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**10EC82**

# Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
## Digital Switching Systems

Time: 3 hrs.                                                                 Max. Marks:100

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

## PART – A

1   a. Explain the different network structures used in communication with neat diagram.
                                                                                  **(06 Marks)**
    b. Explain the principle of operation of four wire circuits with the help of a neat diagram.
                                                                                  **(08 Marks)**
    c. Explain principle of frequency division multiplexing with suitable block diagram. **(06 Marks)**

2   a. Explain in brief different functions of a switching system.                 **(06 Marks)**
    b. Explain distribution frames in strowger exchange with neat diagram.         **(08 Marks)**
    c. Explain basic central office linkages with suitable diagram.                **(06 Marks)**

3   a. Define and explain the following terms:
       (i)   Traffic intensity
       (ii)  Grade of service
       (iii) Busy hour
       (iv)  Occupancy                                                            **(06 Marks)**
    b. From the basic principles of queuing systems derive the equation for finite queue capacity.
                                                                                  **(10 Marks)**
    c. A group of 20 trunks provides a GOS of 0.01 when offered 12E of traffic.
       (i)   How much GOS is improved if one extra trunk is added to the group?
       (ii)  How much GOS deteriorate if one trunk is out of service?             **(04 Marks)**

4   a. What is grading? Explain any two types of gradings.                        **(06 Marks)**
    b. Derive an expression for Grade of Service of a 3 stage network.            **(08 Marks)**
    c. Derive a 3 stage network for connecting 100 incoming trunks to 100 outgoing trunks.
                                                                                  **(06 Marks)**

## PART – B

5   a. With a neat sketch explain the operation of a space switch.               **(08 Marks)**
    b. Discuss the need for frame alignment in time division switching networks.  **(06 Marks)**
    c. Explain single ended unilateral and bilateral synchronization system.      **(06 Marks)**

6   a. Explain in brief Basic software architecture used in digital switching systems. **(14 Marks)**
    b. Explain in brief call models and connect sequence.                         **(06 Marks)**

7   a. Describe the various organizational interfaces of a typical DSS control office. **(10 Marks)**
    b. Explain with a neat diagram a strategy for improving software analysis.    **(10 Marks)**

8   a. Briefly explain generic switch hardware architecture.                      **(07 Marks)**
    b. Briefly explain common characteristics of a DSS.                           **(07 Marks)**
    c. Explain Recovery strategy of DSS.                                          **(06 Marks)**

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10EC832

# Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
## Network Security

Time: 3 hrs.

Max. Marks:100

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

## PART – A

1  a. Explain the general model of Network security system. **(08 Marks)**
   b. Explain play fair rules for encryption, using play fair key – "STORY" Encrypt the plain text "We will meet tomorrow". **(12 Marks)**

2  a. With neat diagram explain S-DES key generation algorithm. In S-DES 10 bit key is 1011001010 find the values of sub keys $k_1$, $k_2$ if
   $P_{10} - 3$  5  2  7  4  10  1  9  8  6
   $P_8 - 6$  3  7  4  8  5  10  9
   Left circular shift by 1-bit for both rounds. **(10 Marks)**
   b. With neat diagram explain single round DES Algorithm. **(10 Marks)**

3  a. Explain the Diffie Hellman key exchange algorithm. **(06 Marks)**
   b. What are the requirements of a public key cryptosystem? **(06 Marks)**
   c. Perform Encryption and Decryption using the RSA algorithm for $p = 3$, $q = 11$, $e = 7$, $m = 5$. **(08 Marks)**

4  a. Describe the Digital Signature Algorithm. **(10 Marks)**
   b. With neat diagram explain the basic uses of Hash function. **(10 Marks)**

## PART – B

5  a. Explain the sequence of events that are required for a transaction in SET. **(10 Marks)**
   b. Explain the various phases of SSL handshake protocol. **(10 Marks)**

6  a. Define Intrusion Detection and explain the architecture of a distributed intrusion detection system. **(08 Marks)**
   b. Explain the password selection strategies in detail. **(08 Marks)**
   c. Mention the classes of intruders and briefly define them. **(04 Marks)**

7  a. With a diagram explain digital immune system. **(10 Marks)**
   b. Explain the different types of viruses. **(10 Marks)**

8  a. Define firewall? With neat diagrams briefly explain the three types of firewalls. **(10 Marks)**
   b. Explain briefly about the firewall configurations. **(10 Marks)**

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**10EC843**

# Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
## GSM

Time: 3 hrs.                                                                 Max. Marks:100

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

## PART – A

1  a. Explain GSM subsystems, with neat diagram and list various GSM subsystem entities. **(08 Marks)**
   b. Write a note on GSM Interfaces. **(08 Marks)**
   c. Write a note on GSM frequency bands. **(04 Marks)**

