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Total No. of Pa

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engg.) (Sem.–5)

CONTROL SYSTEMS

Subject Code : BTEC-504-18

M.Code : 78300

Date of Examination : 20-06-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a. Define linear control system.

b. State Mason's Gain formulae

c. What is meant by relative Stability of a control system?

d. Define rise time for a second order control system

e. Define Nyquist stability criteria

f. What is gain margin?

g. List the standard test signals used in control system.

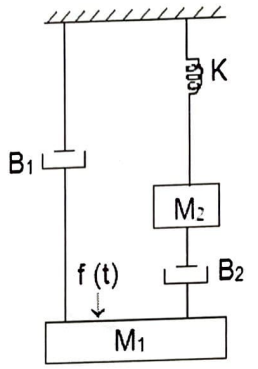
h. Define bandwidth

i. Define Servomechanism

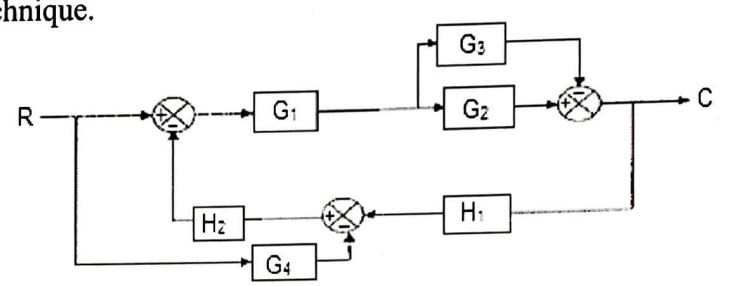
j. Define non-linear control system.

SECTION-B

2. Draw the force-voltage analogy and force current analogy for the mechanical system shown in figure.



3. Develop the transfer function for the block diagram shown in fig. using block diagram reduction technique.



4. Explain the co-relationship between time and frequency response for second order systems.

5. What are the steps to apply Routh criterion? Solve using Routh Hurwitz criterion $s^6+2s^5+8s^4+12s^3+20s^2+16s+16=0$

6. **Differentiate:** AC and DC tacho generators.

SECTION-C

7. For the unity feedback control system $G(s) = \frac{1}{(s+1)(1+2s)}$. Sketch the Bode plot. Determine the gain and phase margin

8. Sketch the root locus for a unity feedback control system has an open-loop transfer function

$$G(s) = \frac{K(s+9)}{s(s^2+4s+11)}$$

9. Distinguish between transfer function and state space representation of linear time invariant system and hence define the state transition matrix with its importance in system study.

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Total No. of Questions : 09

Total No. of Pages : 02

B.Tech. (ECE) (Sem.–5)

LINEAR INTEGRATED CIRCUITS

Subject Code : BTEC-503-18

M.Code : 78299

Date of Exaination : 18-06-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) Draw the circuit diagram of an op-amp with differentiator.

b) What is an Opto-coupler?

c) What is an Antilog Amplifier?

d) The output voltage of an op-amp changes by 25 V in 5 μ Calculate its slew rate.

e) A differential amplifier has a differential voltage gain of 2000 and common mode gain of 0.2. Determine CMRR in dB.

f) Why integrators are preferred over differentiators?

g) What is a Summing Amplifier? Draw its circuit diagram.

h) Define the lock-in range and capture range of a PLL.

i) Define the first order low pass filter. What does the order of a filter signify?

j) What is need for frequency compensation in practical op-amps?

SECTION-B

2. Draw the pin diagram of IC-741 and discuss the function of each pin.

3. Derive the differential input resistance of a simple differential amplifier. Show that the voltage gain equation for the differential amplifier is independent of emitter resistance.

4. Draw the circuit diagram of Logarithmic Amplifier using diodes and obtain an expression for the output voltage.

5. Design a high pass filter with a cut off frequency of 10KHz with a passband gain of 1.5. Also calculate the frequency response for the designed filter.

6. How does negative feedback affect the performance of an inverting amplifier?

SECTION-C

7. Discuss the working of Phase Shift Oscillator along-with its applications and limitations.

8. a) Discuss about the working of Schmitt trigger.

   b) Discuss briefly on the differential mode Instrumentation amplifier.

9. Design a square wave generator using 555 timer for a frequency of 120Hz and 60% duty cycle. Assume C=0.2μF.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Electronics & Communication Engineering) (Sem.–5)

DIGITAL SIGNAL PROCESSING

Subject Code : BTEC-502-18

M.Code :78298

Date of Examination : 14-06-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

(a) Define orthogonal signals.

(b) Write sampling theorem.

(c) How can you define fundamental period?

(d) Define fast fourier transform.

(e) Determine DFT of finite length sinusoidal sequence.

(f) What do you mean by impulse response?

(g) Define limit cycles.

(h) Differentiate between cascaded and parallel forms.

(i) Explain multirate systems.

(j) Define up-sampler.

SECTION-B

2. Explain various properties of z-Transform. 60

3. Write steps to find the pole location of Goertzel filter for calculation of fourth DFT coefficient.

4. Draw and explain direct form realization of IIR system.

5. What is the effect of finite register length in FIR filter design?

6. What are the limitations of analog signal processing? Also, explain advantages of DSP.

SECTION-C

7. Explain the architecture of ADSP. Also, discuss the concept of multirate signal processing.

8. Generate a 4×4 basis matrix M for DFT computation and show that it is orthogonal.

9. Design IIR digital filter using Butterworth method.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (Sem.–5)

PROGRAMMING IN JAVA

Subject Code : BTEC/905D/18

M.Code : 78710

Date of Examination : 24-05-2024

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
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3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) How does the JVM handle Java bytecode?

b) What is a wrapper in Java?

c) What is the difference between the == operator and the equals ()method?

d) Name the three main types of loops in Java.

e) Describe the effect of the return statement within a method.

f) How does an interface differ from a class?

g) What is an exception in Java?

h) What is AWT in Java?

i) What is a JFrame in Swing?

j) What is BeanBox in Java?

SECTION-B

2. Illustrate with examples how jump statements can alter the flow of control in nested loops and switch cases?

3. Analyze the lifecycle of a Java object from creation to garbage collection, highlighting the role of constructors and finalizers.

4. What is CORBA & RMI in Java?

5. Write a Java program that handles an array index out-of-bounds exception.

6. Write a Java program to copy the contents of one text file to another. The program should prompt the user to enter the names of the input and output files.

SECTION-C

7. Explain the Life Cycle of a Thread in detail.

8. Explain the classes and interfaces in the java.io package that are used for reading and writing files, discussing their key methods and usage.

9. Explain various control statements available in Java with examples.

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