ETRX – Fundamentals of Communication Engg TV

CBGS 04/06/18

Q.P. Code: 27544

[Time: Three Hours] [Marks: 80]

N.B.:
1. Q.1 is compulsory
2. Solve any three questions out of remaining questions.
3. **Figures** to the **right** indicate **full** marks.
4. Draw neat diagrams wherever necessary.

Q.1. Attempt any four: [20]

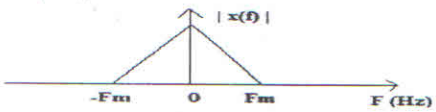
a) What is double spotting? How to avoid it.
b) Derive Friis's transmission formula for tandem connection.
c) What is double spotting? How to avoid it.
d) When a super heterodyne receiver is tuned to 655 kHz, its local oscillation provides the mixer with an input at 1010 kHz. What is the image frequency?
e) Draw & explain the block diagram of communication system.

Q. 2.

a) Explain Indirect Method of FM Generation? [10]
b) Explain the operation of balanced slope detector. Draw its circuit diagram and its response characteristics. [10]

Q. 3.

a) Following Figure shows the magnitude spectrum of modulating signal. Represent the AM Signal in Frequency Domain, if the Carrier Frequency is 1 MHz. [10]



b) A carrier wave $E_c = 5\text{Sin}(2\pi\times500\times10^3t)$ is amplitude modulated by an audio wave $E_m = \text{Sin } 3(2\pi\times500\times t) + 0.1\,\text{Sin}5(2\pi\times500\times t)$. Determine the following:
i. Upper & Lower Sideband Frequency.
ii. Amplitude of USB & LSB.
iii. Draw the Spectrum of AM Wave. [10]

Q.4.

a) Derive the mathematical expression for AM Wave. Draw the envelope of Amplitude Modulated Wave and it Spectrum. [10]
b) Calculate the thermal noise power available from any resistor at a temperature of 390 Kelvin's for a bandwidth of 2 MHz. Calculate the corresponding noise voltage if the resistance is 150 Ohms. [10]

Q. 5.

a) Draw and explain the working of Superheterodyne Radio Receiver. [10]
b) Specify the disadvantage of Linear Delta Modulation. How Adaptive Delta Modulation overcome it. [10]

Q.6. Write short note on following: [20]

a) White Gaussian Noise.
b) Pre-emphasis and De-emphasis.
c) Image Frequency and Fidelity of Radio Receiver.
d) Compare between PAM & PWM Systems.

SE ETRX – Microprocessors & Peripherals sem 4

CBGS

23/05/2018

Q. P. Code: 36259

3 Hours Marks:80

N.B. 1) Question number 1 is compulsory

2)Attempt any three from remaining five questions.

3) Assume suitable data whenever necessary

4)Figure to the right indicates full marks

Q.1 Answer the following questions:

a) Explain the concept of Pipelining in 8086.State the importance of Queue register. 4M

b) WAP to add two 8 bit BCD numbers stored at location 1000H:2000H 4M

c) Explain the significance of following pins: $\overline{TEST}$,LOCK 4M

d) What is meant by Multiprocessor systems? Explain the advantages & disadvantages of Multiprocessor system. 4M

e) Explain the control flags: Direction flag, Trap flag, Interrupt flag. 4M

Q.2.a) Explain in detail Minimum mode of operation of 8086 processor. Also draw Read and Write timing diagrams. 10M

b) WAP to transfer the Block of data (10 bytes) from memory location 0000:C100H to 0000:C200H. 10M

Q.3 a) Explain the block diagram of 8259 Programmable Interrupt Controller in detail. What are different operating modes of 8259 PIC. 10M

b) Design 8086 based system for the following specifications: 10M

i) 8086 operating at 8MHz

ii) 4KB ROM and 8KB RAM

Explain the design and show memory address map

Q.4.a) Draw and explain in detail interfacing of 8086 main processor with 8087 Math Coprocessor. 10M

b) Explain following 8086 instructions using suitable examples 10M

i) XLAT ii) LOOPNE iii) DAA iv)DIV src v) CMPSB

Q.5.a) Interface 8 LEDs with 8255 in Mode 0 and write programs to display 10M

i) ON/OFF LEDs display ii) Running LEDs display

b) Explain different Bus Arbitration techniques in loosely coupled systems. 10M

Also highlight advantages & disadvantages of each.

