



Knowledge Resource & Relay Centre (KRRC)

AIKTC/KRRC/SoET/ACKN/QUES/2022-23/

Date: _____

School: SoET-REV. C-SCHEME Branch: EXTC SEM: VII

To,
Exam Controller,
AIKTC, New Panvel.

Dear Sir/Madam,

Received with thanks the following **Semester/Unit Test-I/Unit Test-II (Reg./ATKT)** question papers from your exam cell:

Sr. No.	Subject Name	Subject Code	Format		No. of Copies
			SC	HC	
1	Microwave Engineering	ECC701		✓	
2	Mobile Communication System	ECC702		✓	
3	Department Level Optional Course III Big data Analytics	ECC704		✓	
4	Department Level Optional Course III Internet Communication Engineering	ETE70X		✓	

Note: SC – Softcopy, HC - Hardcopy

(Shaheen Ansari)
Librarian, AIKTC

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Date: _____

Sem - VII - C-19 - Reg

ET - R19

[Time: 3 Hours]

[Marks:80]

Please check whether you have got the right question paper.

- N.B: 1. Q 1 is compulsory
2. Solve any 3 from remaining
3. Assume suitable data if required

- Q.1 Solve any four 20
- What is mode jumping and how is it avoided in magnetron
 - List microwave frequency bands with frequency range
 - Calculate coupling factor of directional coupler when the incident power is 600 mW and power in auxiliary waveguide is 350 mW.
 - Explain working of Tunnel diode and its application in microwave engineering.
 - Explain microstrip line working with geometry
- Q.2 a) Explain schematic of Reflex klystron & working with applegate diagram. 10
b) Explain physical structure and principle of working of TRAPATT diode. 10
- Q.3 a) An air filled 5 x 2 cm waveguide has $E_z = 20 \sin(40\pi x) \sin(50\pi y) e^{-j\beta z}$ 10
z v/m 15GHz
1. What is mode of propagation. Justify
2. Determine wave impedance E_y/H_x
- b) A magnetron has following parameters 10
Gnner radius : 0.15 m
Outer radius : 0.45m
Flux density of magnetic field B_0 : 1.2 Wb/m²
1. Determine Hull cut off voltage
2. Cut off magnetic field density when beano voltage $V_0 = 6000V$
3. Cyclotron frequency in GHz if $B = 0.3 \text{ Wb/ m}^2$
- Q.4 a) A 50Ω transmission line is terminated on a load of $73 - j80\Omega$. Design 10
single stub matching impedance matching using short circuited shunt stub
b) Explain any two methods of power measurement. 10
- Q.5 a) Construct a four port circulator using two magic Tees & a gyrator. Explain 10
working of same at all four parts.
b) Discuss working of Faraday Rotation isolator from port 1 to port 2 & port 2 10
to port 1 with relevant diagrams.
- Q.6 a) List various modes of oscillation of Gunn diode. Give criteria of 10
classification of these modes and explain working of any one mode.
b) Derive field equations for TE modes in rectangular waveguides. What are 10
degenerate modes?

Sem - VII - C - 1a - Reg

ET-R-9

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

- Q1 Solve any five**
- a Compare GSM and GPRS 4
- b What is Doppler frequency shift?. Derive an expression for it 4
- c Explain why OFDMA is preferred for downlink and SC-FDMA for uplink in LTE 4
- d Explain soft and hard handoff with a neat diagram 4
- e What is SDR? State its advantages 4
- f List the specifications of 5G 4
- Q2**
- a Explain GSM Network Architecture with neat diagram 10
- b In a cellular system with frequency reuse distance of 7 and the mobile receiver located at the boundary of its operating cell, under the influence of interfering cells in the first tier. Compute the S/I ratio at mobile receiver for:
 i) omnidirectional antenna design
 ii) 3 sector 120° directional antenna design
 iii) 6 sector 60° directional antenna design
 comment on the effect of sectoring on S/I ratio.
 Consider path loss exponent of 3. 10
- Q3**
- a Compare 1G, 2G, 3G, 4G and 5G with respect to speed, applications, bandwidth, spectral efficiency and handoff. 10
- b Compare IS-95, CDMA-2000 and WCDMA 10
- Q4**
- a What is MIMO? What are its advantages. Explain MIMO with respect to 4G Technology. 10
- b Draw LTE network architecture and Discuss in details. 10
- Q5**
- a Explain multi-path signal propagation and RAKE receiver in detail 10
- b Draw a neat diagram of UMTS system architecture showing all interfaces and explain in details. 10
- Q6 Write a short note on (Solve any 2)** 20
- a Two Ray ground reflection Model
- b Traffic Theory with respect to mobile cellular networks
- c Orthogonal Frequency Division Multiple Access

ET - R-19

Duration: 3hrs

[Max Marks:80]

Sem - VII - C - (9 - Reg.)

