

Time: 3 Hours

Max. Marks: 80

- N.B. : (1) Question No.1 is compulsory
 (2) Write any three questions from Q. 2 to Q.6.
 (3) Draw neat diagrams wherever necessary.
 (4) Assume suitable data, if required and state it clearly.

- Q1 Solve any five**
- a** Compare GSM and GPRS 4
 - b** What is Doppler frequency shift?. Derive an expression for it 4
 - c** Explain why OFDMA is preferred for downlink and SC-FDMA for uplink in LTE 4
 - d** Explain soft and hard handoff with a neat diagram 4
 - e** What is SDR? State its advantages 4
 - f** List the specifications of 5G 4
- Q2**
- a** Explain GSM Network Architecture with neat diagram 10
 - b** In a cellular system with frequency reuse distance of 7 and the mobile receiver located at the boundary of its operating cell, under the influence of interfering cells in the first tier. Compute the S/I ratio at mobile receiver for: 10
 - i) omnidirectional antenna design
 - ii) 3 sector 120° directional antenna design
 - iii) 6 sector 60° directional antenna design

comment on the effect of sectoring on S/I ratio.
 Consider path loss exponent of 3.
- Q3**
- a** Compare 1G, 2G, 3G, 4G and 5G with respect to speed, applications, bandwidth, spectral efficiency and handoff. 10
 - b** Compare IS-95, CDMA-2000 and WCDMA 10
- Q4**
- a** What is MIMO? What are its advantages. Explain MIMO with respect to 4G Technology. 10
 - b** Draw LTE network architecture and Discuss in details. 10
- Q5**
- a** Explain multi-path signal propagation and RAKE receiver in detail 10
 - b** Draw a neat diagram of UMTS system architecture showing all interfaces and explain in details. 10
- Q6 Write a short note on (Solve any 2)** 20
- a** Two Ray ground reflection Model
 - b** Traffic Theory with respect to mobile cellular networks
 - c** Orthogonal Frequency Division Multiple Access