

EXTC
N.B.:

- (1) Question No. 1 is compulsory.
- (2) Attempt any four questions from remaining six questions.
- (3) Use smith chart if necessary
- (4) Figures to the right indicate full marks.

1. (a) Explain the terms conversion loss and Isolation with reference to mixer. 5
- (b) Find S- parameters of two port series network, $Z=500\Omega$ and $Z_0=50\Omega$. 5
- (c) Explain 1-dB compression point. 5
- (d) What are the characteristic of the power amplifier? 5

2. (a) Derive the transducer Power Gain equation as 10

$$G_T = \frac{P_L}{P_{avg}} = \frac{|s_{21}|^2 (1-|\Gamma_s|^2)(1-|\Gamma_L|^2)}{|1-\Gamma_s \Gamma_{in}|^2 |1-s_{22} \Gamma_L|^2}$$



- (b) A BJT has the following S- parameters. Is the transistor unconditionally stable? 10
Draw input and output stability circle?
 $S_{11} = 0.65 \angle -95^\circ$, $S_{21} = 0.5 \angle 115^\circ$, $S_{12} = 0.035 \angle 40^\circ$, $S_{22} = 0.8 \angle -35^\circ$

3. (a) For the two port network ABCD matrix is given by 10

$$\begin{bmatrix} A & B \\ C & D \end{bmatrix} = \begin{bmatrix} 0.5 & j1.6 \\ j1.6 & 0.5 \end{bmatrix}$$

Find scattering matrix if $Z_0 = 100\Omega$. Find condition of reciprocity.

- (b) Discuss various mixer topologies. Compare performance of them. 10

4. (a) Discuss amplifier linearization methods. 10
- (b) Define and explain noise correlation matrix for general noise two port network. 10
What is congruence transformation?

5. (a) Explain broad-band microwave amplifier using balance amplifier design technology. 10

- (b) Compare microwave amplifier with microwave oscillators. 10

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6. (a) Discuss generator tuning networks for microwave oscillators.
(b) A GaAs FET is biased for minimum noise figure and has following S-parameters and noise parameters at 4 GHz ($Z_0 = 100\Omega$). Design an amplifier with noise figure maximum gain compatible with this noise figure. Assume device is unilateral.

$$S = \begin{bmatrix} 0.6 \angle -60^\circ & 0.05 \angle 26^\circ \\ 1.9 \angle 81^\circ & 0.5 \angle -60^\circ \end{bmatrix}$$

$$F_{\text{min}} = 1.6\text{dB}, (\Gamma_{\text{opt}}) = 0.62 \angle 100^\circ, R_n = 20\Omega$$

7. Write short note on (any two):-
(a) Noise figure test equipments
(b) Power distributed amplifiers
(c) Microwave resonators

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SRASWATI EDUCATION SOCIETY, MUMBAI

EXTC

Sub: WM

QP Code : 31771

(3 Hours)

[Total Marks : 80

- N. B. : (1) Question No. 1 is compulsory.
(2) Solve any three from remaining five.
(3) Draw neat sketches wherever required.
(4) Assum suitable data if required.



1. (a) What is HSDPA explain 5
(b) Explain sensor node components with suitable diagram 5
(c) Explain E-UTRAN with suitable diagram 5
(d) What is RFID. Discuss the different components of RFID and explain how communication takes place among the components. 5

2. (a) Using the following data for a GSM 1800 network calculate (1) average busy hour traffic per subscriber, (2) Traffic capacity per BTS (3) required member of base stations per zone (4) The hexagonal cell radius for the zone. 10
Subscriber usage per month = 150 minutes
Days per month = 24
Busy hour per day = 06
Allocated spectrum = 4.8 MHz
Frequency reuse plan = 4/12
RF channel width = 200 KHz (full rate)
Present number of subscribers in the zone = 50,000
Subscriber growth = 5% per year
Area of the zone = 5000 km²
Initial installation based on a four year design
capacity of a base station (transceiver) (BTS) = 30 Erlangs
Traffic capacity of a GSM cell at 2% Gos (using Erlang B table) = 8.2 Erlangs.
(b) List out the factors affecting size of the cellular network and the frequency planning. Discuss these factors in detail. 10

3. (a) Explain Bluetooth security features and security levels with proper diagrams. 10
(b) Explain zigbee network components and network topologies. 10

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FW-Con. 9521-16.



