

QP Code : 15860

(3 Hours)

[ Total Marks : 100]

- N.B. :** (1) Questions No.1 is compulsory.  
 (2) Attempt any **four** questions from the remaining six questions.  
 (3) Assume suitable data wherever necessary.

1. (a) Explain three operating windows in optical communication. 5  
 (b) State the difference between the dispersion shifted and dispersion compensated fiber. 5  
 (c) Compare direct band gap and indirect band gap semiconductors. 5  
 (d) Derive expression for responsivity of an intrinsic photo detector in terms of quantum efficiency and wavelength. 5
2. (a) A graded index fiber has a core diameter of  $45 \mu\text{m}$ . Core has a parabolic refractive index profile. The fiber has NA of 0.22 and operating at wavelength of  $1.2 \mu\text{m}$ . Estimate total number of guided mode propagating in the fiber. 10  
 (b) Explain any one fiber fabrication process with neat diagram. Compare the different methods of fabrication.
3. (a) Explain all aspects of link power budget and rise time budget. 10  
 (b) What are the factors that are responsible for optical signal attenuation and dispersion during signal propagation through optical fiber. 10
4. (a) A silica optical fiber with core diameter large enough to be considered by Ray theory has a core refractive index of 1.5 and cladding refractive index 1.47. Determine : 10  
     (i) The critical angle.   (ii) The NA.   (iii) The acceptance angle. 10  
 (b) With the help of device structure explain the working of LED and LASER with the emphasis on spontaneous and stimulated emission. 10
5. (a) Describe the various methods of splicing individual fibers together. Enlist the the desirable requirements of good fiber conductor. 10  
 (b) State the working principle of Raman amplifier and state its applications. 10
6. (a) Explain basic principle of operation of photo detector. Explain the working of PIN diode and APD as photo detector, also compare their performance. 10  
 (b) Draw and explain block diagram of Optical receiver along with various noise sources and relevant equations. 10
7. Write short notes on any four :- 20
  - (a) Optical bandwidth and Electrical bandwidth
  - (b) Coherent and Non coherent optical communication.
  - (c) OTDR.
  - (d) Multiplexing of optical signals.
  - (e) Linearly polarized modes.

(3 Hours)

[ Total Marks :100

- N.B. :** (1) Question no.1 is **compulsory**.  
 (2) Solve any **four** questions out of remaining **six** questions.  
 (3) Use smith chart if necessary.  
 (4) **Figures** to the **right** indicate **full** marks.

1. (a) What is an unilateral figure of merit of an amplifier? 5  
 (b) What are the causes of low frequency noise and high frequency noise associated with the mixer? 5  
 (c) Derive the expression of overall noise figure in three cascaded stages of amplifiers. 5  
 (d) Prove that scattering matrix is symmetrical and reciprocal. 5
  
2. (a) Explain in detail stability criteria for microwave amplifier. 10  
 (b) Explain two methods of broadband amplifier design. 10
  
3. Design an amplifier to have a gain of 10 dB at 6 GHz using a transistor with the following s-parameters ( $Z_0 = 50\Omega$ ) : 20  
 $S_{11} = 0.61 \angle -170^\circ$ ,  $S_{21} = 2.24 \angle 32^\circ$ ,  $S_{12} = 0$ ,  $S_{22} = 0.72 \angle -83^\circ$   
 Plot constant gain circles for  $G_s = 1\text{dB}$  and  $G_L = 2\text{dB}$ . Use matching sections with open-circuited shunt stubs.
  
4. A GaAs FET has the following S parameter and noise parameters at 1GHz ( $Z_0 = 50\Omega$ ) 20  
 $S_{11} = 0.7 \angle -155^\circ$ ,  $S_{12} = 0$ ,  $S_{21} = 5.0 \angle 180^\circ$ ,  $S_{22} = 0.51 \angle -20^\circ$   
 $F_{min} = 3\text{dB}$ ,  $\Gamma_{opt} = 0.45 \angle 180^\circ$ ,  $R_N = 4\Omega$  Design a Low noise amplifier for a noise figure of 3.5dB and power gain of 16dB.
  
