B.E (EXTC) Sem VII CBGS 1-1/12/15

Microwave & Radar Engg.

Q.P. Code : **6015**

(3 Hours) [Total Marks : 80

N.B. : (1) Question No.1 is **compulsory**.
(2) Solve any **three** questions from the remaining.
(3) Assume suitable **data if necessary**.

1. (a) Design circulator using magic tees. 5
(b) Explain Travelling wave tube as an amplifier. 5
(c) Explain the operation of 2-hole Directional coupler with s-matrix. 5
(d) Explain Doppler shift and its role in pulsed and CW radar. 5

2. (a) The terminating impedance Z_L is $100+j100\Omega$ and the characteristics impedance Z_0 of the line and stub is 50Ω. The first stub is placed at 0.40λ away from the load. The spacing between the two stubs is $3\lambda/8$. Determine the length of the short circuited stubs when the match is achieved. 10
(b) Explain instrument landing system for aircraft navigation. 10

3. (a) Derive the wave equation for a TE wave and obtain all the field components in a circular waveguide. 10
(b) What is the importance of beam coupling coefficient ? Derive the equation of velocity modulation in klystron. 10

4. (a) Explain the significane of RWH model and two valley model in Gunn diode. 10
(b) With a suitable diagram, explain the working on conical scan tracking radar. Explain the various factors that need to be considered in determining the optimum squint angle. 10

5. (a) Draw and explain with block diagram of MTI radar system. What are its limitations. 10
(b) Discuss the power frequency, current frequency and power gain frequency limitations with refrence to a microwave transistor. 10

6. (a) Design two lumped element L section matching network at 500 MHz to transform $Z_L = 200 - j100\Omega$ to a $100\ \Omega$ transmission line. Use Smith Chart. 10
(b) Write a short note one backward wave oscilator. 5
(c) A radar operating at 1.5 GHz uses a peak pulse power of 2.5 MW and have a range of 100 nmi for objects whose radar cross section is $1m^2$. If the minimum receivable power of the receiver is $2x10^{-13}$ Watt. What is the smallest diameter of the antenna reflector could have, assuming it to be a full paraboloid with $\eta=0.65$. 5

MD-Con. 11083-15.

B.E Sem VII (B.G.S 30/11/15

QP Code : 5916

MC (EXTC)

[3 Hours]

Maximum Marks: 80

1.Question no.1 is compulsory.
2.Write any three questions from remaining five questions.
3.Assume suitable data where ever necessary.

Q1

a] Compare 2G, 3G and 4G with respect to speed, applications and bandwidth 05

b] If 36 Mhz total spectrum is allocated for a duplex wireless cellular System and simplex channel has 25Mhz RF bandwidth find Total number of duplex channels, Number of channels per cell if N=4 cell reuse is used. 05

c] Explain concept and importance of power control in CDMA 05

d] Explain fading effects due to Doppler spread 05

Q2.

a] If a signal to interference ratio of 15 dB is required for satisfactory Forward channel performance of a cellular system, what is frequency Reuse factor and cluster size that should be used for maximum capacity if path loss exponent is 1) n=3 and 2) n=4. Assume six first tier co channel cells & mobile unit is at the center of cell. 10

b] Explain principle of Rake receiver in detail. 10

Q3.

a] An urban area has a population of two million residents. Three competing trunked mobile networks (systems A, B and C) provide cellular service in this area. System A has 394 cells with 19 channels each. System B has 98 cells with 57 channels each; and system C has 49 cells each with 100 channels. Find the number of users that can be supported at 2% blocking if each user averages two calls per hour at an average call duration of 3 minutes. Assuming that all three trunked systems are operating at maximum capacity, compute the percentage market penetration of each cellular service provider. Data: GOS = 0.02;

Number Of Channels	Total Traffic Intensity (Erlangs)
57	45
19	12
100	88

10

b] Explain W-CDMA Forward channel structure in detail. 10

Q4.

a) Compare IS-95, WCDMA and CDMA2000 with respect to Channel bandwidth, chip rate, modulation schemes, data rates and frame size. 10

b) Draw LTE network architecture and discuss it in detail 10

Q5

a) What is the concept of software defined radio? Elaborate in detail. 10

b) Explain Hand off in UMTS. 10

Q6. Write a short note on **any two** of the following: 20

1. Multiantenna Techniques
2. Cellular capacity and coverage improvement Techniques
3. Indoor propagation Models

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B.E. (EXTC) CBGS Sem VII Image & Video Process

