Code: 9A02503

R09

III B. Tech I Semester (R09) Supplementary Examinations, May 2012

CONTROL SYSTEMS

(Common to EEE, E.Con.E, EIE & ECE)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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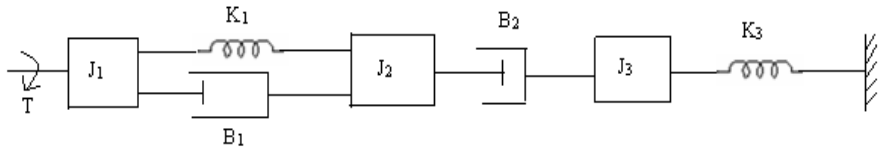
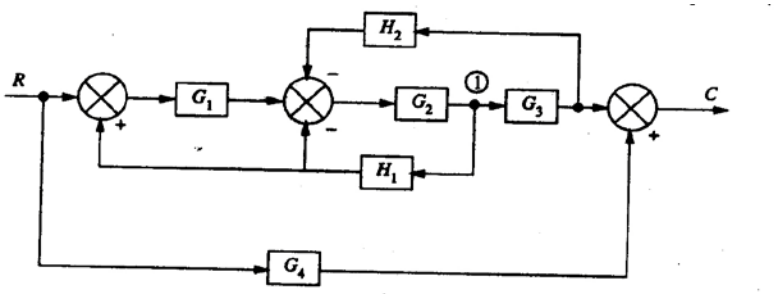
1 Write the differential equations governing the mechanical rotational systems shown in figure. Draw the torque-voltage and torque-current electrical analogous circuits and verify by writing mesh and node equations:



2 Find the transfer function shown in figure using block diagram algebra.



3 (a) Draw the transient response of a second order system and define all the specifications for under damped case?

(b) For a unity feedback control system the open loop transfer function G(s) = 10(s+2)/ s^2(s+1), find the steady state error when the input R(s) = (3/s)-(2/ s^2) + (1/3 s^3).

4 (a) What are the necessary and sufficient conditions to investigate the stability of the system using Routh-Hurwitz criterion?

(b) Factorize the given polynomial using Routh– Hurwitz criterion:
F(s) = s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16=0.

5 (a) Given G(s) = (s-5) / (s+5) Determine the Phase angle at 0, 5 & infinite frequencies.

(b) Draw the Bode phase plot for the system having the following transfer function:
G(s) = 5 (1+2s) / [(1+4s) (1+0.25s)].

6 Sketch the polar plot for following transfer function and from the plot determine the phase margin and gain margin: G(s) = [(1+0.2s) (1+0.025s)] / [s^3 (1+0.005s) (1+0.001s)].

7 Explain the different steps to be followed for the design of a lag compensator using Bode plot.

8 Find the transfer function from the A, B, C matrices of a state model.

$$A=\begin{bmatrix} -2 & 1 & 0 \\ 0 & -3 & 1 \\ -3 & -4 & -5 \end{bmatrix} \quad B=\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \quad C=\begin{bmatrix} 0 & 1 & 0 \end{bmatrix}$$

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Code: 9A04501

R09

III B. Tech I Semester (R09) Supplementary Examinations, May 2012

ANALOG COMMUNICATIONS

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Discuss the fundamental limitations of communication system.
(b) Explain how modulation will reduce noise and interference.

2 (a) Explain the relation between carrier frequency and bandwidth of simplest band pass system.
(b) Derive the expression for transmitted power of AM signal.

3 (a) Describe the generation AMSSB using phase shift method.
(b) A SSB transmitter radiates 5 kW when the modulation percentage is 50%. How much carrier power is required if we want to transmit the same message by an AM transmitter?

4 (a) Give the expression for FM signal and expand the expression in terms of Bessel functions.
(b) Find the carrier and modulating frequencies, the modulation index, and the maximum frequency deviation of the FM wave represented by the voltage equation v = 18 sin ($6 \times 10^8 t$ + 5 cos 1500 t). What power will this FM wave dissipate in a 25 ohm resistor?

5 (a) Discuss the concept of interfering sinusoids.
(b) What is the need for frequency multiplier in FM modulator circuit?

6 (a) Discuss about adjacent channel selectivity of SRF receiver.
(b) Discuss the draw backs of tuned radio frequency receiver.

7 With the help of block diagram, discuss about analog base band transmission system with noise.

8 (a) What is the need for pulse modulation systems?
(b) What sampling rate would be appropriate for a television video channel with a maximum bandwidth of 4 MHz?

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Code: 9A04502

R09

III B. Tech I Semester (R09) Supplementary Examinations, May 2012

LINEAR IC APPLICATIONS

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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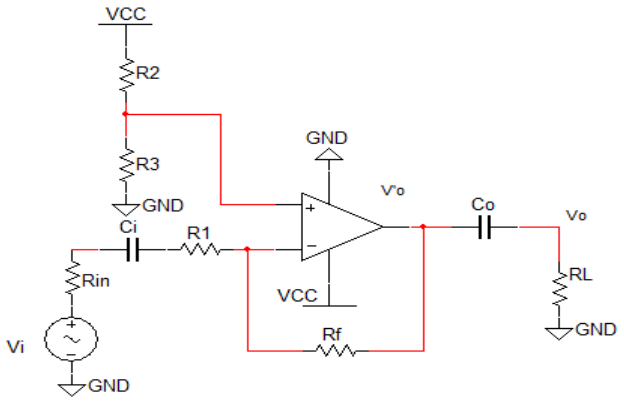
1 (a) Draw the equivalent circuits of emitter coupled differential amplifier from which calculate A_d.
(b) Draw the block diagram of four stage cascaded amplifier. Explain the function of each block.

