B.E / EXTC / Sem VII / CBSGS / RTVP / 22/11/17

Q. P. Code: 24459

(Time: 3 hours) [Total Marks: 80]

N.B: 1) Question number 1 is compulsory

1) Attempt any three questions out of the remaining five questions

2) In all four questions to be attempted

3) Figures to the right indicate full marks

Q.1 (a) Justify or Contradict the following Statements (10)

(i) Histogram is a unique representation of an image.

(ii) Quality of an image is decided by its tonal and spatial resolution

(b) Explain in brief: Image Enhancement in frequency domain (05)

(c) Explain effects of (i) Opening (ii) Closing (05)

Q.2 (a) Write applications/advantages of following (10)

(i) Compass operator (ii) Motion Vector (iii) Hough transform

(iv) Bit plane slicing (v) High Boost filtering

(b) Find K. L. transform of following image: $\begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$ (10)

Q. 3 (a) Define edge in an image. Detect edge in the following image using strength (magnitude) and direction of gradient, Use Prewitt operator. (10)

$$\text{Image} = \begin{bmatrix} 0 & 30 & 60 \\ 5 & 32 & 62 \\ 10 & 38 & 64 \end{bmatrix}$$

(b) Explain in detail optical flow equation for motion estimation in video signal. (10)

Q.4 (a) Perform region filling operation to fill the image (A) ,using structuring element (B) (06)

Image A =  Image B = 

(b) State and prove translation property of DFT. (04)

(c) Explain in detail wiener filter .Derive formula for transfer function of wiener filter in frequency domain. What are the advantages of wiener filter over inverse filter? (10)

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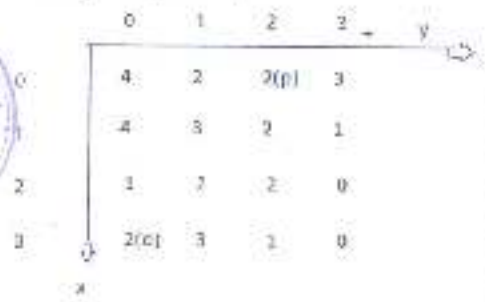
Q. 5 (a) For the following image, Perform: (i) Low Pass Filtering (ii) High pass filtering (iii) Median filtering. Comment on your results. (10)

0	2	1
1	100	2
2	0	1

(b) Write difference between: Image Enhancement and Image Restoration (05)

(c) A 4x4 sub image is shown below. Let V = {2, 4}. Compute D_4, D_8 and D_m distance between point p and q. (05)



Q.6 (a) Explain pixel based method of motion detection technique in video. (08)

b) Segment the following image using split and merge technique. Draw quad tree representation for the segmented image (06)

(c) For the digital image shown below in figure D, perform following operations (06)

10	2	13	7
11	14	6	9
4	7	3	2
0	5	10	7

Figure (D)

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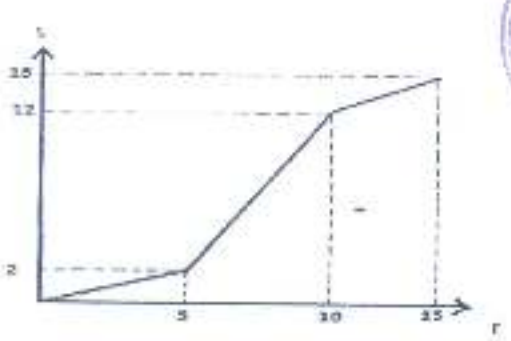

Figure(C)

1) Contrast stretching as per the characteristics given in figure (C).

2) Draw the histogram of original and new image

3) Equalize the histogram

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B.E / EXTC / Sem VII / CBSGS / mc / 28/11/14

Q. P. Code: 25228

Duration-3hrs Marks -80

N.B.

i) Question no.1 is compulsory

ii) Solve any three from the remaining five questions

1	A	How does OFDM provide high data rate?	5
	B	Microcell zone concept helps in improving capacity of a cellular system . Justify.	5
	C	What is software Defined Radio?	5
	D	Differentiate between Rayleigh and Rician distribution.	5
2	A	While designing a cellular system ,how are co-channel and adjacent channel interferences kept under control? What is the role of S/I ratio and Q in this?	10
	B	Draw neatly and explain the role played by various entities in the GSM architecture.	10
3	A	Describe the frequency and channel specifications of forward channels in CDMA1.	10
	B	Explain the Handoff and power control in 3G systems .	10
4	A	Give the main features of WCDMA and how are they different from CDMA 2000.	10
	B	Elaborate on the contribution of MIMO techniques in LTE.	10
5	A	Discuss the frames and slots in LTE. What is a Resource Block?	10
	B	Classify small scale fading based on Multipath Time Delay Spread and Doppler Spread.	10
6		Write notes on:[any two]	20

a)Indoor propagation Models b)RAKE Receiver c) Trunking & GOS

d)GSM authentication & securit

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EXTC / SemVII / CBSGS / OCRN / 05/12/17

