

Time: 3 Hours

Marks: 80

Note:

1. Question No. 1 is compulsory.
2. Attempt any THREE out of the remaining FIVE questions.
3. Assume suitable data if necessary.

- Q. 1.** Attempt any Four.
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| (a) | State the main features of 5 G technology. | 5 |
| (b) | Why radio signals on frequencies between 30 GHz and 300 GHz are called millimetre waves? | 5 |
| (c) | What is the need of CP in OFDM? How CP is added in the OFDM system. | 5 |
| (d) | List the important characteristics and benefits of C-RAN. | 5 |
| (e) | Does Massive MIMO enhance the performance of 5G? Justify your answer. | 5 |
- Q. 2.**
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|-----|---|----|
| (a) | Why carrier aggregation is performed? Explain the type of carrier aggregation techniques. | 10 |
| (b) | Explain CD NOMA/ SCMA with suitable illustrations. What are the characteristics of codebook used in SCMA? | 10 |
- Q. 3.**
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|-----|---|----|
| (a) | Draw the 5G Reference point architecture? Explain the function of AMF, UPF & PCF and List the various interfaces associated with these network functions. | 10 |
| (b) | Draw and explain the Cognitive Radio Function cycle with important features. | 10 |
- Q. 4.**
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|-----|--|----|
| (a) | List the various millimetre wave technology employed to mitigate the effect of multipath fading, human shadowing, rains etc. | 10 |
| (b) | How DFT-S-OFDM is different from CP OFDM / OFDM? Explain DFT-S-OFDM with suitable illustration. | 10 |
- Q.5**
- | | | |
|-----|--|----|
| (a) | Explain various interference management techniques in CR and heterogeneous Networks. | 10 |
| (b) | What is direct conversion transceiver architecture? Explain with suitable illustrations. | 10 |
- Q. 6**
- | | | |
|-----|---|----|
| (a) | What is green small cell cellular network ? What are the various energy saving techniques by keeping BS in sleep modes. | 10 |
| (b) | List the various system structures of C-RAN based on BBU and RRU functionalities. | 10 |