Q.6 Write Short notes on the following (Any 3): 20M

a) Modes of operation for 8255 PPI

b) Interrupt structure of 8086 microprocessor

c) Need of 8237 DMA and its interfacing with 8086

d)Programming model of 8086

****

S-E. ETRX / EXTC - Applied Mathematics IV - CBGS

17/5/2018

Q. P. Code: 38142

(3 Hours) **[Total Marks: 80]**

N.B. : 1) Question No. **1** is **Compulsory**.

2) Answer **any THREE** questions from Q.2 to Q.6.

3) Figures to the right indicate full marks.

Q.1 (a) Verify Cauchy-Schwartz inequality for u= (2, 1,-3) v= (3, 4,-2). Also find angle between u & v. (5)

(b) If $A = \begin{bmatrix} 2 & 0 & 0 \\ 5 & -1 & 0 \\ 2 & 3 & 3 \end{bmatrix}$ find Eigen values of $A^2 + 6A^{-1} - 3I$. (5)

(c) Evaluate $\int_c \frac{z^3+2z}{(z-1)^2} dz$ when C is $|z| = 2$. (5)

(d) Find the extremals of $\int_{x_1}^{x_2} (x + y')y' dx$. (5)

Q.2 (a) Verify Cayley-Hamilton theorem & hence find A^{-1}, where $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & -1 & 4 \\ 3 & 1 & -1 \end{bmatrix}$. (6)

(b) Find the extremal of $\int_{x_1}^{x_2} (2xy - y''^2)$ dx. (6)

(c) Obtain Laurent's series expansion of $f(z) = \frac{z+2}{(z-3)(z-4)}$ about $z = 0$. (8)

Q.3 (a) Evaluate $\int_0^{1+i} z^2 dz$ along the parabola $x = y^2$. (6)

(b) Show that $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ is derogatory & find its minimal polynomial. (6)

(c) Reduce the following quadratic form into canonical form & hence find it's rank, index, signature &value class (8)

$x^2 + 2y^2 + 3z^2 + 2yz + 2xy - 2zx$.

S-E. ETRX / EXTC - Applied Mathematics IV - CBGS

17/5/2018

Q. P. Code: 38142

(3 Hours) **[Total Marks: 80]**

N.B. : 1) Question No. **1** is **Compulsory**.

2) Answer **any THREE** questions from Q.2 to Q.6.

3) Figures to the right indicate full marks.

Q.1 (a) Verify Cauchy-Schwartz inequality for u= (2, 1,-3) v= (3, 4,-2). Also find angle between u & v. (5)

(b) If $A = \begin{bmatrix} 2 & 0 & 0 \\ 5 & -1 & 0 \\ 2 & 3 & 3 \end{bmatrix}$ find Eigen values of $A^2 + 6A^{-1} - 3I$. (5)

(c) Evaluate $\int_C \frac{z^3+2z}{(z-1)^2} dz$ when C is $|z| = 2$. (5)

(d) Find the extremals of $\int_{x_1}^{x_2} (x + y')y' dx$. (5)

Q.2 (a) Verify Cayley-Hamilton theorem & hence find A^{-1}, where $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & -1 & 4 \\ 3 & 1 & -1 \end{bmatrix}$. (6)

(b) Find the extremal of $\int_{x_1}^{x_2} (2xy - y''^2)\, dx$. (6)

(c) Obtain Laurent's series expansion of $f(z) = \frac{z+2}{(z-3)(z-4)}$ about $z = 0$. (8)

Q.3 (a) Evaluate $\int_0^{1+i} z^2\, dz$ along the parabola $x = y^2$. (6)

(b) Show that $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$ is derogatory & find its minimal polynomial. (6)

(c) Reduce the following quadratic form into canonical form & hence find it's rank, index, signature &value class (8)

$x^2 + 2y^2 + 3z^2 + 2yz + 2xy - 2zx$.

Q.4 (a) Find unit vector orthogonal to both $u = (-6,4,2)$ $v = (3,1,5)$. (6)

(b) Evaluate $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+1)(x^2+4)} dx$. (6)

(c) Show that matrix $A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$ is diagonalizable. Also find its diagonal and transforming matrix. (8)

Q.5 (a) Using Rayleigh-Ritz method find solution for the extremal of the functional $\int_0^1 (2xy + y^2 - (y')^2)\, dx$ given $y(0) = y(1) = 0$. (6)

(b) Find an orthonormal basis for the subspace of IR^3 using Gram-Schmidt process where $s = \{(1,0,0), (3,7,-2), (0,4,1)\}$ (6)

(c) Find the curve C of given length 'l' which encloses a maximum area. (8)