QP Code : 5875

Instructions:
(1) Question No 1 is Compulsory
(2) Answer any 3 questions from the remaining questions

23-11-2015

20

Q1 Answer any 4

a. Explain RGB and HSI colour models.
b. Quality of picture depends on the number of pixels and grey level that represent the picture. Justify or contradict.
c. What are the different types of order statistics filters? Discuss their advantages.
d. Discuss the classifications of video frames.
e. Explain opening and closing of a digital image.

Q2 a. Write an expression for a two dimensional DCT. Also, find the DCT of the given image. 10

$$\begin{bmatrix} 1 & 2 & 2 & 1 \\ 2 & 1 & 2 & 1 \\ 1 & 2 & 2 & 1 \\ 2 & 1 & 2 & 1 \end{bmatrix}$$

b. Why Fourier transform and the frequency domain tools are so useful for image enhancement? With the help of neat block diagram explain the basic of filtering in the frequency domain. Give the reasons of shifting the origin. 10

Q3 a. Perform histogram Equalization for the following image. Plot the original and the Equalized Histograms 10

Intensity	0	1	2	3	4	5	6	7
No. of pixels	70	100	40	60	10	70	10	40

b. Discuss region based segmentation. 10

Q4 a. What are the required sampling rates for video signals? Explain video sampling in three dimensions. 10
b. Explain HIT or MISS transform using an example. 10

Q5 a. Explain the working of Weiner filter in image restoration. 10
b. Discuss the concept of optical flow for motion estimation. 10

Q6 Write short notes on any two 20
a. KL Transform.
b. Exhaustive block matching algorithms.
c. Hough transform.
d. Point Processing.

B. E. EXTC (VII) (CBGS). 4/12/15

Optical Communication and Networks.

QP Code : 5954

(3 Hours) [Total Marks : 80

N.B. : (1) Question No. 1 is compulsory
(2) Attempt any three questions out of the remaining five questions.
(3) Figures to the right indicate full marks.

1. (a) Differentiate DWDM, WDM and SONET. 5
(b) What is optical safety? 5
(c) Differentiate LED and LASER sources. 5
(d) Compare different types of splicing techniques. 5

2. (a) Draw the block diagram of optical communication and state its advantages and disadvantages. 10
(b) Explain different types of fibers with their refractive index profile and mention its dimensions. 5
(c) A multimode GIF exhibits total pulse broadening of ms over a distance of 15 km. 5
Estimate (i) The maximum possible Bandwidth on the link assuming no |S|
(ii) The pulse dispersion per unit length
(iii) The Bandwidth length product.

3. (a) What is macrobending loss. Explain with neat diagram. Explain how to minimize microbending losses. 10
(b) Explain OTDR with neats sketch and mention its advantages and applications. 5
(c) Derive an Expression for responsivity of PIN photodiode. 5

4. (a) What are optical amplifiers. Explain different types of front end amplifiers. 7
(b) Explain in detail working principle of RAPD. Why it is called reach through APD. and compare its working with PIN diode. 8
(c) Explain SONET architecture in detail. 5

5. (a) Explain working principle of isolator with neat sketch. Also compare isolator and circulator. 10
(b) Write a short note on link power budget. 10

6. (a) Explain OTDM in detail. 10
(b) Explain optical access networks. 10

Course: B.E. (Sem-VII) (REV -2012) (CBSGS) (E. & T.C. Engg.) (Prog-T3127)

QP Code: 5954

Correction:

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given question in question paper is

Q2 (c) A multimode GIF exhibits total pulse broadening of ms over a distance of 15km.

estimate

(i) the maximum possible bandwidth on the link assuming no |S|

(ii) the pulse dispersion per unit length

(iii) the bandwidth length product.

CORRECT QUESTION IS

Q2(c) A multimode GIF exhibits total pulse broadening of **0.1μs** over a distance of 15km.

estimate

(i) the maximum possible bandwidth on the link assuming no **ISI (inter symbol interference)**

(ii) the pulse dispersion per unit length

(iii) the bandwidth length product **for the fiber.**

Query Update time: 04/12/2015 12:10 PM