USN | | | | | | | | | | **10EC81**

Eighth Semester B.E. Degree Examination, Aug./Sept. 2020
Wireless Communication

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1 a. Describe with a neat flow diagram, the different steps involved in AMPS network operations for a mobile–originated call.   **(10 Marks)**
   b. Explain AMPS handoff operation using various control messages, with the help of message sequence chart.   **(10 Marks)**

2 a. Explain with neat diagram the various hardware elements used to realize a cellular system.
                                                                    (08 Marks)
   b. Explain briefly the function of following terms :
      i)   Visitor location register
      ii) Gated MSC (GMSC)
      iii) Billing gateway (BGW)
      iv) IMSI.
                                                                    (12 Marks)

3 a. Explain the capacity expansion techniques : cell sectoring and cell splitting.   **(08 Marks)**
   b. Write a brief note on Lee's microcell technology.   **(05 Marks)**
   c. Explain the concept of frequency reuse for cellular system. Determine the frequency reuse distance for a mobile system of cluster size and cell radius is 5km. For the same cell radius, find the cluster size if the reuse distance is 17.32km.   **(07 Marks)**

4 a. Explain GSM traffic and control signal burst.   **(10 Marks)**
   b. Discuss the frame format of GSM, hyper frame, super frame, multi-frame and TDMA frame.
                                                                    (10 Marks)

PART – B

5 a. With a neat diagram, explain GSM Intra BSC and inter-BSC handover.   **(12 Marks)**
   b. Explain with neat flow diagram the authentication and ciphering mode operation in GSM cell setup operation.   **(08 Marks)**

6 a. Explain the basic spreading procedure used on CDMA forward channels. Mention the four types of logical channels in forward direction used in IS-95 CDMA system.   **(10 Marks)**
   b. Explain the following terms briefly in case of CDMA system.
      i) Softer hand off   ii) Soft softer hand off.   **(06 Marks)**
   c. Explain with a neat flow diagram the mobile originated call timeline in CDMA system.
                                                                    (04 Marks)

7 a. Define OFDM. Briefly explain an OFDM modulation system.   **(08 Marks)**
   b. Briefly explain the spread spectrum modulation techniques : FHSS and DSSS.   **(06 Marks)**
   c. With a neat diagram, explain the RAKE receiver.   **(06 Marks)**

8 a. List three fundamental ways in which wireless LANS and wireless PANS differ from each other.   **(06 Marks)**
   b. Explain the architecture of a Bluetooth/WPAN with a diagram.   **(08 Marks)**
   c. Describe briefly the basic wireless MAN.   **(06 Marks)**

* * * * *

USN | | | | | | | | | | **10EC82**

Eighth Semester B.E. Degree Examination, Aug./Sept.2020
Digital Switching System

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1 a. With a neat block diagram, explain the National Telecommunication Network. **(10 Marks)**
    b. Explain various types of Network Structures. **(06 Marks)**
    c. What are the standards of Telecommunication System? **(04 Marks)**

2 a. Explain with a neat diagram the distribution frames in stronger switching exchange.
                                                               (10 Marks)
    b. Explain with a neat diagram the Intra LM calls and incoming calls in Digital Switching System. **(10 Marks)**

3 a. During a busy hour, 1200 calls were offered to a group of trunks and 6 calls were lost. The average call duration was 3 min. Find:
     (i)   Traffic offered
     (ii)   Traffic carried
     (iii) Grade of Service
     (iv) The total duration of the periods of congestion **(10 Marks)**
    b. Derive an expression for the Erlang's lost call formula from the basic principles. **(10 Marks)**

4 a. What is Grading? Explain in brief the design of a progressive grading. **(08 Marks)**
    b. Obtain the expression for minimum number of cross points for two stage network with N number of incoming tanks and N number of outgoing trunks and also draw the two stage switching network. **(12 Marks)**

