Paper / Subject Code: 42471 / MICROWAVE ENGINEERING

XTC / SEM-VII / C-2019 / DEC. 2023

(3 Hours) Max. Marks: 80

N.B.: (1) **Question No. 1 is compulsory.**
(2) **Solve any three questions from the remaining five questions.**
(3) **Figures to the right indicate full marks.**
(4) **Assume suitable data if necessary and mention the same in answer sheet.**

Q.1 **Attempt any 5 questions** [20]
(a) List any four applications of Smith Chart?
(b) Write and explain the S-matrix for isolators.
(c) What is the dominant mode in a rectangular waveguide? Justify your answer.
(d) Explain the Faraday Rotation phenomenon with the help of a diagram.
(e) Compare stripline and microstrip line.
(f) Explain two valley model theory for Gunn diode with suitable diagram.

Q.2 (a) Design a single stub matching network using short-circuited shunt stub to match the terminating load $Z_L = 25\text{-}j50\ \Omega$ to the characteristic impedance $Z_0 = 50\ \Omega$. [10]
(b) Derive an expression for velocity modulation of electrons in two-cavity klystron. [10]

Q.3 (a) Derive the field equations for TE modes in a rectangular waveguide. [10]
(b) Draw and explain a rectangular cavity resonator. Derive the dominant mode in the same. [10]

Q.4 (a) Derive the S-parameters of Hybrid Tee. List two applications where a Hybrid Tee could be used. [10]
(b) Explain the principle of operation of IMPATT diode with suitable diagrams and waveforms. [10]

Q.5 (a) A two cavity Klystron amplifier has the following parameters: [10]
$V_o = 1200V$, $R_o = 30\ K\Omega$, $I_o = 25\ mA$ and $f = 10\ GHz$
Gap spacing in either cavity: d = 1 mm
Spacing between the two cavities: L = 4 cm
Effective Shunt Impedance, excluding beam loading: $R_{sh} = 30\ K\Omega$
a. Find the input gap voltage to give maximum voltage.
b. Find the voltage Gain neglecting the beam loading in the output cavity
c. Find the efficiency of the amplifier neglecting the beam loading
Note: For maximum V_2, $J_1(X) = 0.582$ at $X = 1.841$
(b) Explain the method to measure microwave frequency. [10]

Q.6 **Write short note on: (Attempt any four)** [20]
(a) Microwave spectrum and bands with their applications
(b) Waveguide Phase Shifters.
(c) Impedance Measurement in microwave circuit.
(d) Microwave Solid State Devices
(e) Transmission line equations

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CODE

Paper / Subject Code: 42472 / MOBILE COMMUNICATION SYSTEM

B.E/ Sem. VIII/ EXTC/ C.2019/ Dec-2023

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 a neat diagram wherever necessary.
(4) Assume suitable data if required and state it clearly.

Q.1	Attempt any four	**20**
A	Explain power control process in WCDMA.	
B	A 40MHz band is allocated for Mobile communication with simplex BW of 30Khz per user. Calculate no. of duplex channels. Also calculate number of voice channel and number of control channel if 10% channels are dedicated for control information.	
C	Explain Various codes used in IS-95 CDMA system.	
D	What are the factors affecting small scale fading.	
E	Explain GSM features and services.	
Q.2 A	List the methods used to increase the system capacity. Explain any one in detail with advantages and disadvantages.	**10**
B	Draw GSM architecture and explain working of it.	**10**
Q.3 A	Compare multiple access techniques SDMA, TDMA, FDMA and CDMA.	**10**
B	What is Handoff, explain Handoff procedure with neat diagram and also, explain Mobile assisted and Base assisted Handoff.	**10**
Q.4 A	Draw UMTS block diagram and explain function of each block.	**10**
B	Mobile system is operating at 900MHz. For a user moving at a speed of 72km/h, calculate the received carrier frequency if the user is moving (1) Directly away of from the BS (2) Directly towards the BS. (3) 60^0 to the direction of arrival of the transmitted signal (4) Direction perpendicular to the direction of arrival of the transmitted signal.	**10**
Q.5 A	How MIMO system increases reliability and data rate.	**10**
B	Draw and explain 3GPP LTE architecture.	**10**
Q6	Write short notes **(any two)**	**20**
A	How RAKE receiver improves gain in the presence of multipath fading.	
B	Software Defined Radio	
C	Compare 1G, 2G, 3G and 4G	
D	*Explain architecture of EDGE technology, how EDGE technology enhances* data rate.	

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E. Code
33810

Time: 3Hours [Marks:80]

N.B. : **(1) Question No 1 is Compulsory.**
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required, and state it clearly.

1 Attempt **any FOUR** [20]

a What are the benefits of using cloud for transporting industry?

b Explain pros and cons of using relational and nonrelational databases in cloud.

c Explain cloud firewall.

d Differentiate between SAAS, PAAS and IAAS.

e Explain the benefits of virtualization.

2 a Explain cloud storage gateways in details. [10]

b Explain fog and edge computing with necessary diagrams. [10]

3 a Explain authentication and authorization management for clouds. [10]

b Explain database services in cloud with example from any one cloud service provider. [10]

4 a Explain analytics services in cloud with example from any one cloud service provider. [10]

b Explain cloud computing application in healthcare services. [10]

5 a Explain the virtualization at operating system(OS) level with necessary diagrams. [10]

b Explain model view controller with necessary diagrams. [10]

6 a Compare [10]

i. Cloud computing versus peer to peer architecture.

ii. Cloud computing versus client-server architecture.

b Explain content delivery services in cloud with example from any one cloud service provider. [10]

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er / Subject Code: 42480 / INTERNET COMMUNICANTION ENGINEERING (DLOC - IV)

BE | Sem- VII | EXTC | C-2019 | Dec-2023

Time: 3Hours [Marks:80]

N.B.: **(1) Question No 1 is Compulsory.**
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required, and state it clearly.

1 Attempt **any FOUR** [20]

a Discuss some characteristics of real -time audio/video communication.

b Define and explain Internet of Things (IoT).

c What is the need of Firewall for Internet Security?

d Explain S/MIME mail protocol.

e Compare OSI and TCP/IP protocol suite.

2 a Explain DNS query and response message format. [10]

b Write short notes on JPEG and IPTV. [10]

3 a What is Voice over IP? Explain messages and address formats of Session Initiation Protocol (SIP)? How a simple session of VOIP happen using SIP? [10]

b Explain IoT protocol layer diagram with protocols at each layer. [10]

4 a Draw TCP/IP protocol suite and explain each layer in detail. [10]

b Explain VoIP in details. [10]

5 a Explain Distance Vector Multicast Routing Protocol (DVMRP) with its header format. [10]

b Explain Software defined networking in detail with necessary diagrams. [10]

6 a Explain Differentiated Services (DS) with respect to Quality of Service(QoS). Explain DS field, per-hop behavior and traffic conditioner with respect to DS. [10]

b Why do you need Network Automation? Explain. [10]

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38760