Q.P. Code :27410

[Time: Three Hours] [Marks:80]

Please check whether you have got the right question paper.

N.B:
1) Question no. 1 is compulsory.
2) Attempt any three questions from remaining questions.
3) Figures to the right indicate full marks.

1. (a) Define Fresnel Reflection, Numerical Aperture and V-number. 5
   (b) Differentiate APD and PIN code. 5
   (c) Define Splicing. Mention its types and limitations. 5
   (d) Define Four Wave Mixing (FWM). 5

2. (a) Explain OTDR working principle in detail. Mention its limitation. 10
   (b) Discuss different types of Dispersion in optical fiber. 5
   (c) What is DWDM? Mention its advantages and disadvantages. 5

3. (a) Explain in brief any two Fiber Fabrication Techniques. 10
   (b) Explain working principle of LASER source used in optical fiber communication. 5
   (c) Compare Circulator and Isolators. 5

4. (a) Derive an expression for Link Power Budget Analysis of optical fiber. 7
   (b) Explain EDFA amplifier. Mention its advantages. 8
   (c) Explain Macro Bending loss. 5

5. (a) Explain Optical Safety and Cross talk. 10
   (b) Derive an expression for Power Penalty with Impairment. 10

6. Write short note on **any two:** 20
   (a) SONET / SDH
   (b) OTDM
   (c) Optical Access Network
   (d) Wavelength Stabilization

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B.E / Sem VII / EXTC / CBSGS / MERE / 12/12/17

Q. P. Code 26230

(3 Hours) Max Marks: 80

1. Question No. 1 is compulsory.
2. Out of remaining questions, attempt any three questions.
3. Assume suitable additional data if required.
4. Figures in brackets on the right hand side indicate full marks.

1. (A) Explain the working of Directional Couplers. (05)
   (B) Explain travelling wave tube as an amplifier. (05)
   (C) What is meant by RADAR range? (05)
   (D) Explain working of BARITT. (05)

2. (A) With a neat functional diagram explain the working principle of Cylindrical Magnetron. (10)
   (B) Radar operating at 1.5 GHz uses a peak pulse power of 2.5 MW and has a range of 100 nmi for objects whose radar cross section is 1 m^2. If the minimum receivable power of the receiver is 2×10^{-13} Watt, what is the smallest diameter of the antenna reflector could have assuming it to be a full paraboloid with η=0.65. (10)

3. (A) State various modes of Gunn diode and explain any one of them in detail. (10)
   (B) Explain Doppler Shift and its role in pulsed and CW RADAR. (10)

4. (A) Explain instrument landing system for aircraft navigation. (10)
   (B) Match a load impedance Z_L=60-j80 to a 50 Ω line using a double stub tuner. The stubs are open circuited and are spaced λ/8 apart. The match frequency is 2 GHz. (10)

5. (A) Discuss the various frequency bands and characteristics of microwaves. (10)
   (B) Write a short note on rectangular waveguide. (10)

6. (A) Give the working of Two Cavity Klystron. (10)
   (B) With block diagram explain the MTI radar system. Give its limitations. (10)

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Q.P.Code: 26342

Time: 3Hours

Marks: 80

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

1 Solve any four 20

(a) Draw basic current mirror and derive expression for output current I_o in terms of reference current I_{REF}.

(b) For the single stage resistive load CS amplifier as shown in Fig. 1b, V_{DD}=5V, V_{TN}=0.5V, μnC_{ox}=100μA,(W/L)=70 and R_D=1K. Find input voltage swing and corresponding output voltage swing.

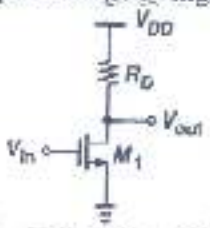

Fig. 1b

(c) For NMOS device with W=100μm, L=0.5μm, gm=10mS, the 1/f noise corner frequency is measured to be 500kHz. If t_{ox}=90A°, what is flicker noise coefficient 'K' in this technology?