PART – B

5 a. Explain with the help of neat diagram the operation of T-S-T switching network and time switch. **(14 Marks)**
    b. Explain the frame alignment of PCM signals in Digital exchange. **(06 Marks)**

6 a. With a neat diagram, explain software linkages during a call. **(10 Marks)**
    b. Explain the flow diagram for subscribers features and call forwarding. **(10 Marks)**

7 a. Describe various organizational interfaces of a typical digital switching system central office. **(10 Marks)**
    b. Explain briefly the methodology for reporting and correction of field problems in digital switching system. **(10 Marks)**

8 a. Explain the basic steps necessary to complete a simple call through a digital switching system. **(10 Marks)**
    b. Explain some common characteristics of Digital Switching System. **(10 Marks)**

* * * * *

USN | | | | | | | | | | **10EC832**

Eighth Semester B.E. Degree Examination, Aug./Sept. 2020
Network Security

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1   a. What are the five categories of X800 security services and explain it.   (11 Marks)
    b. Mention the basic tasks are to be considered while designing a particular security service.
                                                                                 (04 Marks)
    c. Write the few examples of security attacks.   (05 Marks)

2   a. Encrypt the plaintext "FRIDAY" using Hill cipher with the key $\begin{pmatrix} 7 & 8 \\ 19 & 3 \end{pmatrix}$. Show your calculation and also calculate the corresponding decryption of the ciphertext to recover the original plaintext.   (10 Marks)
    b. Explain key generation for simplified DES.   (06 Marks)
    c. Mention advantages and disadvantages of cipher Feedback mode.   (04 Marks)

3   a. Perform encryption and decryption using RSA algorithm for p = 7; q = 11, e = 17; M = 8.
                                                                                 (08 Marks)
    b. Explain Diffie – Hellman key exchange between user A and B using elliptic curves.
                                                                                 (08 Marks)
    c. What are the properties of Hash functions?   (04 Marks)

4   a. What are the properties and requirement for a digital signature?   (06 Marks)
    b. Explain the two approach to digital signature standard.   (09 Marks)
    c. Describe the common weakness/threat of a Direct Digital Signature Scheme. (05 Marks)

PART – B

5   a. Mention the different types of threats, consequences and countermeasures when using web.
                                                                                 (08 Marks)
    b. Explain the SSL record protocol operation.   (06 Marks)
    c. With the help of the block diagram, explain cardholder sends purchase request operation.
                                                                                 (06 Marks)

6   a. Write the techniques used for learning passwords.   (08 Marks)
    b. Draw the architecture for distributed intrusion detection and explain it. (12 Marks)

7   a. Explain the nature of viruses and phases.   (08 Marks)
    b. Explain antivirus approach and its four generation.   (08 Marks)
    c. What is network worm and mention few examples.   (04 Marks)

8   a. What are capabilities and limitations of firewall?   (10 Marks)
    b. What are the design goals for a firewall and also mention techniques that firewalls used to

Eighth Semester B.E. Degree Examination, Aug./Sept.2020
GSM

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1 a. List the general objectives of a GSM PLMN network with respect with respect to services to a subscriber.   **(04 Marks)**
   b. With neat diagram of a GSM reference model, explain MS subsystem entities.   **(08 Marks)**
   c. Explain the following GSM interfaces :
      (i) A_{bis} interface [BTS to BSC]
      (ii) A interface [BSC to MSC]   **(08 Marks)**

2 a. Consider a GSM system with the following data to show the advantages of adaptive array antennas:

