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**Shri Shankaracharya Institute of Professional Management & Technology**
**Department of Electronics and Telecommunication Engineering**
Class Test – I Session- Jan - June, 2022 Month- June
**Sem- ET&T 4th Subject- Analog Communication – B028411(28)**
Time Allowed: 2 hrs Max Marks: 40

*Note: -* ***Attempt any 5 questions (Atleast One from each CO). All questions carry equal marks.***

| Q. NO. | Questions | Marks | Levels of Bloom's taxonomy | COs |
|---|---|---|---|---|
| 1 | Define Modulation. What is the need for modulation. Also Define Modulation Index. Explain the meaning of over modulation, Undermdulation and Critical modulation on the basis of value of modulation index with the help of modulated signal | [4+4] | Apply | CO2 |
| 2 | State and Prove Parseval's theorem for Energy signal | [8] | Understanding | CO2 |
| 3 | Explain Square law modulator and demodulator for generating and detecting AM Signal. | [8] | Apply | CO1 |
| 4 | Determine the fourier transform of the Gaussian pulse $x(t) = e^{-b^2t^2}$ | [8] | Apply | CO1 |
| 5 | Compare all the AM techniques under following heads<br>a) Bandwidth<br>b) Power saving<br>c) Application<br>d) Transmitter and Receiver complexity<br>e) Frequency spectrum<br>f) Standard equation | [8] | Apply | CO2 |
| 6 | A given AM broadcast station transmits a total power of 40 kW when the carrier is modulated by a sinosidal signalwith a modulation idex of 0.8, Calculate<br>a) The Carrier Power<br>b) The Tranmission Efficiency<br>c) The peak amplitude of the carrier assuming the antenna to be represented by a (40+j0)Ω | [8] | Apply | CO1 |
| 7 | Explain Armstrong method of generating FM Signal | [8] | Understanding | CO3 |
| 8 | Differentiate between NBFM and WBFM | [8] | Understanding | CO3 |

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Class Test – I Session- Jan - June, 2022 Month- June
**Sem- ET&T 4th Subject- Probability Theory and Stochastic Processes – B028415(28)**
Time Allowed: 2 hrs Max Marks: 40

*Note: - **Attempt any 5 question. All questions carry equal marks.***

| Q. NO. | Questions | Marks | Levels of Bloom's taxonomy | COs |
|---|---|---|---|---|
| 1. | A random Variable X has a distribution function $F_X(X) = \sum_{n=1}^{12} \frac{(n)^2}{650} u(x-n)$ Find: 1. P{- infinity ≤ X ≤ 6.5} 2. P{X > 4} 3. P{6 < X ≤ 9} | [8] | Apply | CO2 |
| 2. | Find a constant b such that $f_X(x) = \begin{cases} e^{3x}/4 & 0 \le x \le b \\ 0 & \text{elsewhere} \end{cases}$ Is a valid density function. | [8] | Understanding | CO2 |
| 3. | A student is known to arrive late in the class 40% of the time. If the class meets five times each week find: 1. The probability that student is late for atleast three classes in a week. 2. Probability the student will not be late at all during a given week. | [8] | Apply | CO1 |
| 4. | An airline in a small city has five departures each day. It is knownthat any given flight has a probability of 0.3 of departing late. For any given day, determine the probabilities that: 1. No flights depart late 2. All flights depart late 3. Three or more flights depart late | [8] | Apply | CO1 |
| 5. | Find the value of constant of A such that $f(x) = \begin{cases} 0 & x < -1 \\ A(1 - x^2)\cos(\pi x/2) & -1 \le x \le 1 \\ 0 & 1 < x \end{cases}$ Is a valid density function | [8] | Apply | CO2 |
| 6. | In a box there are 100 resistors having resistance and tolerance as shown in the table below. Three events are defined as A as "draw a 47 ohm resistor", B as "draw a resistor having tolerance 5%", C as "draw a 100 ohm resistor". Find the joint and conditional probabilities. | [8] | Apply | CO1 |

| Resistor (ohm) | Tolerance | | |
|---|---|---|---|
| | 5% | 10% | Total |
| 22 | 10 | 14 | 24 |
| 47 | 28 | 16 | 44 |
| 100 | 24 | 8 | 32 |
| Total | 62 | 38 | 100 |

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**Shri Shankaracharya Institute of Professional Management & Technology**
**Department of Electronics and Telecommunication Engineering**
Class Test – I Session- Jan. – June, 2021 Month- June
**Sem- ET&T 4th Subject- EMF - B028413(028)**
Time Allowed: 2 hrs Max Marks: 40

