Bachelor of Engineering
Fourth Semester Main Examination, June-2021
Signals & Systems [EC225T]
Branch- EC

Time: 3:00 Hrs   **Max Marks 70**

Note : Attempt any five questions. All question carry equal marks.

Q.1   (a) Signal sampling and quantization?
            (b)Define signal and classification of signals?

Q.2   (a) Write difference between continuous and discrete time?
            (b) Signal Explain signal operations and properties?

Q.3   (a) What is impulse response of two LTI systems connected in parallel?
            (b) Find convolution of 2 finite duration sequences,
            h(n) = anu(n) for all n and x(n) = bnu(n) for all n
            (i)When a=b
            (ii) When a$\neq$ b
            (iii)Explain basic properties Linearity, Stability and causality?
            (iv) Find the Z-transform of the function and indicate the ROC:
            X (n) = n (n+1)and(n)

Q.4   (a) Derive the relation between Z-transform and Fourier transform?
            (b) State and prove differentiation in Z-domain property of Z-transforms?

Q.5   (a) Explain the properties of ROC?
            (b) Explain recursive and non-recursive discrete time system

Q.6   (a) Determine the DTFS coefficients of,
$$x(n) - 1 + \sin\left\{\frac{1}{12}\pi n + \frac{3\pi}{8}\right\}$$
            (b) Find the DTFT of the signal x(n) given by $x(n) = u(n) - u(n - N)$; where
            N is any positive integer. Determine the magnitude phase components for N=3.

Q.7   (a) Explain properties of convolution summation?
            (b) Explain continuous and discrete time LTI?

Bachelor of Engineering
Fourth Semester Main Examination, June-2021
Integrated Circuits and its Applications [EC226T]
Branch-EC

Time: 3:00 Hrs   **Max Marks 70**

Note: **Attempt any five questions. All questions carry equal marks.**

Q.1   (a) What are the Advantage and Disadvantage of negative feedback?
        (b) Explain advantages and characteristics parameter of ICs?

Q.2   (a) What are Barkhausen criteria? Explain how oscillations start in an oscillator?
        (b) Explain crystal oscillator with suitable diagram?

Q.3   (a) Draw the block diagram of op-amp and write the function of each block?
        (b) Explain differential amplifier?

Q.4   (a) Explain characteristics of op-amp?
        (b) Draw and explain zero crossing detector with input and output waveform?

Q.5   (a) Write a short note on comparator?
        (b) Discuss Zero crossing detector with suitable diagram?

Q.6   (a) Design a low pass filter with a cut off frequency of 1 kHz and with a pass band gain of 2?
        (b) Draw the circuit of a first order Butterworth low pas filter and derive its transfer function?

Q.7   (a) Write a short note on Notch filter?
        (b) Write down the all pass filter and self-tuned filter?

Q.8   Define following (a) CMRR   (b) PSRR   (c) PLL

Bachelor of Engineering
Forth Semester Main Examination, June-2021
Communication Systems [EC227T]
Branch-EC

Time: 3:00 Hrs   **Max Marks 70**

Note: **(i) Attempt any five questions. All questions carry equal marks.**

         (ii) Answer should be precise & to be point only.

         (iii) Assume suitable data if necessary & state them clearly

Q.1   (a) Explain properties of Impulse function?

         (b) Find the Fourier transforms of the following functions and sketches them

         (a)sgn(t)   (b) $\text{rect}(\frac{t}{T})$

Q.2   (a) State and prove time shifting property and frequency shifting property of Fourier transform?

         (b) Explain generation method of A.M using square law modulator with the help of suitable diagram?

Q.3   (a) With the help of circuit diagram, explain the working of balanced modulator for DSB-SC generation?

         (b) Explain the synchronous detection method of DSB-SC signals?

Q.4   (a) Write a short on VSB modulation and demodulation?

         (b) Explain the function of super heterodyne receiver. Write down its advantages and disadvantages?

Q.5   (a) What is tunnel radio receiver?

         (b). Explain noise in Amplitude modulation?

Q.6   (a) What do you understand by angle modulation? Explain the types of angle modulation?

         (b) Explain block diagram of FM transmitter and receiver?

Q.7   (a) Explain narrow band FM and wide band FM?

         (b) Write short on AGC? Draw the block diagram of broadcast receiver using AGC?

Q.8   (a) Explain classification of noise in FM signals?
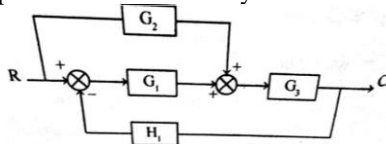
         (b)Explain effect of noise in FM and AM receiver?

Bachelor of Engineering
Fourth Semester Main Examination, June-2021
Control System [EC228T]
Branch- EC

Time: 3:00 Hrs   **Max Marks 70**

Note: **1. Attempt any five questions out of eight.**
  2. All question carry equal marks.
  3. Answer should be precise & to be point only.
  4. Assume suitable data if necessary & state them clearly.

Q.1 (a) What do you mean by takeoff point in block diagram representation?
(b) What do you understand by modeling of electrical system? Explain force-voltage analogy with electrical circuit?