   Coverage area : 60,000 mile^2 One-way System Bandwidth : 12.5 MHz
   Channel Spacing : 200 kHz   Frequency reuse factor : 4
   MS o/p power (w) : 800 mW (29 dBm)   BS antenna gain [G_{bs}] : 20 dBi
   Receive cable / Connector loss [L_c] : 2 dB   MS antenna gain [G_m] : 0 dB
   Required S/I ratio : 12 dB   Information rate : 271 kbps
   Receiver noise figure [F] : 7 dB   Propagation path-loss exponent γ : 4
   One-mile path-loss intercept [I_o] : 80 dBm   Lognormal fading margin [f_m] : 10 dB
   Calculate
   (i)   Minimum received power
   (ii) Maximum allowable path loss
   (iii) Cell radius in miles
   (iv) Number of cells required to cover the service area.   **(08 Marks)**
   b. Explain baseband hopping method of implementation of SFH? Also show SFH for GSM with 3 different frequencies   **(08 Marks)**
   c. Draw neat flow chart of hopping algorithm in GSM.   **(04 Marks)**

3 a. List the allowable logical channel combinations.   **(06 Marks)**
   b. Explain TCH multiframe for TCH/H, TCH/F and CCH multiframe.   **(08 Marks)**
   c. Explain the different types of location registration.   **(06 Marks)**

4 a. Explain Hybrid coding technique of speech.   **(08 Marks)**
   b. List and explain different attributes of speech coder.   **(08 Marks)**
   c. Explain with neat diagram Full rate vocoder.   **(04 Marks)**

PART – B

5 a. List all the supplementary services of GSM.   **(10 Marks)**
   b. With neat diagram of Terminal adaptation and protocol stack and explain Group 3 Fax. **(10 Marks)**

6	a.	List and explain security algorithms for GSM.	(06 Marks)
	b.	Explain wireless authentication requirements.	(08 Marks)
	c.	With neat diagram, explain token-based registration.	(06 Marks)

7 a. Use the following data for DCS-1800 and evaluate the impact of LUs on the radio resource and calculate MSC/VLR translation load.

Density of MS in the cell = 10,000 MS/km^2

Cell radius = 500 m

Average moving velocity of an MS = 10 km/hr

Number of cells/LA = 10

Number of LAS/MSC/VLR = 5

Number of translations and duration of the translations to MSC/VLR/LU for different LUs are

Translation Type	No. of Translations/LU	Duration of Translation
Intra-VLR LU	2	600 ms
Inter-VLR LU with TMSI	14	3500 ms
Inter-VLR LU with IMSI	16	4000 ms

Consider 2 cases:

Case 1 : An optimistic situation in which generated LUs in a cell are only intra VLR LUs.

Case 2 : A pessimistic situation where generated LUs in a cell are inter-VLR LUs.

(12 Marks)

    b. Derive an equation for spectral efficiency of a wireless system. (08 Marks)

8	a.	List the roles of Manager and Agent.	(04 Marks)
	b.	What do you mean by Managed object? Explain.	(06 Marks)
	c.	With neat diagram, explain the functionality of NMS and OMC.	(10 Marks)

* * * * *

Eighth Semester B.E. Degree Examination, Aug./Sept.2020
Optical Networking

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting at least TWO full questions from each part.*

PART – A

1 a. With a neat diagram, explain the evolution of optical fiber transmission system. (10 Marks)
   b. Explain self-phase modulation and cross-phase modulation using mathematical expressions. (10 Marks)

2 a. Explain the principle of operation of Erbium doped fiber amplifier. (10 Marks)
   b. Explain with a neat diagram, principle of operation of polarization independent isolator. (10 Marks)

3 a. What are the main considerations in building large switches? (10 Marks)
   b. Define wavelength converter. Explain different techniques of optolectronic regeneration. (10 Marks)

4 a. Explain interchannel and intrachannel cross talk. (10 Marks)
   b. What are the important types of dispersion mechanisms in optical communication system? Explain. (10 Marks)

PART – B

5 a. With structure of STS-1 frame, explain different section overhead and line overhead bytes in SONET. (12 Marks)
   b. Explain SONET/SDH layers. (08 Marks)

6 a. With a neat diagram, explain a wavelength routing mesh network. (10 Marks)
   b. Discuss Light path Topology Design (LTD) and routing and wavelength assignment (RWA) problem in WDM network design. (10 Marks)

7 a. With a neat diagram, explain the virtual topology design problem. (10 Marks)
   b. Explain the functions of network management. (10 Marks)

8 a. Explain the architecture of an access network. (10 Marks)
   b. Explain Hybrid Fiber Coax (HFC) approach. And the fiber to the curb (FTTC) approach. (10 Marks)

* * * * *

Eighth Semester B.E. Degree Examination, Aug./Sept. 2020
GSM

Time: 3 hrs.

