AANIPAL INSTITUTE OF TECHNOLOGY



(A constituent unit of MAHE, Manipal)

End Exam Question Paper

Semester - VII

Department: Electronics and Communication Engineering

Course/Module Code: ECE 4094

Course Title: 5G:Fundamentals and Architectures

Session: Dec 2023

Date: 9/12/2023

Table 1: Distribution of Marks against Course Learning Outcomes

CLO Statements	Course Learning Outcome	AHEP 4	Marks
Describe LTE- Basic and Advance.	CLO3154.1	C1	
Describe 5G Fundamentals, Use Cases, Network Architecture	CLO3154.2	C2	
Describe 5G Base Station Architecture & Antenna Architecture.	CLO3154.3	C2	
Understanding of Interfaces, Protocol Stacks & Call Management	CLO3154.4	C1	
Understand MIMO & Beamforming in 5G, 3GPP Standards	CLO3154.5	C5,C13	

SEVENTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION MAY/JUNE 2023

SUBJECT: 5G: FUNDAMENTAL AND ARCHITECTURES (ECE 4094), SET-1

TIME: 3 HOURS

MAX. MARKS: 50

- Instructions to candidates

 Answer ALL questions.
 - Missing data may be suitably assumed.

Q. No.	Questions	M*	С *	A*	B *
1A.	Explain the Access Stratum and Non-Access Stratum in case of LTE?	4			
1B.	Write all the interfaces in 5G and draw the architecture diagram ?	4			

1C.	When 5G started with NSA which option was selected first and also explain NSA Option 3 (3, 3x and 3a)?	2		
2A.	Write three use cases of 5G and Explain the Service based architecture principle with message flows?	4		
2B.	What are the characteristics of Connection Management?	4		
2C.	Explain Access Class within the range 0 to 9?	2		
3A.	Explain antenna parameters?	4		
3B.	Write the short note on gNB CU –DU Split. Differentiate with the LTE legacy Model.	4		
3C.	What is channel mapping and explain the channel mapping in case of 5G.	2		
4A.	Write the 5G Call Flow from Air Interface view with sequence diagram?	4		
4B.	What is Dual-polarized beamforming technique and how it can be achieved?	4		
4C.	What is Grid of Beams based Beamforming and explain its benefits and limitations.	2		
5A.	Write all RRC states and explain each functionality or role.	4		
5B.	The 5G Frame Structure is specified in the 3GPP (3rd Generation Partnership Project) specification (38.211) explain Numerology, Radio Frame and Subframe, Slot, Resource Block, and Resource Grid.	4		
5C.	Write the short note of mm Wave and how it can help towards 6G goals	2		

M*--Marks, C*--CLO, A*--AHEP LO, B* Blooms Taxonomy Level

QUESTION PAPER ANALYSIS

Distribution based on CLOs	Set1 End Exam (50 Marks)	Set2 End Exam (50 Marks)
CLOxxxx.1		
CLOxxxx.2		
CLOxxxx.3		
CLOxxxx.4		
CLOxxxx.5		

Distribution based on	Set1 End Exam	Set2 End Exam (50
Blooms Taxonomy	(50 Marks)	Marks)
Remembering		
Understanding		
Applying		
Analysing		
Evaluating		
Creating		
Total		