?
   a) ASK b) FSK c) PSK d) DPSK

8) In FM, the frequency deviation is proportional to
   a) the amplitude of modulating signal
   b) the frequency of modulating signal
   c) the amplitude of the carrier
   d) the frequency of the carrier

B) State **true** or **false**/fill in the blanks : **6**

1) Tunnel circuits are used in radio receivers.

2) The greater the modulation index the lesser is the power of AM wave.

3) If carrier is modulated more than 100% then distortion takes place.

4) For a given carrier wave, maximum undistorted power is transmitted when modulation index is _____ (1/100)

5) FSK stands for _____ (Frequency shift keying/Frequency shift kernel)

6) Baud is nothing but a unit of measurement of _____ (bit rate/ transmission speed).

2. Write short answers : **[14]**

a) What is time division multiplexing and frequency division multiplexing ? **5**

b) Explain the balanced modulator. **5**

c) Explain the advantages and disadvantages of spread spectrum techniques. **4**

3. Answer the following : **[14]**

a) What is PN sequence ? Discuss its characteristics. **6**

b) What is CDMA ? How does it employ spread spectrum technique during the multiple access of signals. **8**

4. Answer the following : **[14]**

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

   b) Explain simplex, half duplex, full duplex transmission modes. **6**

5. Answer the following : **[14]**

   a) What do you mean by demodulation or detection ? Explain with diagram the working diode envelope detector for A.M. What are the sources of distortion of the detected output ? **10**

   b) Explain in brief drawbacks of Delta modulation. **4**

6. Answer the following : **[14]**

   a) With a block diagram, explain pseudo-random sequence generator. **8**

   b) Using a appropriate block diagram, how the four message signal can be recovered from TPM transmission. **6**

7. Answer the following : **[14]**

   a) For given data, draw unipolar RZ, unipolar NRZ, Bipolar RZ, Bipolar NRZ. Data = 10110011. **8**

   b) Compare TDM and FDM techniques (at least 8 points). **6**

SLR-JK – 9

Seat No.	

M.Sc. (Part – I) (Semester – II) Examination, 2014
ELECTRONICS (Communication Science) (Paper – V) (New)
Computational Methods and Programming

Day and Date : Saturday, 15-11-2014 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

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

1. a) Choose the correct answer : **6**

i) Romberg's method is based on successive application of

A) Trapezoidal rule

B) Simpson's one third rule

C) Simpson's three eight rule

D) Weddle's rule

ii) Guassian quadrature formula is used

A) To solve the partial differential equation

B) To solve ordinary differential equation

C) To find the roots of transcendental equation

D) To evaluate definite integration

iii) In Euler's method, given initial value problem $y' = \frac{dy}{dx} = f(x, y)$ with $y(x_0) = y_0$, then the n^{th} approximation is given by

A) $y_{n+1} = y_n + hf(x_{n-1}, y_{n-1})$ B) $y_{n+1} = y_n + hf(x_n, y_n)$

C) $y_{n+1} = y_n$ D) None of these

iv) In application of principle of least square in fitting of a linear curve $y = ax + b$ if y_i are observed value of y at $x = x_i$ and Y_i is calculated value of y at $x = x_i$ then

A) $\sum_i^n (y_i - Y_i)$ is minimized B) $\sum_i^n (y_i - Y_i)^2$ is minimized

C) $\left[\sum_i^n (y_i - Y_i)\right]^2$ is minimized D) None of these

v) Using Bisection method the second approximation to the root of the equation $x^3 - 4x - 9 = 0$ between 2 and 3 is

A) 2.25 B) 2.5

C) 2.75 D) 2.625

vi) Gauss Seidal method for solving the system AX = B fails if

A) Matrix A is not diagonally dominant

B) Matrix A is diagonally dominant

C) Matrix A is non-singular

D) None of these

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

i) Given initial value problem, $y' = \frac{dy}{dx} = f(x, y)$, where $y(x_0) = y_0$. In Runge Kutta method $Y_{n+1} = Y_n + \frac{1}{6}[k_1 + 2k_2 + 2k_3 + k_4]$.

ii) The normal equations required to fit a curve of the form $y = ax^b$ are 3.

iii) As soon as a new value of a variable is found by iteration, it is used immediately in the next step, this method is called as Gauss Elimination method.

iv) Romberg's method is based on successive application of Simpson's three eight rule.

v) For finding root of equation f (x) = 0. The Newtons Raphson method fails, if $f'(x)$ is zero.

vi) For deriving Newton-Cotes quadrature formula for $\int_a^b f(x)\,dx$, $f(x)$ is expressed as an n^{th} degree polynomial by using Newton's forward interpolation formula.

vii) Newton's forward difference formula is used for the value of independent variable which is present at lower part of the table.

viii) Gaussian two point formula is given by $\int_0^1 f(x)\,dx = f\left(-\frac{1}{\sqrt{3}}\right) + f\left(\frac{1}{\sqrt{3}}\right)$.