4. (a) Why TCP and UDP protocols are unsuitable for implementation in WSN. List out transport protocols designed for WSN explain any one in detail. 10
- (b) What is the key feature of SMAC explain it in detail justify its use in sensor network. 10
5. (a) Why network management design is critical issue in WSN? Give reasons. 10
- (b) What is localization of WSN nodes. Explain with examples centralized & distributed schemes in localization algorithms. 10
6. Write short notes :- 20
- (a) Middleware Architecture of WSN
- (b) IEEE 802.16 protocol Architecture

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SC

QP Code : 629201

(3 Hours)

Total Marks : 100

- N.B. :
- 1) Question No 1 is compulsory.
 - 2) Attempt any four questions from question No 2 to "
 - 3) Assume suitable Data Wherever necessary and justify the same
 - 4) Draw neat sketches/diagrams wherever Necessary.



1. Answer the following (any four)
 - (a) State and explain Kepler's laws? And show that $a_{GSO} = 42,000$ km. 5
 - (b) What is meant by polarization of satellite signals and why circular polarization is preferred in satellite applications? 5
 - (c) Compare LEO, MEO, GEO satellites? 5
 - (d) Briefly explain sun transit outage? 5
 - (e) What are the differences between GEOSynchronous GEOstationary orbits? 5
2.
 - (a) Discuss design criteria and problems encounter by communication satellite and mention different sub systems of satellite? 10
 - (b) Draw block diagram of transmit received earth station and explain each block? 10
3.
 - (a) What is telemetry, tracking and command sub system? And explain it's working with necessary block diagrams? 10
 - (b) Compare spin stabilization and 3-axis stabilization methods. Mention their advantages and disadvantages? 10
4.
 - (a) Explain different types of double reflector antennas used in satellite communication? 10
 - (b) Explain briefly importance of reliability, qualification and Bath tub curve? 10
5.
 - (a) What are look angles? An earthstation is located at latitude 30° S and longitude 130° E, calculate antenna look angles for satellite at 156° S? 10
 - (b) Discuss different launching mechanism of satellite in GEOstationary orbit with necessary diagrams? 10

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QP Code : 6292

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6. (a) A satellite circuit has the following parameters:

	Uplink, decibels	Downlink, decibels
[EIRP]	54	34
[G/T]	0	17
[FSL]	200	198
[RFL]	2	2
[AA]	0.5	0.5
[AML]	0.5	0.5

Calculate the overall $[C/N_0]$ values.

(b) Why TWT is preferred for satellite communication and multiple carriers operations? Explain 1 dB compression point? And what is the significant of this point in relation to operating point of TWT?

7. Write short notes on any two :-

- Orbital perturbations with equations
- Double conversion Transponders
- SPADE system
- VSAT and GPS

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OFC

EXTC (Rev) Sem VIII.

24/5/2016

May-16

Sub: - OFC

Q.P. Code : 629600



EXTC

(3 Hours)

Total Marks : 100

- N.B. : (1) Question No.1 is compulsory.
(2) Attempt any four questions from remaining six questions.
(3) Assume suitable data wherever necessary, justify the same.
(4) Figures to the right indicate full marks.



1. Answer the following in brief:

- (a) State the spectral band designations used in optical fiber communication. 20
- (b) What do you mean by optical waveguide? How it is different from Electrical waveguide?
- (c) What are direct and indirect semiconductors? Which types are suitable to be used as optical sources and detectors.
- (d) Discuss the possible sources of noise in optical receivers.
2. (a) Draw refractive index profile of a graded index fiber and show with neat diagram transmission of light through this fiber. Explain how graded index fiber has transmission bit rate much higher than multimode step index fiber. 10
- (b) What do you understand by degenerating modes in step index fiber? 5
- (c) What is the difference between coherent and non-coherent optical transmission? 5
3. (a) Explain link power budget what is the significance of rise time budget? 10
- (b) List the important factors responsible for power loss in optical fiber explain each factor in detail. 10
4. (a) Draw and explain structure of APD along with electrical field profile in the various regions. Why it is also called RAPD. 10
- (b) Explain any one fiber fabrication process in detail with a neat diagram. 10

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3. (i) Explain with neat sketches the splicing techniques. List the requirements of a good splice connection.
- (ii) A multimode graded index fiber exhibits total internal reflection. Find out a distance of 1 km. Calculate
- (a) The maximum possible W/V on the fiber.
 - (b) Pulse broadening per unit length.
 - (c) The bandwidth length product of the fibers.
6. (a) What is the basic principle on which optical switches work? Explain in brief operation of LASER.
- (b) Describe the different types of preamplifiers used in optical systems.
7. Write short notes on any four:
- (a) WDM in optical fiber communication.
 - (b) Bending losses.
 - (c) OTDR.
 - (d) Optical Modulators.
 - (e) Double heterojunction LED.

