Code: 9A02503

R9

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2013

CONTROL SYSTEMS

(Common to EEE, E.Con.E, EIE, ECE and MCT)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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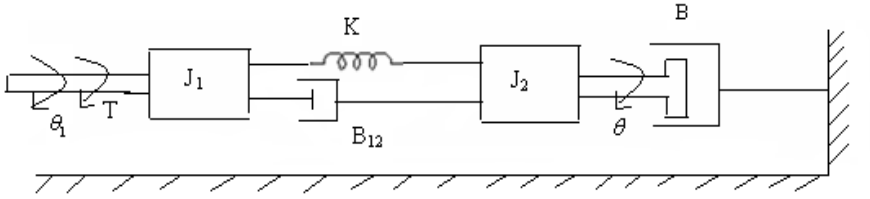
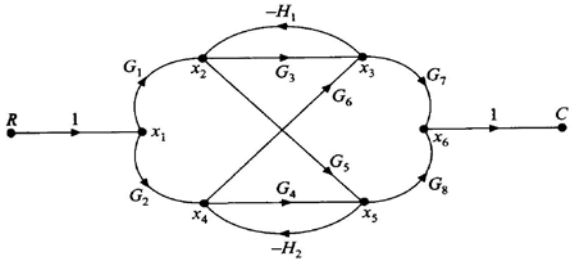
1 (a) Explain the classification of control systems.

(b) Write the differential equations governing the mechanical rotational system shown in the figure.



2 Using mason gain formula find the transfer function $^{C}/_{R}$ for the signal flow graph shown in figure.



3 (a) Explain about various test signals used in the control systems.

(b) For the servomechanism with open loop transfer function given below, what types of input signal gives rise to a constant steady state error and calculate their values.

$G(s) = 10/ [s^2(s + 1) (s + 2)]$.

4 (a) Explain the Routh-Hurwitz criterion to determine the stability of the system.

(b) Examine the characteristic equation $s^4 + 2s^3 + s^2 + 4s + 2 = 0$ for stability.

5 (a) Explain the procedure to determine the transfer function from Bode plots.

(b) Draw the Bode phase plot for the system having the following transfer function:

$G(s) = 20/[s(1 + 3s)(1 + 4s)]$

6 With the help of Nyquist plot assess the stability of the system $G(s) = 3/s(s + 1) (s + 2)$. What happens to the stability if the numerator of the function is changed from 3 to 30?

7 The open loop transfer function of a certain unity feedback control system is given by $G(s) = K/s(s + 4) (s + 80)$. It is desired to have the velocity error constant, $K_v = 30$ sec^{-1} and the phase margin to be at least 33^0. Design a phase lag series compensator.

8 (a) Obtain state variable representation of a field controlled D.C motor.

(b) Find the state transition matrix for a given system matrix. $A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$

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Code: 9A04501

R9

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2013

ANALOG COMMUNICATIONS

(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) What are the benefits of modulation? Explain in detail.

(b) Explain different coding methods used in communication.

2 (a) What is a band pass signal and how it is relevant to communication system.

(b) The antenna current of an AM broad cast transmitter, modulated to a depth of 40 percent by an audio sine wave, is 11 A. It increases to 12 A as result of simultaneous modulation by another audio sine wave. What is the modulation index due to this second sine wave?

3 (a) Describe the demodulation of AM SSB signal using filter method.

(b) A 400 W carrier is amplitude modulated to a depth of 100%. Calculate the total power in case of SSB technique. How much power saving is achieved for SSB compared to AM and DSBSC?

4 (a) Derive the mathematical equation for PM, if carrier and modulating signals are of sinusoidal.

(b) Certain FM system is having maximum frequency deviation of 75 KHz and modulating frequencies are cover from 100 Hz to 15 KHz. Find modulation index and bandwidth.

5 Draw the block diagram of phase shift discriminator and explain the functionality of each block.

6 (a) Discuss about self excited mixer.

(b) In a broadcast super heterodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit is 150. If the Intermediate frequency is 455 KHz, calculate:

(i) The image frequency and its rejection ratio at 0.1 MHz.

(ii) The image frequency and its rejection ratio at 25 MHz.

7 (a) Discuss about different sources of noise.

(b) Explain about threshold effect in FM.

8 Draw the block diagram and TDM-PAM signal and explain about it.

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Code: 9A04502 **R9**

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2013

LINEAR IC APPLICATIONS

(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) Draw the circuit diagram of level translator. Explain the operation with suitable examples.
(b) Explain how the voltage gain of a differential amplifier be increased without the increase of very high voltage collector resistors with necessary circuits.

2 (a) State the two types of integrated circuits classified according to their mode of operation and briefly explain the significance of each.
(b) Derive the expression for CMRR for the first stage differential amplifier.