2. Write short notes on :

a) Write a note on Least Square Principle. **5**

b) What are Pseudo Random Numbers explain with example ? **4**

c) Write a note on interpolation. **5**

3. a) Using Lagrange's formula of interpolation find y (9.5) given : **6**

x :	7	8	9	1
y :	3	1	1	9

b) Using Runge Kutta Method find y (0.8) given

$\frac{dy}{dx} = y - x^2$, y (0.6) = 1.7379, in two steps. **8**

4. a) Given $\frac{dy}{dx} = xy + y^2$, y (0) = 1. Obtained y (0.1), y (0.2) and y (0.3) by Euler's method. Hence estimate y (0.4) by Adam's Bashforth method. **10**

b) Solve the following system of equation by Gauss Seidal method : **4**

$27x + 6y - z = 85$

$6x + 15y + 2z = 72$

$x + y + 54z = 110.$

5. a) Find the real positive root of $3x - \cos x - 1 = 0$ by Newton Raphson Method up to 5 decimal places. **8**

   b) Solve the system of equation by Gauss-Jordan method : **6**

   $x - y + z = 1$

   $-3x + 2y - 3z = -6$

   $2x - 5y + 4z = 5.$

6. a) Evaluate $\int_{0.5}^{0.7} \sqrt{xe^{-x}}\, dx$ using Simpson's $\frac{1}{3}$ rule and $\frac{3^{th}}{8}$ rule. Divide the range into six equal subintervals. **8**

   b) Using Taylor's Series Method find y (x) and also find, y (0.2), given

   $\frac{dy}{dx} = 1 - 2xy$, y (0) = 0. **6**

7. a) Evaluate $\int_{2}^{4} \left(2x^2 + 1\right) dx$ by Gaussian Quadrature method with n = 3. **6**

   b) Find the positive roots of the equation $xe^x = 2$, using Regula False method up to 5 decimal places. **8**

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SLR-JK – 10

Seat No.	

M.Sc. (Part – I) (Semester – II) Examination, 2014
ELECTRONICS (Communication Science)
Digital Design and VHDL Programming (Paper – VI)

Day and Date : Tuesday, 18-11-2014 Total Marks : 70
Time : 11.00 a.m. to 2.00 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. Objective questions : **14**

A) Select correct alternative : **6**

1) For a binary half-subtractor having two inputs A and B, correct set of logical expression for the outputs D (difference) and X (borrow).

a) $D = AB + \overline{A}B,\ X = \overline{A}B$ b) $D = \overline{A}B + A\overline{B},\ X = A\overline{B}$

c) $D = \overline{A}B + A\overline{B},\ X = \overline{A}B$ d) $D = AB + \overline{A}\,\overline{B},\ X = A\overline{B}$

2) A full adder can be implemented with half adders and OR gates. A 4-bit parallel full adder without any initial carry requires.

a) 8 half-adders, 4 OR gates b) 8 half-adders, 3 OR gates

c) 7 half-adders, 4 OR gates d) 7 half-adders, 3 OR gates

3) The characteristic equation of the T-FF is given by

a) $Q^+ = \overline{T}Q + T\overline{Q}$ b) $Q^+ = T\overline{Q} + Q\overline{T}$

c) $Q^+ = TQ$ d) $Q^+ = T\overline{Q}$

4) 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

P.T.O.

5) Digital multiplexer is basically a combinational logic circuit to perform the operation.
   a) AND – AND b) AND – OR c) OR – OR d) OR – AND
6) PROMS are used to store
   a) bulk information
   b) sequential information
   c) information to be accessed rarely
   d) relatively permanent information

B) State **true** or **false** / justify / **one line** answer : **8**

1) State diagram are used to represent combinational logic.
2) A 3 bit ripple counter is same as that of 3-bit synchronous counter.
3) In transport delay, output follows any changes in input.
4) Cary look ahead adder is faster than serial adder.
5) A process is used in behavioural description.
6) Johnson's counter is a synchronous counter.
7) The entity declaration of test bench includes port list.
8) A-4 bit ring counter can be used as an divide by four circuit.

2. Attempt **all** :
   1) Draw architecture of PLA and explain it. **5**
   2) Explain operator overloading with example. **5**
   3) Write a VHDL code for 2 : 4 decoder. **4**

3. A) Write a VHDL code for 8-bit full adder using generate statement. **8**
   B) Write a short note on attributes. **6**

4. A) Draw architecture of altera Max 7000 and explain in brief. **8**
   B) Explain different types of delays. **6**

5. A) Design 4-bit synchronous down counter using JK flip flop. **8**
   B) Design 10-bit parity generator. **6**

6. A) With the help of neat diagram explain universal shift register. **8**
   B) Write VHDL code for 4 : 1 multiplexer. **6**

7. A) What are the different types of data objects used in VHDL ? Explain each of them. **8**
   B) Write down the truth table, VHDL code for SR FF using behavioural modeling. **6**

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