# SILIGURI INSTITUTE OF TECHNOLOGY
## Department of ECE
### Internal Examination (CA-3)-2022
Subject: WSN  Paper Code: PEEC703B

*write full paper Name*

Full Marks: 25          Time: 01 Hour

*Bold*

Group-A (Answer any 05 questions)  05 X 01 = 05

1. GSM architecture, modulation scheme is CDMA
   - a. True        b. False        (CO1)
2. Frequency reuse factor is applicable to GSM
   - a. True        b. False        (CO1)
3. GSM architecture can supports TDMA
   - a. True        b. False        (CO1)
4. Channel bandwidth is defined as
   - a. True        b. False        CO1
5. OSI model have 7 layers
   - a. True        b. False        CO2
6. TCP/IP have 04 layers
   - a. True        b. False        CO2
7. Full name of TDM is time division multiplexing
   - a. True        b. False        CO1

## Group-B (Answer any 04 questions)  04 X 05 = 20

A. What is the propagation time if the distance between the two points is 12,000 km? Assume thepropagation speed to be $2.4 \times 108$ mls in cable.        (CO1)

B. A network with bandwidth of 10 Mbps can pass only an average of 12,000 frames per minute with each frame carrying an average of 10,000 bits. What is the throughput of this network?        (CO1)

C. We have a channel with a 1-MHz bandwidth. The SNR for this channel is 63. What are the appropriate bit rate and signal level?        (CO1)

D. What are the propagation time and the transmission time for a 2.5-kbyte message (an e-mail) if the bandwidth of the network is 1 Gbps? Assume that the distance between the sender and thereceiver is 12,000 km and that light travels at $2.4 \times 108$ *mls*. CO2

E. The power we use at home has a frequency of 60 Hz (50 Hz in Europe). Calculate the period of this sine wave. Express a period of 100 ms in microseconds.        CO1

F. Design a FSK digital transmitter and receiver circuit Working as a modem.        CO2

*use Number 1–6 for Gr B Questions*

*22/09/2022*

# SILIGURI INSTITUTE OF TECHNOLOGY
## Department of Electronics & Communication Engineering
### Internal Examination (CA-3)-2022
Subject: Power Electronics  Paper Code: PE-EC505C

**Full Marks:25**

**Time: 01 Hour**

### All questions are from (CO2)
### Group-A (Answer any 05 questions)
05 X 01 = 05

1. The condition suitable for the inverting mode of operation of a single-phase bridge rectifier is
a) R-L load, with α greater than 90°
b) an extra inductance series with dc motor load, with α>120°
c) a battery in series with a dc motor, with 90°<α<120°
d) a battery and an extra inductance in series with a load, with α>120°.

2. For continuous conduction, each thyristor pair for a two-pulse full converter should conduct for
a) α
b) π-α
c) π+α
d) π

3. The output voltage of a dc to dc converter can be controlled by
a) Amplitude modulation  b) Frequency modulation  c) pulse width modulation  d) pulse width modulation and frequency modulation

4. For type A chopper V is the source voltage R is the load resistance & α is the duty cycle. Average output voltage of this chopper is
a) αV
b) (1-α)V
c) V/α
d) V/(1-α)

5. In a single phase full wave converter (M-2 connection) feeding on R - L load, the input voltage is $v = V_m \sin \omega t$. The expression for dc output voltage is

a) $\frac{1}{\pi}\int_{0}^{\pi} V_m \sin \omega t \, d(\omega t)$
b) $\frac{1}{\pi}\int_{\alpha}^{\pi} V_m \sin \omega t \, d(\omega t)$
c) $\frac{1}{\pi}\int_{\alpha}^{\pi+\alpha} V_m \sin \omega t \, d(\omega t)$
d) $\frac{1}{\pi}\int_{\alpha}^{\pi-\alpha} V_m \sin \omega t \, d(\omega t)$

6. The phenomenon of overlap in converter operation due to
a) source resistance
b) source inductance   c)
c) both source resistance and source inductance
d) high value of firing angle

7. Number of SCRs required in the half-controlled full-wave rectifier is
a) 1 b) 2 c) 3 d) 4

*Maintain Proper Spacing*

### Group-B (Answer any 04 questions)
04 X 05 = 20

1. Explain why freewheeling diode is not required in semiconverter? What is the difference between different configurations of semiconverter?

2. Prove that the average output voltage of a single-phase full wave controlled rectifier using center tap transformer at firing angle α is $V_0 = \frac{V_m}{\pi}(1 + \cos \alpha)$.