- 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 is Big Data? What is Hadoop? How are Big Data and Hadoop linked?
 B Write the step of Grivan-Newman algorithm. Explain clustering of Social Network Graph using GN algorithm with example.
 C What is MapReduce ? Explain How Map and Reduce Work?
 D Explain PCY algorithm with suitable examples.
 E Explain NoSQL data Architecture patterns.
 F Explain Recommendation system & its various types with example.
- 2 a Describe the structure of HDFS in a Hadoop Ecosystem using a diagram [10]
 b What is NOSQL? What are the business drivers for NoSQL? Discuss any two architectural patterns of NoSQL. [10]
- 3 a Explain Page Rank with Example. Can a Website's Page rank Ever Increase? What are its chances of Decreasing? [10]
 b Evaluate PCY algorithm on the following transaction to find the candidate sets (frequent sets). [10]
 Given data: Threshold value or minimization value = 3
 Hush function = $(i * j) \bmod 10$.
- | | | |
|-----------------|-----------------|-----------------|
| T1 = {1, 2, 3} | T2 = {2, 3, 4} | T3 = {3, 4, 5} |
| T4 = {4, 5, 6} | T5 = {1, 3, 5} | T6 = {2, 4, 6} |
| T7 = {1, 3, 4} | T8 = {2, 4, 5} | T9 = {3, 4, 6} |
| T10 = {1, 2, 4} | T11 = {2, 3, 5} | T12 = {3, 4, 6} |
- 4 a Explain the Role and effect of damping Factor(teleportation) in page rank computation [10]
 b Calculate the Cosine distance measure for given vectors [10]
 $d_1 = 3\ 2\ 0\ 5\ 0\ 0\ 0\ 2\ 0\ 0$
 $d_2 = 1\ 0\ 0\ 0\ 0\ 0\ 0\ 1\ 0\ 2$
- 5 a Explain Clearly with diagram how the PCY algorithm helps to perform frequent itemset mining for large datasets [10]
 b Give the formal definition of Nearest Neighbor problem, Show how finding plagiarism in a document is nearest Neighbour Problem. What similarity measure can be used [10]
- 6 a Given a Dim Dataset {1,5,8,10,2} Use the agglomerative clustering algorithm with Euclidean distance to establish hierarchical grouping relationship. Draw the dendrogram. [10]
 b Write a note on (Any Two) [10]
 i) HITS
 ii) Distance measurement for Big data
 iii) Multistage Frequent Itemset Mining Algorithm

50am

ET (R-19)

16/12/22

Sem-VII - C-K-Reg.

Duration: 3 Hours

[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 is Software Defined Networking (SDN)?
 - b Explain the Real Time Transport Control Protocol (RTCP) message types.
 - c Describe each field of Secure Shell (SSH) packet format with diagram.
 - d Explain Virtual Private Network in brief with diagram.
 - e Compare OSI and TCP/IP protocol suite.
- 2 a Explain concepts of device provisioning, data collection, migration and configuration management with respect to network automation. [10]
- b What are the steps involved in image compression using JPEG standard. [10]
- 3 a What is a firewall? Explain packet filter and proxy firewall with necessary diagrams. [10]
- b Explain IoT protocol layer diagram with protocols at each layer. [10]
- 4 a Describe each field of Real Time Transport Protocol (RTP) packet header format with diagram? [10]
- b Explain DHCP packet format with diagram. [10]
- 5 a Explain query and response messages in DNS with header format. [10]
- b Explain Differentiated Services (DS) with respect to Quality of Service (QoS). [10]
- Explain DS field, per-hop behavior and traffic conditioner with respect to DS.
- 6 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 Pretty Good Privacy (PGP) protocol with respect to application layer security. [10]