2  a. Write a note on Slow frequency hopping used in GSM. **(08 Marks)**
   b. What are the benefits of using adaptive antennas in GSM? Explain briefly. **(08 Marks)**
   c. For a GSM system to be designed to cover 60,000 mile$^2$ cell radius is 29.85 miles. What is the number of cells required to cover the service area? **(04 Marks)**

3  a. List GSM logical channels with proper groupings. **(06 Marks)**
   b. Write a note on data encryption method used in GSM, with a neat diagram. **(08 Marks)**
   c. Explain Mobile identification process, with neat figure. **(06 Marks)**

4  a. Explain with neat graph, Speech Codec Attributes relating with Bit rate and quality of speech. **(07 Marks)**
   b. Explain GSM Full rate LPC – RPE vocoder with diagram. **(08 Marks)**
   c. Write a note on A Law or µ Law compounded PCM. **(05 Marks)**

## PART – B

5  a. Explain briefly GSM PLMN services. **(07 Marks)**
   b. Explain Signaling Protocol Reference Model BS – MSC used for messaging in GSM on A interface. **(06 Marks)**
   c. With neat figure, explain call set up by a mobile in GSM. **(07 Marks)**

6  a. Write a note on Security algorithms for GSM, with neat figure. **(06 Marks)**
   b. Write a note on token based registration process in GSM, with neat figure. **(07 Marks)**
   c. Explain file structure of SIM card used in GSM. **(07 Marks)**

7  a. What are the salient features of planning of wireless network like GSM? **(07 Marks)**
   b. What are various requirements to be satisfied to design a wireless system? **(06 Marks)**
   c. What are the factors to be considered in selecting a modulation scheme for TDMA system in GSM? **(07 Marks)**

8  a. What are management requirements for wireless networks? Explain. **(06 Marks)**
   b. Explain NM Interface and Architecture, with neat figure. **(07 Marks)**
   c. Explain GSM TMN Architecture with figure. **(07 Marks)**

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# Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
## Ad-hoc Wireless Networks

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 out the differences between cellular network and Ad-hoc wireless network. **(05 Marks)**
　　b. Discuss the major issues to be considered for a successful adhoc wireless internet. **(10 Marks)**
　　c. Explain the applications of Adhoc networks. **(05 Marks)**

2　a. Explain briefly the classification tree diagram for MAC protocols in Adhoc wireless networks. **(06 Marks)**
　　b. Explain any 5 issues to be considered while designing a MAC protocol for Adhoc wireless network. **(10 Marks)**
　　c. With neat sketch, explain Haud shake mechanism in MACA and MARCH protocol. **(04 Marks)**

3　a. Explain distributed Laxity Based priority scheduling mechanism. **(10 Marks)**
　　b. Explain directional Busy tone based MAC protocol. **(10 Marks)**

4　a. Explain in detail DSDV protocol. **(10 Marks)**
　　b. Explain in detail the process of route establishment in adhoc on-demand distance vector (AODV) routing protocol. **(10 Marks)**

## PART – B

5　a. Explain in detail OLSR protocol. **(10 Marks)**
　　b. Explain the important routing metrics considered for designing power awake routing protocol. **(10 Marks)**

6　a. Explain the major issues in designing a transport layer protocol for Adhoc wireless networks. **(10 Marks)**
　　b. Explain the major reasons behind throughput Degradation that TCP faces in Adhoc wireless networks. **(10 Marks)**

7　a. Discuss the issues and challenges in security provisioning for Adhoc Wireless networks. **(06 Marks)**
　　b. Explain the network security requirements in Adhoc wireless networks. **(04 Marks)**
　　c. Explain Network security attacks in detail in Adhoc wireless networks. **(10 Marks)**

8　a. Explain the issues and challenges in providing QoS in Adhoc wireless network. **(10 Marks)**
　　b. Give the classification of QoS solutions for Adhoc wireless networks. **(10 Marks)**

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# Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
## Optical Networking

Time: 3 hrs.  Max. Marks:100

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

## PART – A

1  a. What is the need for multiplexing in an optical fiber? Explain the different multiplexing techniques for increasing the transmission capacity of an optical fiber. **(07 Marks)**
   b. Explain the fixed and statistical multiplexing of TDM. **(06 Marks)**
   c. Discuss the different types of WDM architecture. **(07 Marks)**

2  a. Discuss the design principle and operation of polarization independent isolator. **(10 Marks)**
   b. Explain with neat diagrams transmission and reflection grating. **(10 Marks)**

3  a. Explain the principle and operation of a photodetector. Show that the responsivity R is given by, $R = \dfrac{h\lambda}{1.24}$ Amp/w, where $\lambda$ is given in $\mu$m and h is the quantum efficiency. **(10 Marks)**
   b. Explain the main considerations in building a large switch. Also discuss with neat diagram the design principle in realizing $4 \times 4$ crossbar switch using $2 \times 2$ switches. **(10 Marks)**