5. (a) A MESFET is biased for Large signal class A operation with the following small-signal s-parameters at 5GHz. 10  
 $S_{11} = 0.55 \angle -150^\circ$ ,  $S_{12} = 0.04 \angle 20^\circ$   
 $S_{21} = 3.5 \angle 170^\circ$ ,  $S_{22} = 0.45 \angle 30^\circ$   
 The large signal  $S_{21} = 2.8 \angle 180^\circ$ .  
 Design a Large signal class A amplifier with max. Transducer gain in  $50\Omega$  system.  
 (b) Derive the necessary condition for two port NR oscillator. 10

6. (a) Explain in detail single ended diode mixer. Also explain mixer design aspects. 10
- (b) Design a transistor oscillator at 4GHz using GaAs FET in common gate configuration 10  
with 5nH inductor in series. Common gate configuration s-parameters are  
 $S_{11} = 2.18 \angle -35^\circ$ ,  $S_{21} = 2.75 \angle 96^\circ$   
 $S_{12} = 1.26 \angle 18^\circ$ ,  $S_{22} = 0.52 \angle 155^\circ$   
Select  $\Gamma_T$  so that  $\Gamma_{in} > 1$
7. Write short notes on:— 20
- (i) Noise figure test equipment
  - (ii) Power amplifier linearity
  - (iii) Comparison of microwave amplifier and oscillator.
  - (iv) 1dB compression point.
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QP Code : 15790

(3 Hours)

[Total Marks : 100]

- NB: 1. Question no.1 is compulsory.  
2. Solve any four from remaining.

- Q.1 (a) Justify / Contradict: Quality of picture depends on number of pixels and gray levels that represent the picture. 05  
 (b) What is K-L transform? Why it is called as method of principle components? 05  
 (c) Explain Log transformation and power law transformation. 05  
 (d) Explain following method of data compression indicating clearly whether they are lossy or lossless. Also state the type of redundancy they can minimize : 05  
 (i) Huffman coding  
 (ii) Transform coding  
 (iii) Adaptive Delta Modulation  
 (iv) Differential Pulse code Modulation  
 (v) Run length coding on bit planes.
- Q.2 (a) Explain the method of segmentation of image by region splitting and merging. 10  
 (b) Draw and explain a model of the image degradation/restoration process. 10
- Q.3 (a) State and explain the properties of 2-D Fourier transform. (Any five) 10  
 (b) Explain with block diagram basic steps for filtering in frequency domain. 10
- Q.4 (a) Generate Huffman code for following table in which eight symbol with corresponding probabilities are given: 10
- | Symbol      | A0   | A1    | A2    | A3   | A4   | A5   | A6   | A7   |
|-------------|------|-------|-------|------|------|------|------|------|
| Probability | 0.05 | 0.008 | 0.022 | 0.06 | 0.18 | 0.13 | 0.07 | 0.48 |
- (b) Obtain Hadamard matrix  $H(8)$  from simple second order matrix  $H(2)$  and draw flow diagram for  $H(8)$ . Define frequency and find it for  $H(8)$ . 10
- Q.5 (a) Histogram of a digital image with eight quantization level is shown below. Perform histogram equalization. 10
- | Gray Level        | R     | 0   | 1   | 2  | 3  | 4  | 5   | 6   | 7   |
|-------------------|-------|-----|-----|----|----|----|-----|-----|-----|
| No. of gray level | $h_r$ | 220 | 140 | 50 | 60 | 70 | 170 | 130 | 160 |
- (b) Explain principal techniques to estimate the degradation function for use in image restoration. 10
- Q.6 (a) Explain the following techniques:- 10  
 (i) Arithmetic coding  
 (ii) Bit Plane Coding

