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**Question Paper Code: 52941**

M.E.DEGREE EXAMINATION, JUNE 2016

Elective

Computer Science and Engineering (With Specialization in Networks)

15PNE501 - 4G TECHNOLOGIES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

- EDGE stands for
  - Enhanced data GSM evolution
  - Enhanced data global evolution
  - Enhanced double GSM evolution
  - None of these
- The function of the network element have been clearly specified by
  - 4GPP
  - 3GPP
  - 2GPP
  - all the above
- Application of 4G technology in
  - high definition mobile TV
  - video conferencing
  - cloud computing
  - All the above
- Pilots are used to track the
  - residual phase error
  - reduce the phase error
  - residual sequence error
  - none of these
- LTE (Long-Term Evolution) is based on the \_\_\_\_\_ network technologies.
  - GSM/EDGE
  - UMTS/HSPA
  - both (a) and (b)
  - none of these

PART - B (5 x 3 = 15 Marks)

6. Identify the improvements in 3GPP2 standard over 3GPP standard for mobile communication.
7. Why are RNS and RNC important in UMTS terrestrial radio access network?
8. What are the enhancements in MIMO systems over HSDPA?
9. If OFDM is to be used as the transmission scheme in a mobile-communication system, what are the basic OFDM parameters need to be decided upon?
10. Specify the role of multi standard radio base stations in LTE.

PART - C (1 x 16 = 80 Marks)

11. (a) (i) Why does 3GPP prefer TDD over FDD mode of telecommunication? Draw the frame structure of TDD frame. Also, list the problems of using TDD mode. (10)  
(ii) Compare and contrast the features of 3G and 4G networks. (6)

Or

- (b) (i) Draw the protocol stack for TD-SCDMA system for mobile communication. Highlight the features of each of the interfaces in it. (8)  
(ii) Give the basic idea behind 3GPP2 technology. Illustrate how CDMA 2000 system provides its support for 3GPP2 system. (8)
12. (a) Indicate the various components of a core networks in a mobile communication system. Enumerate the functions of each of the components. Also, elucidate how these components extend their support for the mobile communication. (16)

Or

- (b) (i) Depict the HSDPA architecture with an explanation. Summarize the overall channel structure with HSDPA. (8)  
(ii) What is EV-DO? What are its different enhancements? Give a comparison of different enhancements. (8)
13. (a) Elaborate the role of smart antennas in wireless communication. What are the improvements over the smart antenna types? With neat sketch, provide a detailed outline of different types of smart antennas. (16)

Or

- (b) (i) Explain the layered space time architecture for wireless communication as means for using multiple antennas to improve reliability rather than data-rate. (8)
  - (ii) Appraise the need for multi-carrier modulation. State its advantages. (8)
14. (a) (i) How does cyclic-prefix insertion help in making OFDM insensitive to the time dispersion? Illustrate with appropriate diagram. (8)
- (ii) State and explain the benefits of mobile broadband wireless access (IEEE 802.20). (8)

Or

- (b) Demonstrate the working principle of WiMax technology. Identify the various components in the WiMax architecture and their functions. Also, compare it with other wireless communication technologies. (16)
15. (a) (i) what are trade-offs and relationships between noise, sensitivity and dynamic range while dealing with high-quality receiver systems in LTE? Give your comments. (8)
- (ii) Provide a concise outline of spectrum emission mask and spurious emission. (8)

Or

- (b) (i) Draw the LTE frequency bands and spectrum allocations. Give a brief account of it. (8)
  - (ii) Enumerate the power level requirements for LTE. (8)
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