4  a. What are the sources of interchannel and intrachannel cross talk? Explain them. **(10 Marks)**
   b. With the block diagram, explain the various components of WDM link. **(10 Marks)**

## PART – B

5  a. What are the advantages of SONET/SDH over PDH? **(06 Marks)**
   b. With neat diagram, explain and identify the different parts of SONET / SDH infrastructure. **(08 Marks)**
   c. Compare ATM network with IP. **(06 Marks)**

6  a. With neat diagram, explain the different types of wavelength conversion techniques that are realized in a node. **(10 Marks)**
   b. With neat diagram, explain and analyse the architectural variations in the wavelength routing networks. **(10 Marks)**

7  a. Explain the network management functions. **(10 Marks)**
   b. Discuss different types of protection techniques for point to point links that comes under fault management. **(10 Marks)**

8  a. Explain the different types of fiber access network with required sketch. **(10 Marks)**
   b. Write short notes on:
      (i) Packet interleaving
      (ii) Synchronization. **(10 Marks)**

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# Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019

## GSM

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 relevant figures, explain GSM PLMN structure.                     (06 Marks)
    b.   Explain the general objectives and services of GSM PLMN.               (06 Marks)
    c.   Draw a neat diagram of a GSM reference model. Explain the various functional entities, indicating the interfaces used for their inter connections.                (08 Marks)

2   a.   With a neat block diagram, explain baseband frequency hopping implementation.   (04 Marks)
    b.   Explain how advanced antenna technology helps to reduce interface in GSM.       (08 Marks)
    c.   Consider a GSM system with the following data:
         Coverage area $= 80000$ mile$^2$
         One-way system bandwidth $= 12.5$ MHz
         Channel spacing $= 200$ kHz
         Frequency reuse factor $= 4$
         MS output power (w) $= 800$ mw
         BS antenna gain (Gbs) $= 20$ dB
         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 $y = 4$
         One-mile path loss intercept $(I_o) = 80$ dBm
         Lognormal fading margin $(f_m) = 10$ dB
         $KT = -174$ 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.   With the help of neat diagram, explain various bursts used in GSM.     (10 Marks)
    b.   Explain the data encryption method used in GSM.                        (06 Marks)
    c.   List and explain the types of location registration GSM supports.      (04 Marks)

4   a.   What is speech coding? Explain the time domain waveform coding.        (06 Marks)
    b.   Write a short note on ITU-T standards.                                 (06 Marks)
    c.   Explain with illustration, working of full rate vocoder.              (08 Marks)

## PART – B

5  a.  Explain message flow diagram for call setup by mobile station. **(10 Marks)**
   b.  With neat block diagram, explain architecture of SMS and protocol stack for SMS. **(10 Marks)**

6  a.  Describe briefly security algorithms for GSM. **(06 Marks)**
   b.  Briefly explain the wireless security requirement in a GSM. **(08 Marks)**
   c.  Write a note on Token-based challenge in GSM system. **(06 Marks)**

7  a.  Discuss Teletraffic models. **(06 Marks)**
   b.  Explain planning of wireless network. **(06 Marks)**
   c.  Write a short note on spectral efficiency of a wireless system. **(08 Marks)**

8  a.  What are the five TMN layers in 3010? Explain the pertinent three TMN layers. **(08 Marks)**
   b.  Explain simplified TMN physical architecture with necessary diagram. **(06 Marks)**
   c.  Explain with neat diagram GSM containment tree. **(06 Marks)**

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## Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
### Fuzzy Logic

Time: 3 hrs.                Max. Marks:100

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

### PART – A

**1** a. Define crisp properties.          **(10 Marks)**

   b. For the two fuzzy sets:

$$A = \left\{ \frac{1}{0} + \frac{0.8}{20} + \frac{0.65}{40} + \frac{0.45}{60} + \frac{0.3}{80} + \frac{0.1}{100} \right\} \text{ and}$$

$$B = \left\{ \frac{0}{0} + \frac{0.45}{20} + \frac{0.6}{40} + \frac{0.8}{60} + \frac{0.95}{80} + \frac{1}{100} \right\}.$$

   Find: (i) $A \cup B$      (ii) $A \cap B$      (iii) $A \cup \overline{B}$

        (iv) $B \cup \overline{A}$      (v) $\overline{A \cup B} = \overline{A} \cap \overline{B}$      **(10 Marks)**