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- (b) For the 3-bit 4X4 size image, perform the following operations: 10
- (i) Negation
  - (ii) Thresholding with  $T=4$
  - (iii) Intensity level slicing with background  $r_1=2$  and  $r_2=5$
  - (iv) Bit plane slicing for MSB and LSB planes
  - (v) Clipping with  $r_1=2$  and  $r_2=5$

1	2	3	0
2	4	6	7
5	2	4	3
3	2	6	1

Q.7

Write short notes on: (Any two) :-

- (a) Connectivity of pixels 10
- (b) 2D-DCT computation by row and column passes with 1D-DCT algorithm 10
- (c) Wiener filtering 10

BE EXTC Sem VIII (R)

TNM

26/11/14

**QP Code : 15784**

( 3 Hours )

[ Total Marks : 100

**N.B. :** (1) Question No. 1 compulsory.

(2) Attempt any **four** questions out of remaining **six** questions.

(3) Assume **suitable** data if **necessary** and state it **clearly**.

1. (a) What is TRAP ? Explain the significance of TRAP. 5  
(b) What are the limitations of SNMP v1 ? 5  
(c) Compare between CMIS/CMIP and SNMP. 5  
(d) Describe RMON standard. 5
2. (a) What is ATM remote monitoring ? 10  
(b) Describe ADSL configuration management. 10
3. (a) Describe different network management models and standards. 10  
(b) What are the functional requirements of NMS Design ? 10
4. (a) Describe network management tools related to status, route and traffic monitoring. 10  
(b) Explain with neat diagram SNMP v1 PDU format. 10
5. (a) Compare between SNMP v1, SNMP v2 and SNMP v3. 10  
(b) Describe the capabilities of RMON2 in Enterprise network management. 10
6. (a) Describe the services offered by CMISE. 10  
(b) What is policy based security management in SNMP v3 ? 10
7. Write short notes on (any two) :- 20  
(a) SNMP proxy server  
(b) TMN conceptual model  
(c) Management Information Tree (MIT).

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QP Code : 15787

(3 Hours)

[ Total Marks : 100

- N.B :** (1) Question No. 1 is compulsory.  
 (2) Answer any **four** out of remaining **six** questions  
 (3) **Assume** any suitable data wherever requires.  
 (4) **Figures** to the **right** indicate **marks**.

- |    |      |   |    |
|----|------|---|----|
| 1. | (a)  | Compare microwave integrated circuits with conventional circuits. | 10 |
|    | (b)  | Explain construction principle and applications of PIN diode.     | 10 |
| 2. | (a)  | Explain green's function and discuss their applications.          | 10 |
|    | (b)  | Obtain the dispersion relation for open microstrip.               | 10 |
| 3. | (a)  | Develop wave equation for Coupled lines.                          | 10 |
|    | (b)  | Explain the concept of narrow band coupled line filter.           | 10 |
| 4. | (a)  | Describe a slot line. Explain the waveguide model of analyzing it | 10 |
|    | (b)  | Describe all the steps needed to fabricate microstrip resistance. | 5  |
|    | (c)  | Explain briefly ion implantation technique.                       | 5  |
| 5. | (a)  | Explain various configurations of monolithic capacitors.          | 10 |
|    | (b)  | Discuss the effect of strip thickness on CPW characteristics.     | 10 |
| 6. | (a)  | Give the equivalent circuit and working of Varactor diode         | 10 |
|    | (b)  | Write short notes on :—   | 10 |
|    | (i)  | Directional Coupler   |    |
|    | (ii) | Dielectric resonator  |    |

QP Code : 15781

(3 Hours)

[ Total Marks :100

N.B. : (1) Question Number 1 is **Compulsory**.(2) **Attempt** any **Four** questions from the remaining **Six** questions.(3) Assume **suitable** data wherever **necessary**.

