



**B.E DEGREE EXAMINATIONS: DEC 2022**

(Regulation 2018)

Seventh Semester

**ELECTRONICS AND COMMUNICATION ENGINEERING**

U18ECE0001: Cognitive Radio

**COURSE OUTCOMES**

- CO1:** Explain the principles of the software defined radio (K2).  
**CO2:** Describe the architecture of software defined radio (K2).  
**CO3:** Explain the design considerations of cognitive radio (K2).  
**CO4:** Illustrate cognitive radio architecture (K2).  
**CO5:** Demonstrate knowledge of spectrum sensing (K2).  
**CO6:** Apply cross-layer design for cognitive radio (K3).

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 2 = 20 Marks)**

**(Answer not more than 40 words)**

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|--|-----|-------------------|
| 1. List the limitations of SDR.  | CO1 | [K <sub>2</sub> ] |
| 2. What are the characteristics of a plug and play module?                         | CO1 | [K <sub>2</sub> ] |
| 3. Summarize the architectural goals of the SDR.                                   | CO2 | [K <sub>2</sub> ] |
| 4. What are the architecture implications of the SDR?                              | CO2 | [K <sub>2</sub> ] |
| 5. Encapsulate the applications enabled by CR.                                     | CO3 | [K <sub>2</sub> ] |
| 6. Define the term spectrum pooling.   | CO4 | [K <sub>2</sub> ] |
| 7. List the type of antenna's used in CR and give the explanation for choosing it. | CO4 | [K <sub>2</sub> ] |
| 8. Outline the challenges in spectrum sensing?                                     | CO5 | [K <sub>2</sub> ] |
| 9. Define spectrum mobility.   | CO6 | [K <sub>2</sub> ] |
| 10. What is Spectrum Broker?   | CO6 | [K <sub>2</sub> ] |

**Answer any FIVE Questions:-**

**PART B (5 x 16 = 80 Marks)**

**(Answer not more than 400 words)**

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|---|----|-----|-------------------|
| 11. a) Outline the evolution of SDR.  | 8  | CO1 | [K <sub>2</sub> ] |
| b) Illustrate the Quantifying Degrees of Programmability of SDR.                        | 8  | CO1 | [K <sub>3</sub> ] |
| 12. a) Elucidate the major signal processing involved in the RF section of the Software | 12 | CO2 | [K <sub>2</sub> ] |

	Defined Radio (SDR) using block diagram.			
b)	List the advantages of SDR.	4	CO2	[K <sub>2</sub> ]
13. a)	What is Cognition Cycle? Discuss the various phases involved in cognition cycle with neat diagram.	10	CO3	[K <sub>2</sub> ]
b)	Elaborate any two design rules involved in functional component interfaces.	6	CO3	[K <sub>2</sub> ]
14.	Discuss in detail about enabling location and environmental awareness in cognitive radio.	16	CO4	[K <sub>2</sub> ]
15.	Classify spectrum sensing and compare different types of spectrum sensing techniques used in cognitive radio.	16	CO5	[K <sub>3</sub> ]
16.	Explain the XG architecture using necessary illustrations and elucidate parameters involved in the spectrum analysis of XG network.	16	CO6	[K <sub>2</sub> ]

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