**2** a. Define the following operations as applied to fuzzy relations:

   (i) Union      (ii) Intersection      (iii) Complement      (iv) Containment.      **(06 Marks)**

   b. Let R be fuzzy relation on $A \times B$, S be fuzzy relation on $B \times C$ given:

$$A = \left\{ \frac{0.3}{30} + \frac{0.7}{60} + \frac{1}{100} + \frac{0.2}{120} \right\}$$

$$B = \left\{ \frac{0.2}{20} + \frac{0.4}{40} + \frac{0.6}{60} + \frac{0.8}{80} + \frac{1}{100} + \frac{0.1}{120} \right\}.$$

$$C = \left\{ \frac{0.3}{500} + \frac{0.6}{1000} + \frac{1}{1500} + \frac{0.1}{1800} \right\}$$

   Find: (i) Relation of R      (ii) Relation of S      (iii) Max-min composition $T = R \circ S$

        (iv) Max-product composition $T = R \circ S$.      **(14 Marks)**

**3** a. Describe the features of the membership function.      **(08 Marks)**

   b. Briefly explain the following value assignment methods : (i) Intuition    (ii) Rank ordering (iii) Neural network.      **(12 Marks)**

**4** a. For the three fuzzy sets shown in Fig. Q4 (a), find the defuzzified values z in meters using,

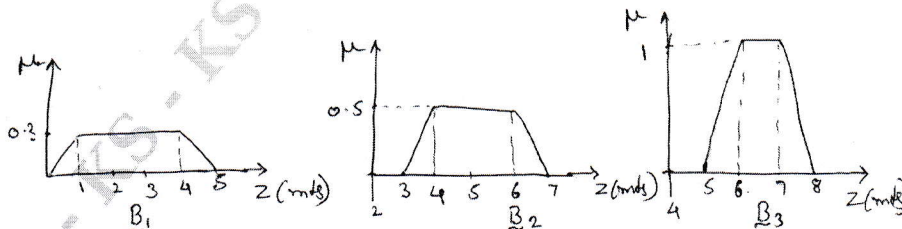   (i) Centroid method   (ii) Weighted average method   (iii) Mean max membership method.      **(10 Marks)**



Fig. Q4 (a)

b. Explain DSW algorithm. **(06 Marks)**

c. List the four properties of Lambda-cut sets. **(04 Marks)**

## PART – B

5 a. Show that the given proposition is tautology, verify with help of truth table:

Hypotheses : Teachers are magicians

Magicians are polite.

Conclusion : Teachers are polite. **(06 Marks)**

b. Let X be {55, 60, 65, 70, 75} a fuzzy set, defined on $\underset{\sim}{A} = \left\{ \frac{1}{50} + \frac{0.9}{60} + \frac{0.3}{65} + \frac{0}{70} + \frac{0}{75} \right\}$, Y be

{76, 79, 82, 85, 88} be a fuzzy set defined on $\underset{\sim}{B} = \left\{ \frac{1}{76} + \frac{1}{79} + \frac{0.5}{82} + \frac{0.1}{85} + \frac{0}{88} \right\}$ and

$\underset{\sim}{C} = \left\{ \frac{0}{76} + \frac{0.4}{79} + \frac{1}{82} + \frac{0.4}{85} + \frac{0}{88} \right\}$. Find : (i) IF A THEN B (ii) IF A THEN B ELSE C

**(14 Marks)**

6 a. Explain fuzzy concentration, fuzzy dilation and fuzzy intensification. **(08 Marks)**

b. Let X = {100, 150, 200, 250, 300} on set

$Small = \left\{ \frac{0}{100} + \frac{0.2}{150} + \frac{0.4}{200} + \frac{0.7}{250} + \frac{1}{300} \right\}$ and $Big = \left\{ \frac{0}{100} + \frac{0.3}{150} + \frac{0.6}{200} + \frac{1}{250} + \frac{0.8}{300} \right\}$. Find:

    (i) Small and very Big

    (ii) Very very small and not minus big.

    (iii) Plus big or not small.

    (iv) Intensely small or Intensely big. **(12 Marks)**

7 a. Explain fuzzy ordering. **(06 Marks)**

b. Given $I_1 = \left\{ \frac{1}{3} + \frac{0.8}{7} \right\}$, $I_2 = \left\{ \frac{0.7}{4} + \frac{1}{6} \right\}$ and $I_3 = \left\{ \frac{0.8}{2} + \frac{1}{4} + \frac{0.5}{8} \right\}$. Assess the truth value of

inequality : (i) $I_1 \geq I_2$    (ii) $I_1 \geq I_3$    (iii) $I_2 \geq I_1$    (iv) $I_2 \geq I_3$    (iv) $I_3 \geq I_1$

(iv) $I_3 \geq I_2$

And also find the overall ordering for the three fuzzy sets. **(14 Marks)**

8 a. Explain the following:

    (i) Cluster analysis.

    (ii) Cluster validity.

    (iii) C-means clustering. **(10 Marks)**

b. Explain Hard C-means (HCM). **(10 Marks)**

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