SE | E-TRX | CBSGS | AM-IV | May-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)

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S.E SEM IV (Elect.) Rev. 2012. (CBSGS) May 2018.

Discrete Electronics Circuits.

Q.P. Code :37278

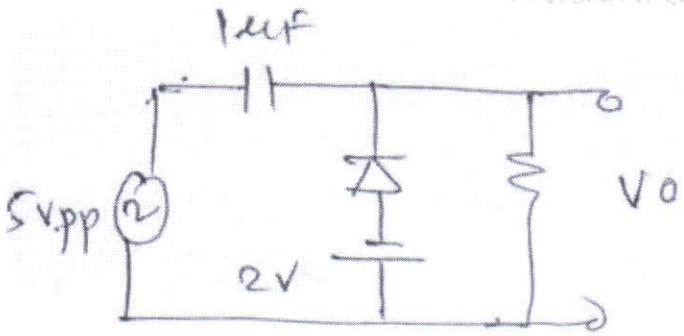
[Time: Three Hours] **[Marks:80]**

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



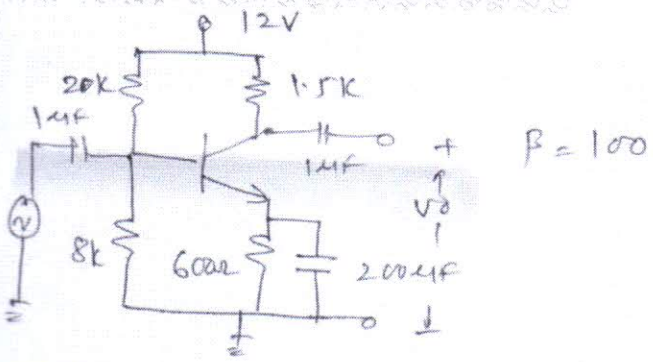
2) Explain need for cascading of amplifiers. 05

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

4) Explain advantages of negative feedback. 05

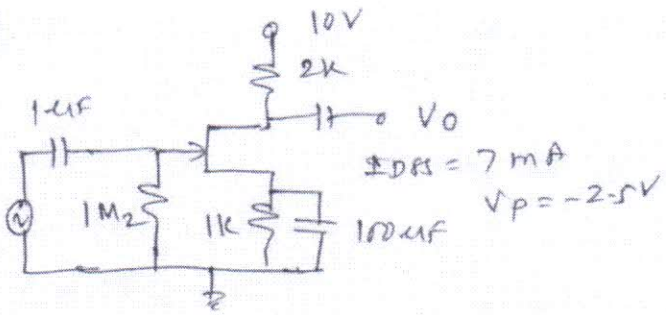
5) Compare CE amplifier with CS amplifier. 05

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 BJTS and it's use.
3) Cascode amplifier
4) Constant current source in diff amps. (any one)

SE/ETRX/Sem-IV (CBSGS)/Microprocessor & Peripheral/
May-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: $\overline{TEST}$,$\overline{LOCK}$ 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

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B.E.(E) Sem IV (CBSGS) R-2012 May 2018.
Prin. of Control Systems.

Q. P. Code: 38196

Time: 3 hours **Marks: 80**

N.B. **(1) Question number 1 is compulsory.**

(2) Attempt any 3 questions from remaining.

(3) Assume suitable data if required.

(4) Figure to the right indicates full marks.

Q1. Attempt any four . **[20]**

a) Explain open loop & closed loop control systems by giving suitable examples & also highlight their merits & demerits.

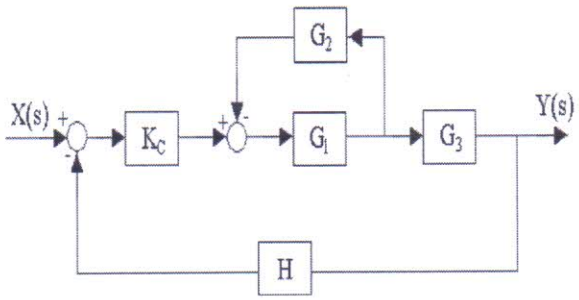
b) What are the properties of state transition matrix?

c) What is a compensator? Why is it required?

d) Explain Mason Gains' Formula with its need.

e) Explain the effect of addition of pole and zero to a system.