Max. Marks:100

Note: *Answer FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1　a. Draw a neat diagram of GSM reference model. Discuss the primary function carried out by each interface. **(08 Marks)**

　b. With suitable diagram describe how GSM layers are mapped to OSI layers. **(08 Marks)**

　c. List the objectives of GSM PLMN. **(04 Marks)**

2　a. With relevant diagram explain dynamic power control in GSM. **(06 Marks)**

　b. What is channel borrowing? Why it is used? Explain different types of channel borrowing techniques. **(06 Marks)**

　c. Consider a GSM system with the following data :

Coverage area	: 60,000 mile^2
Channel spacing	: 200KHz
One way system bendwidth	: 12.5MHz
Frequency reuse factor	: 4
MS output power (W)	: 800MW (29dBm)
BS antenna gain (Gbs)	: 20dB
Receive cable/ connector loss (L$_C$)	: 2dB
MS antenna gain (G$_m$)	: 0dB
Required S/I ratio	: 12dB
Information rate	: 271 Kbps
Receiver noise figure (F)	: 7dB
Propagation path loss exponent γ	= 4
One mile path loss intercept (I$_0$)	: 80dBm
Log normal fading margin (f$_m$)	: 10dB
KT	= –174 dBm/Hz

　　Calculate :

　　i) Minimum received power

　　ii) Maximum allowable path loss

　　iii) Cell radius in miles

　　iv) Number of cells required to cover the service area. **(08 Marks)**

3　a. Discuss the different kinds of bursts that are used in GSM to carry user and control information. **(08 Marks)**

　b. Explain GSM logical channel structure discussing the functionalities of each. **(06 Marks)**

　c. Discuss the GSM location area and cell area identification process in GSM mobility management. **(06 Marks)**

4　a. What are speech coding methods? Explain the speech code attributes. **(09 Marks)**

　b. What are VOCODERS? Explain GSM – full rate VOCODERS

PART – B

5 a. Explain message flow diagram for call release by mobile initiated.   **(08 Marks)**
    b. With a neat block diagram, explain GSM – GPRS with protocol stack.   **(08 Marks)**
    c. Discuss the message flow between MS and BS, listing the primitives.   **(04 Marks)**

6 a. What are the security algorithms used in GSM? Explain them briefly.   **(08 Marks)**
    b. With neat diagrams, explain the different types of SIM cards used in GSM.   **(06 Marks)**
    c. With a neat call flow diagram, explain token based unique challenge in GSM.   **(06 Marks)**

7 a. Explain the spectral efficiency of wireless system with proper expressions.   **(08 Marks)**
    b. Derive an expression for received signal strength of a base station receiver with diagram.
      (06 Marks)
    c. What are the models used in modeling framework for a celluler/PCS network?   **(06 Marks)**

8 a. What are the five TMN layers in M3010? Explain the pertinent three TMN layers. **(08 Marks)**
    b. With a neat diagram explain the NM architecture and interfaces.   **(08 Marks)**
    c. Write short note on OSI systems management.   **(04 Marks)**

* * * * *

Eighth Semester B.E. Degree Examination, Aug./Sept. 2020
Fuzzy Logic

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1 a. Explain sets as points in hyper-cubes with neat diagram. **(08 Marks)**

   b. Given :

$$A = \left\{ \frac{1}{2} + \frac{0.5}{3} + \frac{0.3}{4} + \frac{0.2}{5} \right\}$$

$$B = \left\{ \frac{0.5}{2} + \frac{0.7}{3} + \frac{0.2}{4} + \frac{0.4}{5} \right\}$$