3 (a) What are the advantages of instrumentation amplifier? Derive an expression for the transfer function of an instrumentation amplifier.
(b) For the non - inverting AC amplifier R_{in} = 50 Ω, C_i = 0.1μF, R_1 = 1 KΩ, R_O = R_3 = 820 Ω, R_F = 5.6 KΩ and R_1 = 10 KΩ. Determine the gain and band width of the amplifier.

4 (a) Explain half wave rectifier using inverting and non-inverting configuration.
(b) Explain the principle of operation of Saw-tooth waveform generator with suitable circuit.

5 (a) Explain the operation of first order high pass buffer worth filter.
(b) Design a HPF at the cutoff frequency of 1 KHz and a pass band gain of 2.

6 (a) Explain the significance of each of comparators and operation of 555 timers.
(b) Explain the application of 555 timers as linear ramp generator.

7 (a) Explain the operation of a counter type analog to digital converter.
(b) Mention the drawbacks of counter type analog to digital converter and indicate the ways to overcome these drawbacks.

8 (a) What are the basic blocks of analog multiplexer? Explain how the data selection process in performed in it.
(b) Draw a sample and hold circuit and explain its operation with necessary input and output waveforms and indicate its uses.

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Code: 9A04503 **R9**

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2013

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) Define the terms:
(i) Beam width. (ii) Side lobe level. (iii) Polarization. (iv) Effective aperture area.
(b) What is the effective length of an antenna? Determine the effective length of a half wave dipole antenna.

2 (a) Define and explain the terms antennas gain, effective aperture, radiation intensity and effective length in case of a $\frac{\lambda}{2}$ dipole.
(b) Derive an expression for the terminal impedance as a function of frequency and hence define its bandwidth.

3 (a) Compute the principle bean width for broad side and end fire array.
(b) Explain the principle bean width for broad side and end fire array.

4 (a) Describe the construction and properties of rhombic antenna.
(b) Derive electric field expression for non resonant antenna.

5 (a) Describe the case grain feed mechanism of a parabolic reflectors.
(b) What are the different advantages and disadvantages of loop directional antenna?

6 (a) Explain the basic principles of operation in lens antennas. Hence distinguish between the different types of lens antennas used in practice.
(b) Calculate the minimum distance required to measure the field pattern of an antenna of diameter 2 m at a frequency of 3 GHz derive the necessary equation.

7 (a) Show that MUF of ionized layer is given by FCP1 + (D/2h) 2 for flat earth.
(b) Discuss the following:
(i) Ionospheric storms.
(ii) Sudden Ionospheric disturbances.

8 (a) What is signal fading? List the various types of fading and explain.
(b) Discuss the atmospheric effects in space wave propagation.

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Code: 9A04504

R9

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2013

DIGITAL IC APPLICATIONS

(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 effect of floating inputs on CMOS gate.
(b) Explain how a CMOS device is destroyed.
(c) What is the difference between transmission time and propagation delay? Explain these two parameters with reference to CMOS logic.

2 (a) Compare CMOS, TTL and ECL with reference to logic levels, DC noise margin, propagation delay and fan-out.
(b) Draw the circuit diagram of basic CMS gate and explain the operation.

3 (a) Explain with an example the syntax and the function of the following VHDL statements:
(i) Process statement. (ii) Case statement.
(b) Explain implicit and explicit visibility of a library in VHDL.

4 (a) Write the data flow style VHDL program for this IC.
(b) Write a process based VHDL program for the prime-number detector of 4-bit input and explain the flow using logic circuit.

5 Draw the logic diagram of 74X283 and explain its operation and write a VHDL code in data flow model.

6 Draw the logic diagram of 74X283 and explain its operation and write a VHDL code in data flow model.

7 (a) Design a conversion circuit to convert a SR flip-flop to JK flip flop.
(b) Write a VHDL code for a SR flip-flop in behavioral model.

8 Determine the ROM size needed to realize the combinational logic function performed by each of the following MSI parts 74X49, 74X139, 74X153, 74X257, 74X381, 74X682.

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Code: 9A05406 **R9**

B.Tech III Year I Semester (R09) Supplementary Examinations, May 2013

COMPUTER ORGANIZATION

(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 block diagram of a computer with functional units.
(b) Write a brief note on exceptions.

2 (a) What are register transfer languages?
(b) Draw and explain the bus structure for the data transfer between various registers and the common bus.

3 (a) What is a pipeline register? What is the use of it? Explain in detail.
(b) Why do we need subroutine register in a control unit? Explain.

4 (a) Explain the flow chart for add and subtract operations.
(b) Perform the following arithmetic operations by using 2's complement representation:
(i) (+35) + (+40)
(ii) (-35) + (-40)
(iii) (-35) - (-40)

5 Explain in detail the different mapping procedures in the organization of cache memory with necessary diagram.

6 (a) Explain the operation of RS 232 protocol with neat sketch.
(b) Describe input-output processor serial communication.

7 Draw the flow chart for point addition and subtraction for pipeline operations. Explain with an example.

8 Define multiprocessing. What are the software implementation issues?

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