2 (a) Discuss the electrical characteristics of an OP-AMP in detail.
(b) Discuss the three basic types of linear IC packages and briefly explain the characteristics of each.

3 For the inverting amplifier with a single supply shown below determine:
(a) Band width. (b) Maximum ideal voltage swing.
(c) Sketch output waveforms V_O and V_O if V_{in} = 200 mV peak sine wave at 1 KHz.
If R_1 = 10 KΩ, $R_2 = R_3 = R_f$ = 100 KΩ, $C_i = C_O$ = 0.1 μF.



4 (a) Design a saw tooth wave form generator using OP-AMP and plot the waveforms for the given specifications: frequency: 5 KHz, V_{sat}= ± 15 V. (Assume necessary data).
(b) Explain how an operational amplifier is used as a basic comparator.

5 (a) Find the order of a low pass filter which provider -60 dB attenuation at w/w_0 = 2.
(b) Design a third order Butterworth low pass with upper cutoff frequency 1 KHz.

6 (a) Configure a 555 timer as a Schmitt trigger and explain.
(b) Explain frequency translation and FSK demodulation using 565 PLL.

7 (a) Classify commonly available analog to digital converters.
(b) Describe the operation of successive approximation type analog to digital converter.

8 Derive the output voltage expression for:
(i) Analog voltage multiplier circuit. (ii) Analog voltage divider circuit.

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Code: 9A04503

R9

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2012

ANTENNAS AND WAVE PROPAGATION

(Electronics and Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) Explain the role of antenna apertures and beam area.
(b) Discuss retarded potential-Helmholtz theorem.

2 (a) Find the directivity of a half-wave dipole.
(b) Compare for fields of small loop and short dipole.

3 (a) Derive the null-to null beam width for broad side array.
(b) Discuss the features of binomial arrays.

4 (a) Design a rhombic antenna to operate at a frequency of 30 MHz with the angle of elevation $\Delta = 30^0$ with respect to ground.
(b) Explain the features of Yagi-uda array.

5 (a) List the characteristics of micro-strip antenna.
(b) Explain the functions of paraboloidal reflectors.

6 (a) Write short notes on non-metallic dielectric lenses.
(b) Explain the method of gain measurement by 3-antenna method.

7 (a) Explain Scattering phenomena.
(b) Explain the effect of earth's curvature.

8 (a) Discuss the structure of Ionosphere.
(b) Give the relation between MUF and Skip distance.

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Code: 9A04504

R09

III B. Tech I Semester (R09) Supplementary Examinations, May 2012

DIGITAL IC APPLICATIONS

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) Design a three input NAND gate using diode logic and a transistor inverter. Analyze the circuit with the help of transfer characteristics.
(b) Compare HC, HCT, VHC and VHCT CMOS logic families with the help of output specifications with VCC from 4.5 V to 5.5 V.

2 (a) Draw the circuit diagram of basic CMS gate and explain the operation.
(b) Discuss the steps in VHDL design flow.

3 (a) What is the importance of time dimension in VHDL and explain its function?
(b) Write a VHDL program to generate a clock with off time and on time equal to 10 ns.

4 (a) Using two 74×138 decoders design a 4 to 16 decoder.
(b) Write a data flow style VHDL program for the above design.

5 Explain about combinational multiplier with a neat diagram.

6 Write a structural VHDL program for counting number of ones in a 32 bit number.

7 (a) Design a self correcting 4 bit, 4 state ring counter.
(b) Design a self correcting 4 bit, 8 state ripple counter.

8 Design a 8X4 diode ROM using 74X138 for the following data starting from the first location 1, 4, 9, B, O, F, C.

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Code: 9A05406

R09

III B. Tech I Semester (R09) Supplementary Examinations, May 2012

COMPUTER ORGANIZATION

(Electronics & Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Explain the different performance measures used to represent a computer system's performance.
(b) Describe the double-precision representation in IEEE 754 standard.

2 (a) What is addressing mode? Explain the different addressing mode techniques used by the computer.
(b) Explain the evaluation of arithmetic expressions using reverse polish notation.

3 (a) What are the major design considerations in microinstruction sequencing?
(b) Discuss how microinstructions are arranged in control memory and how they are interpreted.

4 (a) Why should the sign of the remainder after a division be the same as the sign of the dividend?
(b) Design an array multiplier that multiplies two 4 bit numbers by using AND gates and binary adders.

5 (a) Give a short note on RAID.
(b) Explain about virtual memories.

6 Explain about Peripheral devices and components in detail.

7 (a) Write in detail about RISC pipeline vector processing.
(b) Discuss about Instruction pipeline process.

8 (a) Explain the Interprocessor communication.
(b) Write in detail about Interprocessor arbitration.

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