3. What is source inductance? What is its effect on rectifier circuit?

4. How full wave controlled rectifier is operated in rectifying as well as inverting mode, explain.

5. Compare between semi converter and full converter.

6. Explain the operating principle of chopper with proper circuit diagram and waveforms.

26/9/22

## SILIGURI INSTITUTE OF TECHNOLOGY
### Department of ECE
### Internal Examination (CA-3)-2022
### Subject: Signal and System Paper Code: EC 303

Full Marks:25                Time: 01 Hour

**Group-A (Answer any 05 questions)        (5 X 1) = 05**

1. Which one of the following systems is causal?(CO1)
   i) $y(t)=x(t)+x(t-3)+x(t^2)$ ii) $y(n)=x(n+2)$ iii) $y(t)=x(t-1)+x(t-2)$
   iv) $y(n)=x(2n^2)$

2. The Fourier Transform of the signal $x(t)= e^{7t}u(-t)$ is (Co3)
   i) $1/(7+j\omega)$ ii) $7/(1+j\omega)$ ii) $1/(7-j\omega)$ iii) $1/(7-j\omega)$ iv) $7/(1-j\omega)$

3. The inverse Z transform of $3/(z-4)$, $|Z|<4$ is (CO3)
   i) $3(4)^n u(n-1)$ ii) $3(4)^{(n-1)} u(n)$ iii) $3(4)^{(n-1)} u(n+1)$ iv) $(4)^{(n-1)} u(n-1)$

4. The integral of impulse function is a i) step ii) ramp
   iii) exponential function (CO1)

5. Is the system $y[n] = 2x[n]+2$ linear? i) yes  ii) no (CO2)

**Group-B (Answer any 04 questions)   (4 X 5) = 20**

1. Calculate the Z transform of $(0.5)^{(n-1)} u(n-1)$ (CO3)
2. State and prove the frequency shifting property for Laplace  transform. (CO3)
3. Determine the Laplace transform and ROC for $x(t) = e^{-3t}u(t)$ (CO3)
4. What are Dirichlet Conditions? (co3)
5. Perform convolution of $x_1(t) = u(t+5)$ and $x_2(t)= u(t-2)$ using Laplace Transform. (CO3)
6. State and prove the BIBO stability criteria for LTI systems (CO2)

# Siliguri Institute of Technology

| | |
|---|---|
| Semester: 8th | Group: A and B |
| Paper Code: EC803C | Paper Name: Cyber Security |
| Full Marks: 25 | Time: 1hour |

## Group-A

**Answer any 5 questions:** (no. of Questions should be 7)   5X1=5

Q1. In which of the following, a person is constantly followed chased by another person or group of several peoples?
   a. Bulling   b. Stalking   c. Identity theft   d. Phishing     **(Aligned to CO1)**

Q2. Which one of the following can be considered as the class of computer threats?
   a. Dos Attack   b. Phishing   c. Soliciting   d. Both A and C     **(Aligned to CO2)**

Q3. Which of the following is considered as the unsolicited commercial email?
   a. Virus   b. Malware   c. Spam   d. All of the above     **(Aligned to CO1)**

Q4. _____ is a type of software designed to help the user's computer detect viruses and avoid them.
   a. Malware   b. Adware   c. Antivirus   d. Both B and C     **(Aligned to CO1)**

Q5. Which one of the following is a type of antivirus program?
   a. Quick Heal   b. Mcafee   c. Kaspersky   d. All of the above     **(Aligned to CO1)**

Q6. It can be a software program or a hardware device that filters all data packets coming through the internet, a network, etc. it is known as the
   a. Antivirus   b. Firewall   c. Cookies   d. Malware     **(Aligned to CO2)**

Q7 ?

## Group-B

**Answer any 2 questions:**   5X2=10

Q1. What is cyber security? What is the need of it? **(Aligned to CO1)**
Q2. Explain Strategy Vs. Policy in cyber security. **(Aligned to CO2)**
Q3. What do you mean by cyber space? What are the different motives of cyber attack? **(Aligned to CO2)**

## Group-C

**Answer Any 1 question:**   10X1=10

Q1. What are the different Cyber attacks? Explain in brief. **(Aligned to CO1)**
Q2. Explain ITA section 43, 66, 66B and 66C in brief. **(Aligned to CO2)**
Q3. Explain Cyber Security Metrics. **(Aligned to CO2)**

20/3/23

**Siliguri Institute of Technology**
**Department of Electronics and Communication Engineering**
**B. Tech. 3$^{rd}$ Year 1$^{st}$ Semester Internal Examination, 2023**

QA3

Paper Name: Control & Instrumentation          Paper Code: EC601C
Full Marks: 25 Times: 1h 00m