Q.2 (a) Compare positive and negative feedback?
(b) What is regenerative feedback?

Q.3 (a) Compare transient and steady state responses?
(b).Explain and drive mathematical equations for time responses of a II order control system subjected to impulse input function?

Q. 4 (a) Write down the guidelines for sketching root locus.
(b).Find out the conditions for the systems whose characteristics equation give below. The case where stability is suggested for real values of K. determine the values of K which will cause sustained oscillations. Find the frequency of oscillations.
$S^4 + 20S^3 + 224S^2 + 1240S + 2400 + K = 0$

Q. 5 (a) What is the correlation between transient response and frequency response?
(b) List the application of bode plots?

Q.6 (a) Write down the relation between state equation and transfer function?
(b)What is compensation? Discuss various types of compensators.

Q.7 (a) Find closed loop transfer function of system shown in figure

(b) The open loop transfer function of a unity feedback control system is given as:

$G(s) = \dfrac{10Ke^{-ST}}{s(s+1)(s+7)}$ for K=1, determine T such that the system is marginally stable?

Q.8   (a) Check the observability of the below given system?
       X2 = x2 , x2 = -2x1-3x2+4 and y = x1+x2
       (b) What do you mean by state space representation ?

Bachelor of Engineering
Fourth Semester Main Examination, June-2021
Material Science [ES220T]
Branch: EC

Time: 3:00 Hrs   **Max Marks 70**

Note: 1. Attempt any five questions out of eight.
            2. All question carry equal marks.

Q.1   (a) Write a short note on orbital magnetic dipole movement and angular momentum of simple atomic model.
      (b) What do you mean by dipolar relaxation?

Q.2   (a) Explain Bragg's Law in details.
      (b) Write short note on :(i) Bravais lattice (ii)Composite material.

Q.3   (a) What is Curie-Weiss law? Also explain spontaneous magnetization
      (b) Explain spin magnetic moment in details.

Q.4   (a) Explain magnetic resonance in details.
      (b) What do you mean by atomic structure? Also explain molecules and general bonding principles

Q.5   (a) Explain atomic interpretation of Ohm's law of conductor.
      (b) Explain high conductivity and high resistivity material.

Q.6   (a) Explain conductors and also write properties of superconductor.
      (b) Write short note on Linde's rule and Joule's rule.

Q.7   (a) Explain optical fibers and fiber materials?
      (b) Write short note on Solar cell and Fuel cell?

Q.8   Write short note on following: i) carbon dioxide laser ii) Nd-YAG laser

Bachelor of Engineering
Fourth Semester Main Examination, June-2021
Material Science [ES220T]
Branch: EE/EC

<u>**Time: 3:00 Hrs**</u>   **Max Marks 70**

Note : 1. Attempt any five questions out of eight.
         2. All question carry equal marks.

Q.1   (a) What do you mean by dipolar relaxation?
        (b) Explain magnetic resonance in details.

Q.2   (a) Explain Bragg's Law in details.
        (b) Write short note on Linde's rule and Joule's rule.

Q.3   (a) What do you mean by atomic structure? Also explain molecules
        and general bonding principles.
        (b) Explain spin magnetic moment in details.

Q.4   (a) Write a short note on orbital magnetic dipole movement and
        angular momentum of simple atomic model.
        (b) What is Curie-Weiss law? also explain spontaneous magnetization.

Q.5   (a) Explain high conductivity and high resistivity material.
        (b) Explain atomic interpretation of Ohm's law of conductor

Q.6   (a) Explain n-type and p-type semiconductor in details.
        (b) What do you mean by semiconductors? Explain chemical bonds in
        Ge and Si.

Q.7   (a) What is photoconductivity and photo electronic cells?
        (b) Explain conductors and also Write properties of superconductor.

Q.8   Write short note on :
        (i) Bravais lattice   (ii) Composite material.

Bachelor of Engineering
Fourth Semester Main Examination, June-2021
System Engineering [ES221T]
Branch-CS/EX/EC/IT/ME

Time: 3:00 Hrs   **Max Marks 70**

Note: **(i) Attempt any five questions out of eight.**

(ii) All question carry equal marks.

Q.1 (a) Discuss origin of system Engineering.

(b) Explain system engineering fields.

Q.2 (a) Discuss structure of complex systems.

(b) Explain system environment, interfaces.

Q.3 (a) Discuss complexity of modem systems.

(b) Explain concept development and exploration.

Q.4 (a) Discuss system operational requirements.

(b) Explain Implementation of concept exploration.

Q.5 (a) Discuss reducing program risk.

(b) Explain functional analysis and design.

Q.6 (a) Explain prototype development as a risk mitigation technique.

(b) Explain test planning and preparation.

Q.7 (a) Explain operational test and evaluation.

(b) Write short notes on any two:
   (i)   Production operations
   (ii) System engineering approaches
   (iii) Integrating testing

Q.8 (a) Explain the concept of modeling systems.

(b) Explain the system life cycle phase and the product development life cycle phases.