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24/5/2016

Sub: - SCN

Q.P. Code : 729600

EXTC

(3 Hours)

[Total Marks : 80

- N.B. : 1. Question No.1 is compulsory
2. Attempt any three from remaining
3. Assume suitable data if necessary

1. a) Why does a satellite in highly inclined elliptical orbit spend most of its orbital period over higher latitude regions? What are the advantages and disadvantages of highly inclined orbit? 5
- b) Why LAN is placed closed to antenna of out door unit? 5
- c) What are space particles? What is their impact on the satellites? The TWT has a limited life and is considered less reliable than other sub-system. Justify. 5
- d) Differentiate between window and frame organization. 5
2. a) What are the technical constraints which limit the maximum available DC power from a satellite? Draw and explain Centralized and Distributed Power sub-system 10
- b) Explain 10
1) Input back off and Output back off,
2) AM/PM conversion.
3. a) Explain T T & C subsystem. Explain the use of multi-tone frequency in tracking system. 10
- b) What are the different types of lasers used for satellite communication? Explain acquisition link model for optical communication. 10
4. a) With the help of a block diagram describe the working of transmit receive earth station used for telephone traffic. 10
- b) Explain in detail the operation of the Spade system of demand assignment. Explain what is meant by thin route service? Suggest the type of satellite access is most suitable for this service. 10
5. a) A 12 GHz receiver consists of an R.F stage with gain $G_1 = 30$ dB and noise temperature $T_1 = 20$ K, a down converter with gain $G_2 = 10$ dB and noise temperature $T_2 = 360$ K and an IF amplifier stage with gain $G_3 = 15$ dB and noise temperature $T_3 = 1000$ K. Calculate the effective noise temperature and noise figure of the system. Take reference temperature as 290 K. 8



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Note: 1) Question No. 1 is compulsory.
2) Attempt any 04 Questions out of remaining 06 Questions.
3) Figures to the right indicate full marks.

- 1 a. Explain forward link features of CDMA2000. (5)
- b. What is adaptive multirate coding. (5)
- c. List out the services provided by 3G networks. (5)
- d. Give different WLAN topologies. (5)
- 2 a. Explain in detail the components of sensor networks. (10)
- b. Explain different modes of operations of Bluetooth with complete flow diagram showing network connection establishment. (10)
- 3 a. Compare WAP and imode protocol stack. (10)
- b. Explain sensor network protocol stack. (10)
- 4 a. Explain the concept of HSPDA in detail. (10)
- b. Discuss WAP programming model in detail. (10)
- 5 a. Explain Link budget analysis and requirements of wireless networks (10)
- b. Explain LR-WPAN device architecture with suitable diagram. (10)
- 6 a. Explain UMTS network architecture and list important features of UMTS interfaces. (10)
- b. Compare WCDMA and CDMA2000. (5)
- c. Explain the concept of OFDM. (5)
- 7. Write short notes on any TWO: (20)
 - a. WiMAX
 - b. Zigbee
 - c. RFID

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WIEGEC-ENGINEER

MARGAR 29

IVC

EXTC Sem VIII CBGS

30/5/16

May-16

EXTC

Sub: IVC
(3 Hours)

Q.P. Code : 717901

Total Marks : 80

- N.B. : (1) Question No. 1 compulsory.
(2) Attempt any three questions out of remaining five.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if required and mention the same in answer sheet.

1. Solve any four.

- (a) When web pages are sent out, they are prefix by MIME headers, Why?
(b) Discuss the three way handshaking in TCP for connection establishment.
(c) Explain Classless Inter Domain Routing (CIDR)
(d) Explain the use of fragmentation in Internet communication.
(e) Explain any one characteristics of RTP in detail.

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2. (a) Explain the transition states of DHCP with a neat diagram.
(b) Distinguish between OSI model and TCP/IP model.

10

10

3. (a) Explain congestion control mechanism in TCP.
(b) Explain the different error reporting messages in ICMP with message format.

10

10

4. (a) The following is a dump of a TCP header in hexadecimal format.
05320017 00000001 00000000 500207FF 00000000

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- (i) What is the source port number?
(ii) What is the destination port number?
(iii) What is Sequence number?
(iv) What is the acknowledgement number?
(v) What is the length of the header?
(vi) What is the type of the segment?
(vii) What is the window size?



- (b) An ISP is granted a block of addresses starting with 190.100.0.0/16 (65,536 addresses). The ISP needs to distribute these addresses to three groups of customers as follows :

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- (a) The first group has 64 customers; each needs 256 addresses.
(b) The second group has 128 customers ; each needs 128 addresses.
(c) The third group has 128 customers ; each needs 64 addresses.

Design the sub blocks and find out how many addresses are still available after these allocations .

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Q.P. Code : 717901

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5. (a) What is RTP? Where it is used? Discuss different messages used in RTP.
(b) Explain in detail the architecture of H.323.
6. (a) What is the need of digitizing of Audio and Video in Internet communication?
Explain Video Compression (MPEG) in detail.
(b) Explain the resource record format of DNS.



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