A and B are fuzzy sets of universe $X = \{1, 2, 3, 4, 5\}$ obtain :

   i) A/B ii) B/A iii) $\overline{A \cup B}$ iv) $\overline{A} \cup \overline{B}$

   v) $\overline{A} \cup A$ vi) $\overline{B} \cup B$ vii) $\overline{A} \cap \overline{B}$.   **(10 Marks)**

   c. Explain chance versus Ambiguity.   **(02 Marks)**

2 a. Explain properties of crisp equivalence relation.   **(08 Marks)**

   b. For given data compute relation matrix using max-min method.

Regions	x_1	x_2	x_3	x_4	x_5
x_{i1}	0.3	0.2	0.1	0.7	0.4
x_{i2}	0.6	0.4	0.6	0.2	0.6
x_{i3}	0.1	0.4	0.3	0.1	0

   (12 Marks)

3 a. Define the following terms with neat figures.
   i)   Core
   ii) Support
   iii) Boundary
   iv) Height.   **(05 Marks)**

   b. Explain following membership value assignment methods :
   i)   Intuition
   ii) Rank ordering
   iii) Angular fuzzy sets   **(15 Marks)**

4 a. What is defuzzification. Obtain defuzzified value for given Fig. Q4(a) using :
   i)   Mean max – membership
   ii) Weighted average method
   iii) Center of sums method.
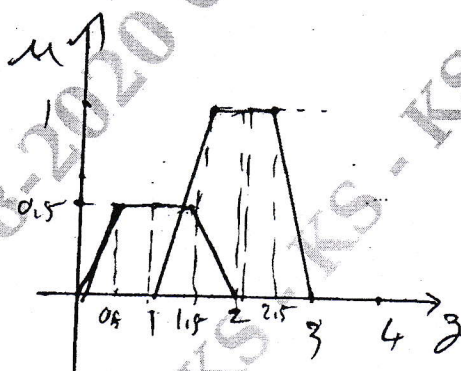

Fig.Q4(a)   (10 Marks)

   b. Suppose we have integers 1 to 10 as the elements of two identical but different universes $V_1 = U_2 = \{1, 2, - - - - 10\}$ and two fuzzy numbers A and B are defined as :

   $A =$"approximately $\quad 2$"$= \left\{ \dfrac{0.6}{1} + \dfrac{1}{2} + \dfrac{0.8}{3} \right\}$

   $B =$"approximately $\quad 3$"$= \left\{ \dfrac{0.8}{5} + \dfrac{1}{6} + \dfrac{0.7}{7} \right\}$

   Obtain "approximately 12", using extension principle on universe $V = \{5, 6, - - - -18, 21\}$.
                                                                         (06 Marks)
   c. Explain DSW algorithm.   (04 Marks)

PART – B

5 a. For given two membership function :

   $\underset{\sim}{A} = \left\{ \dfrac{0.1}{x_1} + \dfrac{0.9}{x_2} + \dfrac{0.0}{x_3} \right\}$

   $\underset{\sim}{B} = \left\{ \dfrac{0}{y_1} + \dfrac{1}{y_2} + \dfrac{0}{y_3} \right\}$

   i) Calculate the associated fuzzy logic relation for the compound proposition "If x is $\underset{\sim}{A}$,

   then y is $\underset{\sim}{B}$" using classical implication.

   ii) $A' = \left\{ \dfrac{0.3}{x_1} + \dfrac{1}{x_2} + \dfrac{0}{x_3} \right\}$

   obtain B' for preposition "If x is A' then B'"   (14 Marks)

   b. Prove that the following statements are tautologies :
   i) $P \rightarrow (P \vee Q)$
   ii) $[(P \rightarrow Q) \wedge (Q \rightarrow R)] \rightarrow (P \rightarrow R)$.   (06 Marks)