**Group A:**      Answer any 5 Questions 5X1=5

1.  i. The steady state error due to unit ramp input to the first order

   system $\dfrac{1}{5s+1}$ is          (CO1)

   a. 0   b. 1   c. 5   d. 10

   ii. In an open loop system the control action is depends on ....a. input signal   b. system variables c.  Size of the system d. none of above.(CO1)

   iii. The system response can be tested better with... a. sinusoidal input signal   b. unit impulse input signal   c. ramp input signal d. exponentially decaying signal.(CO1)

   iv. The position and velocity errors of a type-2 system are
      a.  constant, infinity. b. infinity, constant c. zero, zero. d. zero, constant(CO1)

   v. Mass, in force voltage analogy, is analogous to
      a. Inductance      b. capacitance      c. resistance  d. none of the above(CO1)

   vi. The characteristic equation of a system is $S^2 + 3S + 2 = 0$
      The system is. ...a. critically damped. b. under damped c. constant c. zero. zero. d. zero, constant(CO1)

   vii. The root locus always starts at the
      a. open loop poles      b. open loop zeros   c. both open loop poles & open loop zeros  d. None of these(CO2)

**Group B:**           Answer any 4 Questions 5X4=20

4×5=20

2.  Construct Routh array table and determine the stability of the system represented by the characteristics equation $S^5 + S^4 + 2S^3 + 2S^2 + 3S + 5 = 0$. Comment on the location of the roots of characteristic equation. (CO2)

3.  Calculate the overall transfer function using Block Diagram Reduction Technique or Signal flow graph method from the given figure(CO1)
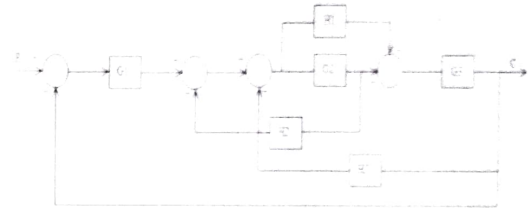


4.  Determine the transfer function of the network shown in the figure.(CO1)
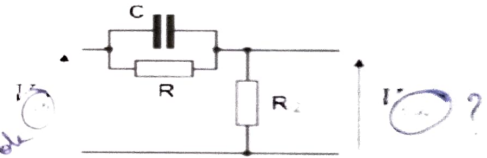


5. The open loop transfer function of a unity negative feedback system is given by
   $G(s) = \dfrac{4}{s(s+5)}$  (a) Calculate transient response of a unit step input.  (b) Rise time & Peak time. (CO1)

6. Calculate Static velocity and acceleration Error coefficient and steady state error from given transfer function $G(s) = \dfrac{(s+1)}{s(s+2)}$  H(s)=1 (CO1)

7. Calculate and mark in the graph paper to plot Root locus (**Draw the graph in the graph paper**) of the following points a)Break away Point, b) Asymptotic angle  c) Centroid. For the given open loop transfer function

$$G(s)H(s) = \frac{K}{s(s+1)(s+2)}(CO2)$$

2.03.23

### GROUP A : Answer Any five Question                    1X5 =5   5×1=5

1.  a) $T(n) =1+T(n-1)$ if  $n>=1$. Time complexity of the relation is:        (CO1)
    i) $O(n^2)$  ii) $O(n^3)$  iii) $O(2^n)$  iv) None of these

    b) The Asymptotic notation omega( $\Omega$ ) denoted as:                 (CO1)
    i) Tightly bound  ii) Lower bound  iii) Upper bound  iv) None of these

    c)Locally best computation is done in :                              (CO2)
    i) Dynamic Programming  ii)Backtracking  iii) Greedy  iv) Branch &Bounce

    d)Time complexity of Binary search is:                               (CO2)
    i)$O(n^2)$  ii) $O(n)$ iii) $O (\log n)$ iv) $O(n/2)$

    e)Time complexity of linear search of ' n' bit input length.        (CO2)
    i)$O(n)$  ii) $O(n^n)$  iii)$O(2^n)$  iv) $O(n^2)$

    f)Time complexity of Tower of Hanoi in recursive approach            (CO1)
    i)$O(n)$  ii) $O(n^n)$  iii)$O(2^n)$  iv) $O(n^2)$

    g)The Asymptotic notation Big-Oh( O ) denoted as:                   (CO1)
    i) Tightly bound  ii) Lower bound  iii) Upper bound  iv) None of these


### GROUP  B :     Answer Any four  Question              4x5 =20

2. Analyse the time complexity of Merge sort                           (CO2)

3.Write an algorithm for Merge sort using Divide and conquer Strategy.  (CO2)

4.What is asymptotic notation? Explain with suitable example.           (CO1)

5. Find the Optimal solution using Greedy strategy having knapsack capacity 100 for the list of item and weight given bellow:                                               (CO2)

| Item | Value | Weight |
|------|-------|--------|
| 1 | 10 | 15 |
| 2 | 20 | 25 |
| 3 | 30 | 35 |
| 4 | 40 | 45 |
| 5 | 50 | 55 |

6. Analyse the Bestcase Time complexity of Quick sort. A machinesrequired 100ms to sort 1000 record using merge sort. How much time required to sort 2000 records.                    (CO2)

7.What is Recursion? Explain the recursive algorithm for tower of Hanoi.    (CO1)