QP Code: R251B037 | Reg. No | | | | | | | | | | | AY 24

GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

(GIET UNIVERSITY)

M.Tech. (First Semester) Regular Examinations, February – 2025

24MECPC11012 –Cognitive Radio

(ECE)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	Compare cognitive radio with software-defined radio (SDR).	CO1	K2
b.	What is the concept of spectrum pooling in cognitive radio systems?	CO2	K1
c.	List and explain the key parameters involved in spectrum management.	CO3	K1
d.	What are the disadvantages of dynamic spectrum sharing in wireless communication?	CO4	K1
e.	Define spectrum trading and its significance in cognitive radio networks.	CO1	K2

PART – B **(10 x 5 = 50 Marks)**

		Marks	CO #	Blooms Level
	Answer ***ALL*** the questions			
2. a.	Explain the concept of the cognition cycle and discuss its various phases with a detailed diagram.	5	CO1	K3
b.	What is spectrum allocation? Describe its classification in cognitive radio (CR) networks.	5	CO1	K3
	(OR)			
c.	Discuss spectrum sharing business models in detail, including concepts such as the spectrum commons and real-time secondary spectrum markets.	5	CO1	K2
d.	Compare and contrast linear programming and non-linear programming in the context of spectrum allocation.	5	CO1	K3
3.a.	Describe the components and functionalities of xG network architecture with a neat diagram.	5	CO2	K3
b.	What is spectrum trading? Briefly explain its classification.	5	CO2	K2
	(OR)			
c.	Discuss the challenges and benefits of implementing cognitive radio technologies.	5	CO2	K3
d.	Explain the concept of spectrum holes and how they are detected in TV white spaces.	5	CO2	K2
4.a.	Provide examples of potential applications of cognitive radio across different domains.	5	CO3	K3
b.	Briefly discuss the role of centralized dynamic spectrum access in cognitive radio networks.	5	CO3	K2
	(OR)			
c.	Explain the role of geo-location databases in spectrum sharing and interference management.	5	CO3	K3
d.	What is auction theory? Explain its classification in cognitive radio networks.	5	CO3	K3
5.a.	Describe the adaptation features used in the conceptual model of cognitive radio.	5	CO4	K3
b.	What are the major challenges in spectrum management, and how is spectrum analysis performed?	5	CO4	K2

(OR)

c.	Discuss various spectrum sensing methods used in cognitive radio networks.	5	CO4	K3
d.	Explain each component and its functionality in a cognitive radio (CR) architecture with a neat diagram.	5	CO4	K2
6.a.	Compare and contrast convex programming and dynamic programming in optimizing spectrum allocation.	5	CO2	K2
b.	Describe the importance of antenna design in cognitive radio networks.	5	CO1	K3

(OR)

c.	Discuss the significance of collaborative sensing in detecting spectrum holes and the challenges associated with it.	5	CO1	K3
d.	Explain the sensing interface and the primary concepts of position awareness in cognitive radio with an architectural diagram.	5	CO3	K3

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