Code: DE66   **Subject: WIRELESS & MOBILE COMMUNICATIONS**

DipIETE – ET (Current Scheme)

Time: 3 Hours   **JUNE 2015**   **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.
- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1   **Choose the correct or the best alternative in the following:**   **(2×10)**

a. GSM is a _____ generation cellular wireless system.

   (A) First   **(B)** Second
   (C) Third   **(D)** Fourth

b. DSDV routing protocol is used in

   (A) GSM   **(B)** WLAN
   (C) MANET   **(D)** CDMA

c. Frequency reuse distance is given by D = _____.

   (A) $R\sqrt{3N}$ **(B)** $\sqrt{3N}$
   (C) $\dfrac{1}{\sqrt{3N}}$ **(D)** $\sqrt{3NR}$

d. GSM employs _____ as the multiple access technique.

   (A) FDMA   **(B)** CDMA
   (C) OFDM   **(D)** TDMA

e. Cell splitting _____ the capacity utilization of the available bandwidth.

   (A) Increases   **(B)** Decreases
   (C) No change in   **(D)** Either **(A)** or **(B)**

f. IEEE 802.15 standard correspond to _____ .

   (A) Bluetooth   **(B)** WiMax
   (C) WiFi   **(D)** Ethernet

g. IS-95 uses CDMA bands of _____ per band.

   (A) 1.25 MHz   **(B)** 12.5MHz
   (C) 25 MHz   **(D)** 200 kHz

h. GEO is situated at about _____ above the earth's surface.

(A) 500 km   (B) 1500 km
(C) 20,000 km   (D) 36, 000 km

i. Smart antennas at the base stations use _____.

(A) CDMA   (B) SDMA
(C) FDMA   (D) TDMA

j. DSSS is used by the _____ cellular phone system.

(A) AMPS   (B) GSM
(C) IS-95   (D) D-AMPS

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Explain FDMA, TDMA and CDMA multiple access schemes with suitable diagrams. **(10)**

b. If a total of 33 MHz of bandwidth is allocated to a particular cellular telephone system that uses two 25 KHz simplex channels to provide full duplex voice channels, compute the number of simultaneous calls that can be supported per cell if a system uses
(i) FDMA
(ii) TDMA with 8way time multiplexing **(6)**

Q.3 a. What is inter symbol interference (ISI)? Discuss with suitable illustrations. **(6)**

b. Discuss the effect of reflection, diffraction and scattering on radio wave propagation with the help of a neat figure. **(6)**

c. Write a note on Doppler effect. **(4)**

Q.4 a. With suitable diagram, explain the concept of frequency reuse in cellular systems. **(6)**

b. Explain the concept of CSMA / CA with ACK. **(6)**

c. With respect to mobile cellular communication, explain the following terms.
(i) Cell sectoring
(ii) Cell splitting **(4)**

Q.5 a. What is the difference between guard band and guard Time and why are they important in cellular system? Explain clearly. **(8)**

b. How many bits can be transmitted in one second using 16 QAM to transmit a binary sequence if the baud rate is 2400 Hz. **(4)**

c. Explain reuse partitioning based allocation strategy with a diagram. **(4)**

Q.6   a.   With respect to a satellite system explain:
         (i)   Orbits
         (ii)   Footprint
         (iii)   Inclination   **(8)**

      b.   What is meant by bidirectional tunneling. Why do you need HA-FA in addition to the HLR –VLR pair? Explain in detail.   **(8)**

Q.7   a.   With respect to GSM explain:
         (i) Frequency band and channels
         (ii) Frames in GSM   **(8)**

      b.   Discuss the function of various logical channels in IS-95.   **(8)**

Q.8   a.   List the characteristics of ad-hoc networks.   **(4)**

      b.   What are the differences between cellular and adhoc networks?   **(4)**

      c.   What is a wireless sensor network? Explain hierarchical routing in sensor networks with an example.   **(8)**

Q.9   a.   Discuss the salient features of WLAN with more stress on IEEE 802.11 standard.   **(8)**

      b.   What is SDMA? Explain the basic functions of smart antenna with a diagram.   **(8)**