1. (a) Explain what is meant by ascending and descending notes. Would you expect them to change with time? Explain. 5
- (b) Explain what is meant by geostationary orbit. How do the this is differ from geosynchronous. 5
- (c) Explain what is meant by "effective path length" in connection with rain attenuation. 5
- (d) In most satellite TV receivers the first IF band is converted to a second, fixed IF. Why is this second frequency conversion required? 5
- (d) Explain why the low-noise amplifier of a receivers system is laced at the antenna end of the feeder cable. 5
2. (a) Explain what is meant by 'noise factor.' For what source temperature is noise factor defined? The EIRP from a satellite is 49.4dBw. Calculate. 4
- (i) The power density at a ground station for which the range is 40,000 km and 6
- (ii)The power delivered to a matched load at the ground station receiver if the antenna gain is 50 dB. The downlink frequency is 4GHz.
- (b) Explain in detail the operation of the spade system of demand assignment. What is the function of the common signaling channel? 10
3. (a) Define and explain what is meant by frame efficiency in relation to TDMA operation. Explain why the frame period in a TDMA system is normally chosen to be an integral multiplication of 125  $\mu$ ses. 10
- (b) Explain what is meant by polarization interleaving. With the help of block diagram explain indoor receiving unit of a satellite TV/FM receiving. 10
4. (a) Why faraday rotation is no concern with circularly polarized waves? Explain how depolarization is caused by rain and ice and it is taken care in link analysis? 10
- (b) Discuss briefly how perturbations affects the planetary motion. 10
5. (a) Explain briefly the 'off set feed' used with parabeloidal reflector antenna, stating its main advantaages and disadvantages. Explain with neat diagrams the antennas used in satellite communication. 10
- (b) What are issues fased by communication satellite with respective to life time and reliability? What are space particles? What is their impact on the satellite? 10

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6. (a) Discuss the TT&C system of a communication satellite. Explain what is meant by “redundant receiver” in communication satellite. 10
- (b) Define and explain the term 1-dB compression point. What the significance of this point in relation to the operating point of a TWT? Explain why operation near the saturation point of a TWTA is to be avoided when multiple carriers are being amplified. 10
7. Write short note (any four) :— 20
- (a) Different stabilization techniques.
  - (b) VSAT
  - (c) Satellite Radio
  - (d) Earth station Design considerations.
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BE/EXTC/ VIII (REG)  
W.N.

8/12/2014.

QP Code : **16024**

( 3 Hours)

[ Total Marks : 100

- N.B. :** (1) Question No. **I** is **compulsory**.  
(2) **Attempt** any **four** questions from remaining Q. Nos. 2 to 7.  
(3) **Draw** neat sketches wherever required.  
(4) Assume suitable data if required.

1. (a) Discuss two evolution paths for the GSM to offer 3G services. 5  
(b) Discuss briefly HSDPA for WCDMA. 5  
(c) Explain various states in Bluetooth system. 5  
(d) Why is power control used in cdma 2000 and WCDMA? 5
2. (a) What are the channel types that are used in the UMTS? Discuss the role of each channel type. Also discuss the responsibilities of the RNC and node B in UMTS network? 10  
(b) What are technical differences between cdma 2000 and WCDMA? 10
3. (a) Explain the ZigBee technology? Discuss different types of network topology that are supported in ZigBee. 10  
(b) What is WAP? Discuss WAP architecture in brief. 10
4. (a) Explain IEEE 802.11 WLAN standards. Also discuss WLAN applications. 10  
(b) What is RFID? Discuss some of its applications. 10
5. (a) Discuss WiMax. What are the main differences between the IEEE 802.11b (Wi-Fi) and WiMax? 10  
(b) Explain in brief forward and reverse link channels in cdma 2000. 10
6. (a) What is imode? What are the major differences between WAP and imode? 10  
(b) Explain Bluetooth security features and security levels with proper diagrams. 10
7. Write short notes on :— 20  
(a) Link budget analysis  
(b) Wireless sensor network