Q.6 (a) If $A = \begin{bmatrix} \pi & \frac{\pi}{4} \\ 0 & \frac{\pi}{2} \end{bmatrix}$ find $cos\, A$. (6)

(b) Check whether the set of all pairs of real numbers of the form $(1, x)$ with operations

$(1, a) + (1, b) = (1, a + b)$ and $k(1, a) = (1, ka)$ is a vector space , where k is real number. (6)

(c) Find the singular value decomposition of $A = \begin{bmatrix} 2 & 3 \\ 0 & 2 \end{bmatrix}$. (8)

****

SE - sem IV (CB GS) Electronics. 11/5/2018

Discrete Electronics Circuits (7)

Q.P. Code :37278

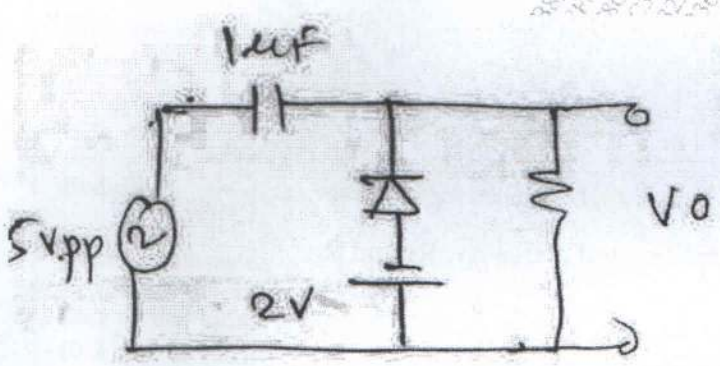
[Time: Three Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B: **1. Q.1 is compulsory.**
2. Solve any three from remaining.
3. Assume suitable data if necessary.

Q.1 Solve any four.

1) Draw i/p and o/p waveform for the following circuit. Identify the circuit. 05



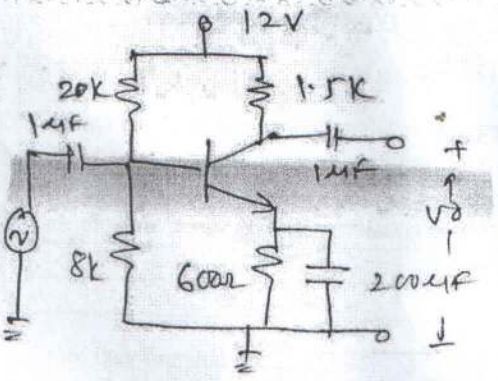
2) Explain need for cascading of amplifiers. 05

3) Derive expression for efficiency of Class A power amplifier. 05

4) Explain advantages of negative feedback. 05

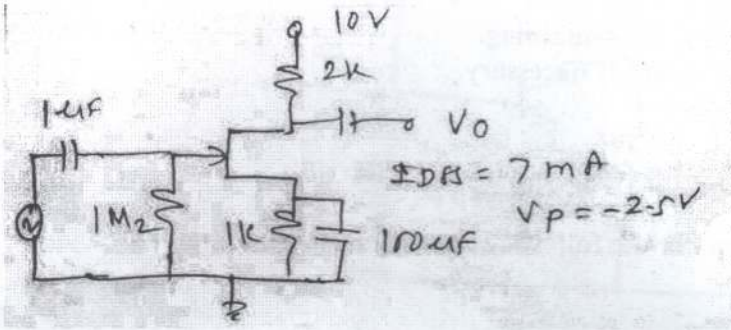
5) Compare CE amplifier with CS amplifier. 05

Q.2 a) For the given Circuit calculate Av, Ri and Ro, f_L. 10



b) Explain working of Wein bridge oscillator. Compare with RC phase shift oscillator.

Q.3 a) For the given circuit plot DC/AC load line, find operating point. 10



b) Draw two stage CS-CS amplifier and derive Av, Ri and Ro. 10

Q.4 a) Draw dual i/p balanced o/p differential amplifier. Explain its working. What is the use of swamping resistor in it? 10

b) Explain working of Class B power amplifiers. What are the techniques to remove cross over distortion? 10

Q.5 a) Draw block diagram of current series negative feedback. Derive necessary equations. 10

b) Draw high frequency model for CE amplifier. Derive expression for f_T. 10

Q.6 Solve any three:- 20

1) Hartley Oscillator working
2) Power BITS and it's use.
3) Cascode amplifier
4) Constant current source in diff amps. (any one)