Q2. A) Find the transfer function C(s)/R(s) of the following system using block diagram technique. **[10]**



Q2. B) Consider Unity feedback control system with open loop transfer function given as **[10]**

$$G(s) = \frac{k(s+1)(s+2)}{(s+0.1)(s-1)}$$

Plot the Root Locus and find the gain at which system is critically damped.

Q3. A) Write a note on advances in control system. **[10]**

Q3. B) Obtain the state variable model of the transfer function – **[10]**

$$\frac{Y(s)}{R(s)} = \frac{s+3}{s^3+5s^2+8s+4}$$

Q4. A) Check controllability and observability for the system described by [10]

$$\dot{x} = \begin{vmatrix} 0 & 6 & -5 \\ 1 & 0 & 2 \\ 3 & 2 & 4 \end{vmatrix} x + \begin{vmatrix} 0 \\ 1 \\ 2 \end{vmatrix} u$$

$$Y = [1 \quad 2 \quad 3]\, x$$

Q4. B) Determine the stability of the system having characteristic equation [10]

$$S^5+s^4+2s^3+3s+5 = 0$$

Q5. A) Construct the Bode Plot for the following transfer function. Comment on stability. [10]

$$G(s) = \frac{K}{(s+3)(s+5)(s^2+2s+2)}$$

Q5. B) List the performance specifications of Time Response Analysis and derive any four of them. [10]

Q6. Write in short

A) Explain with example Adaptive Control System. [20]

B) Compare PI,PD, PID Controller.

C) Explain the stability of $s^5+2s^4+2s^3+4s^2+4s+8 = 0$ using Routh Method.

D) Draw polar plot for the transfer function given by

$$G(s) = \frac{1}{(1+s)(1+4s)}$$

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S.E.(E) SEM IV (CBSGS) Rev.2012 May 2018.
Fund. of Comm. Engg

Q.P. Code : 50770

(3 Hours) **Total marks: 80**

Note : (i) Question 1 is compulsory and Solve any three from the remaining five questions
(ii) Assume suitable data if necessary.
(iii)Figures to the right indicate full marks

Q.1. Answer any **four questions** from the following: [20]

a Compare AM and FM..

b What is multiplexing? Compare TDM with FDM.

c Discuss the need for Pre emphasis and De emphasis circuits with waveforms.

d With a neat circuit diagram and waveforms , explain the working of envelope detector. What are its merits and demerits?

e Explain the working of TRF Receiver with a neat block diagram. What are its merits and demerits?

Q.2.a Explain the generation and detection of DSB-SC with neat diagrams [10]

b. Bring out the salient features of Vestigial Side Band system(VSB). [04]

c. A sinusoidal carrier has amplitude of 6v and frequency 20 KHz is amplitude [06]
modulated by a sinusoidal voltage of amplitude 3v and frequency 2 KHz. Modulated voltage is developed across a 50Ω resistance. **i)** find the modulation index and Write the equation for modulated wave and d ii) calculate total power and sideband power in the modulated wave **iv)** Draw the two sided spectrum of modulated wave and find its BW.

Q.3.a With the help of a neat circuit diagram, explain the working of Ratio detector. Compare its features with that of Foster Seelay discriminator. [10]

b. Draw the functional block diagram of Super-heterodyne receiver with waveforms at the output of each block. Explain the functions of each block. [10]

Q.4.a With a neat block diagram ,discuss the working of Linear Delta modulation , Bring out its advantages and disadvantages [10]

b. State and Prove Sampling theorem for low pass signals. Draw the spectrum of sampled signal for $fs > 2W$, $fs < 2W$, $fs = 2W$. What is Aliasing error? How can you overcome it? [10]

Q.5.a. Explain the terms with reference to Radio receivers: Selectivity, Sensitivity, Fidelity and Double spotting, AGC [10]

b. Discuss the generation and demodulation of PPM signal. For a sinusoidal modulating signal, draw PPM, and PWM pulses. [10]

Q.6 **Write short notes on any four:** [20]

a) Indirect method of FM wave generation
b) PCM Transmitter and receiver
c) Noise triangle
d) Product demodulator of SSB-SC
e) Companding

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