6 a. Explain with neat figures graphical technique of inference for two cases of fuzzy systems, with crisp input (two)
   i) Max-min inference
   b. ii) Max – product inference. **(16 Marks)**
   Explain following terms with neat figures :
   i) Concentration
   ii) Dilation. **(04 Marks)**

7 a. Suppose we have universe of integers $Y = \{1, 2, 3, 4, 5\}$ and defined the following linguistic terms as a mapping onto Y.

$$Small = \left\{ \frac{1}{1} + \frac{0.8}{2} + \frac{0.6}{3} + \frac{0.4}{4} + \frac{0.2}{5} \right\}$$

$$Large = \left\{ \frac{0.2}{1} + \frac{0.4}{2} + \frac{0.6}{3} + \frac{0.8}{4} + \frac{1}{5} \right\}$$

Develop membership functions for the following linguistic phrases.
   i) Not very small and not very very large = α
   ii) Intensely small. **(10 Marks)**
   b. Explain multi-objective decision making process. **(10 Marks)**

8 a. Explain fuzzy C-mean algorithm. **(10 Marks)**
   b. For given equivalence relation R

$$R = \begin{array}{c} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{array} \begin{pmatrix} 1 & 0.8 & 0.4 & 0.5 & 0.8 \\ 0.8 & 1 & 0.4 & 0.5 & 0.9 \\ 0.4 & 0.4 & 1 & 0.4 & 0.4 \\ 0.5 & 0.5 & 0.4 & 1 & 0.5 \\ 0.8 & 0.9 & 0.4 & 0.5 & 1 \end{pmatrix}$$

Obtain classification of five data points according to λ – cut levels.
   i)   1
   ii) 0.9
   iii) 0.8
   iv) 0.5
   v)   0.4.
Also draw classification diagram. **(10 Marks)**

* * * * *

Eighth Semester B.E. Degree Examination, Aug./Sept. 2020
Adhoc Wireless Network

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1   a.   List six main differences between cellular and adhoc wireless network.   (06 Marks)
    b.   Explain the Major challenges in routing protocol.   (06 Marks)
    c.   Explain briefly : i) Quality of Service   ii) Multicasting.   (08 Marks)

2   a.   Explain the design goals of a MAC protocol for Adhoc wireless network.   (06 Marks)
    b.   Explain soft Reservation Multiple Access with priority assignment.   (06 Marks)
    c.   Explain five – phase reservation protocol.   (08 Marks)

3   a.   Explain MAC protocol using directional antennas.   (06 Marks)
    b.   Explain with neat diagram multichannel MAC protocol.   (06 Marks)
    c.   Explain briefly Receiver – Based Autorate Protocol.   (08 Marks)

4   a.   List at least 8 characteristics of an Ideal Routing Protocol for Adhoc Wireless Network.   (06 Marks)
    b.   Bring out the classification of routing protocol. Explain briefly any one.   (06 Marks)
    c.   Explain wireless routing protocol. Mention its advantages and disadvantages.   (08 Marks)

PART – B

5   a.   Explain briefly CEDAR protocol with a suitable network.   (08 Marks)
    b.   Explain optimized link State Routing Protocol.   (06 Marks)
    c.   Bring out the important routing metrics of power aware routing protocols.   (06 Marks)

6   a.   Explain briefly issues and design goals of a transport layer protocol for Adhoc wireless network.   (08 Marks)
    b.   Explain with a suitable network the split – TCP.   (06 Marks)
    c.   Explain Application controlled transport protocol.   (06 Marks)

7   a.   Explain briefly network layer attacks.   (08 Marks)
    b.   Explain the differences between symmetric key and Asymmetric key algorithm.   (06 Marks)
    c.   Explain SEAD routing protocol.   (06 Marks)

8   a.   Briefly discuss the issues and challenges in QoS for Adhoc wireless network.   (08 Marks)
    b.   Explain QoS enabled adhoc on-demand distance vector routing protocol.   (06 Marks)
    c.   List the QoS parameters in adhoc wireless network.   (06 Marks)