(d) What is thermal noise? How to model the same in MOSFET

(e) Discuss various performance parameters of Comparator.

2 (a) Explain design procedure to design 2 stage Operational trans conductance amplifier (OTA) using appropriate equations to meet the specifications like Voltage gain (Av), Gain Bandwidth (GB), Slew Rate (SR), Power Dissipation (P_{diss}), Input Common Mode Range (ICMR), Output Voltage Range. 15

(b) Why frequency compensation is necessary for operational amplifier. Explain Miller's compensation technique with respect to two stage OTA. 5

3 (a) Explain in detail working of switched capacitor Amplifier with neat circuit diagram and appropriate waveforms. 10

(b) Design current mirror load differential amplifier to meet the following specifications small-signal differential voltage gain Av>100V/V, higher cut-off frequency f_{3dB}≥ 150KHz, Slew Rate SR≥10V/μS, C_L=5pF, Input common Mode Range (ICMR = -1.0V to 2.5V), Power Dissipation P_{diss}<2mW, V_{DD}=3.5V, V_{SS}=-3.5V. Use transistors with V_{TN}=0.7V,μnC_{ox}=120μA/V^2,λ_n=0.04V^{-1}, V_{TP}=-0.7V,μpC_{ox}=60μA/V^2,λ_p=0.05V^{-1} 10

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4	(a)	Explain with the help of suitable example why input referred noise modeled by single voltage source in series with input is incomplete representation of noise at the input. How this problem is overcome?	10
	(b)	With the help of suitable block diagram, explain working of Successive Approximate Register (SAR) ADC.	10
5	(a)	With the help of circuit diagram and appropriate waveforms, explain common mode response of differential amplifier.	10
	(b)	Consider 4-bit DAC with following measured output voltage with V_{REF}=5V. Find DNL and INL. Does this DAC provide 4-bit resolution? {0.00:0.3195:0.625:1.0375:1.325:1.5625:1.755:2.1875:2.5:2.8125: 3.125:3.5875:3.75:4.0625:4.495:4.6875}	10
6		Write short notes on any four.	20
	(a)	Comparator Design	
	(b)	Cyclic DAC	
	(c)	Beta Multiplier	
	(d)	Mixed Signal Layout Issues	
	(e)	Representation of noise in circuits	

BE/Extc/VII/CBSGS/PC&E/18/12/17

Q. P. Code: 27401

Time: 3 hours **Marks: 80**

1. Q. 1 is compulsory. Solve any 3 questions from remaining 5.
2. Assume required data where ever necessary with proper justification.

Q.1 (a) What is the significance of modeling and coding in data compression? (20)
(b) What are the goals of cryptography? Explain any one in detail.
(c) List techniques used for lossless image compression.
(d) Solve the following
(i) 4^{-1} mod 55
(ii) 3^{144} mod 13
(iii) 6^{-1} mod 17
(iv) Euler's toteint function $\Phi(49)$

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Q.2 (a) What is 'frequency' and 'temporal' masking? Explain how it is used and implemented in MP3 audio compression. (10)
(b) Explain Diffie Hellman Key exchange with the help of an example. (10)

Q.3 (a)Explain standard JPEG with neat block diagram. What are advantages of JPEG 2000 over standard JPEG? Justify the use of is DCT in JPEG? (10)
(b)Explain RSA in detail and also discuss attacks on RSA. (10)

Q.4 (a)State following theorems with their applications in cryptography (10)
(i) Fermats' Theorem (ii) Euler's Theorem (iii) Chinese Remainder Theorem.
(b) Explain Hash and MAC functions with their role in cryptography. (10)

Q.5 (a) Consider the probabilities p(a)= 0.2 , p(b)=0.3, p(c) =0.1,p(d)=0.4 Encode and decode the sequence 'abcad' using arithmetic coding technique. (10)
(b) What is Motion compensation and Motion Estimation in video compression? Explain how they are used in MPEG video compression with appropriate block diagram. (10)

Q.6 (a)Encode and decode the sequence 'abbacbbabbacc' using LZ78. Compare LZ77 and LZ78. (10)
(b) Write short notes**(Any two)** (10)
(i) μ Law and A Law Companding
(ii)Fire walls
(iii) Intruders and viruses

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