BE/EXTC/SEM-VIII (OLD)/ Optical fiber Communication/
MAY-16

Q.P. Code : 629600

(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: **20**
   (a) State the spectral band designations used in optical fiber communication.
   (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**

TURN OVER

5. (a) Explain with neat sketches fiber splicing technique. Enlist the desirable requirements of a good fiber connector. **10**

(b) A multimode graded index fiber exhibits total pulse broadening of 0.1μsec used over a distance of 12km. Calcualte: **10**

(i) The maximum possible B.W.on the link assuming ISI.

(ii) Pulse broadening per unit length.

(iii) The bandwidth length product of the fibers.

6. (a) What is the basic principle on which optical sources work? Explain in brief operation of LASER. **10**

(b) Describe the different types of preamplifiers used in optical receivers. **10**

7. Write short notes on any four: **20**

(a) WDM in optical fiber communication.

(b) Bending losses.

(c) OTDR.

(d) Optical Modulators.

(e) Double heterojunction LED.

Sem-VIII (Old)/ EXTC/ Satellite Communication/ May-2016

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 7.
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 Keiper'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 30^0S 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**

[TURN OVER

6. (a) A satellite circuit has the following parameters: **10**

	Uplink, decilogs	Downlink, decilogs
[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 careers operations? Explain 1 dB compression point? And what is the significant of this point in relation to operating point of TWT? **10**

7. Write short notes on **any two** :- **20**

(a) Orbital perturbations with equations
(b) Double conversion Transponders
(c) SPADE system
(d) VSAT and GPS

E. SEM VIII (OLD) EXTC ADV. MICROWAVE

QP Code:629102

(3 Hours) **[Total Marks :100**

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=500Ω and Z0 =50Ω. **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?
   $S_{11} = 0.65 <- 95^0$, $S_{21} = 0.5 <115^0$, $S_{12} = 0.035 < 40^0$, $S_{22} = 0.8 <-35^0$

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 varies 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**

[Turn Over

6. (a) Discuses generator tuning networks for microwave oscillators. **10**

(b) A GaAs FET is biased for minimum nose figure and has following S- parameters and noise parameters at 4 GHz ($Z_0 = 100\Omega$). Design an amplifier with 2dB noise figure maximum gain compatible with this noise figure. Assume device is unilateral. **10**

$$S = \begin{bmatrix} 0.6 < -60^0 & 0.05 < 26^0 \\ 1.9 < 81^0 & 0.5 < -60^0 \end{bmatrix}$$

$F_{min} = 1.6dB$, $(\Gamma_{opt}) = 0.62 < 100^0$, $R_N = 20\Omega$

7. Write short note on (any **two**):- **20**

(a) Noise figure test equipments

(b) Power distributed amplifiers

(c) Microwave resonators

EXTC/SEM.VIII (OLD)/Wireless Network/MAY-16

QP Code : 629700

(3 Hours) **[Total Marks : 100**

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 toplogies. (5)

2 a. Explain in detail the components of sensor networks. (10)
b. Explain diffferent 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)

5a. Explain Link budget analysis and requirements of wireless networks (10)
b. Explain LR-WPAN device architecture with suitable diagram. (10)

6a. Expalin UMTS network architacture 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