*Note: -*
**Part 1 carry 2 marks for each question, part 2 carry 8 marks for each question. Attempt 4 questions from each part.**

| Q. NO. | Questions | Marks | Levels of Bloom's taxonomy | COs |
|---|---|---|---|---|
| | **PART-1** | | | |
| 1. | A Scalar function, V is given by $V=xyz^2$, find the gradient of V. | 2 | Apply | CO1 |
| 2. | If a vector, $\vec{B} = 4xy^2\hat{a}x+2y^3\ \hat{a}y + xyz\ \hat{a}z$. find divegence of B. | 2 | Apply | CO1 |
| 3. | Given a vector, $\vec{A} = 3x\hat{a}_x + y\ \hat{a}_y + 5z\hat{a}_z$. Find the curt of $\vec{A}$. | 2 | Apply | CO1 |
| 4. | If the scalar potential is given by $V=x^2-y^2-z^2$ volts. Find the laplacian of V. | 2 | Apply | CO1 |
| 5. | If a vector $\vec{A} = 4\hat{a}_x + 2\hat{a}_y + \hat{a}_z$ express it in cylindrical coordinater. | 2 | Apply | CO1 |
| | **PART-2** | | | |
| 6. | Two charges $Q_1 = 2\mu c$ & $Q_2 = 5\mu c$ are located at (-3, 7, 4) & (2, 4, -1) respectivly. Determine the force on $Q_2$ due to $Q_1$. | 8 | Apply | CO2 |
| 7. | Two point charges $Q_1 = 5c$ & $Q_2$= 1nc, are located at (-1, 1, -3) & (3, 1, 0). Determine the electric field at $Q_1$. | 8 | Apply | CO2 |
| 8. | Find $\vec{E}$ at (2, 0, 2) if a line chenge of 10 pc/m lies along the y axis. | 8 | Apply | CO2 |
| 9. | Two point charges $Q_2$ = 2nc & $Q_2$ = 4nc are located at (1, 1, 1) & (1, 0, 0). Determine the potential at p (1, 1, 0) due to point charge. | 8 | Apply | CO2 |
| 10. | Explain Different Magnetic Materials | 8 | Understanding | CO3 |

***"Teachers can open the door, but you must enter it yourself."***

**Shri Shankaracharya Institute of Professional Management & Technology**

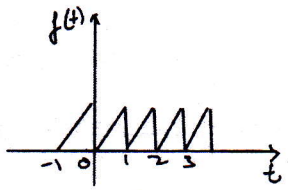
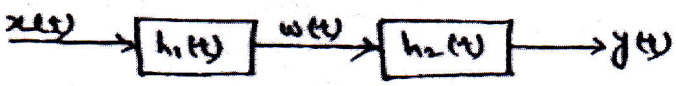
**Department of Electronics and Telecommunication Engineering**

Class Test – I Session- Jan. – June, 2022 Month- June

**Sem- 4th Subject- Signal and System - B028414(028)**

Time Allowed: 2 hrs Max Marks: 40

*Note: -* ***Attempt any 5 question. All questions carry equal marks.***

| Q. NO. | Questions | Marks | Levels of Bloom's taxonomy | COs |
|---|---|---|---|---|
| 1. | Show that $e^{j\omega 0t}$ is periodic in nature with time period $2\Pi/\omega_0$ | [8] | Apply | CO1 |
| 2. | State and prove any four properties of Fourier Series. | [8] | Understanding | CO2 |
| 3. | Find the Fourier Series for the Sawtooth Function shown below.   | [8] | Apply | CO2 |
| 4. | Consider an LTI system with input x (n) & impulse response h (n) given as:<br>x (n) = 2n u(-n)<br>h (n) = u(n)<br>Calculate output of the system using convolution sum. | [8] | Apply | CO5 |
| 5. | State whether the given system is linear, causal, time-invariant and stable.<br>y(n)= 2x(n+1) + [x(n-1)]2 | [8] | Apply | CO1 |
| 6. | Calculate the impulse response of over all system   $h_1(t) = e^{-2t}u(t)$, $h_2(t) = 2e^{-t}u(t)$ | [8] | Apply | CO5 |

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Class Test – I , Month- June 2022

**Sem- ET&T 4th Subject- AEC**

Time Allowed: 2 hrs Max Marks: 40

**NOTE : (1)** Attempt any Five Questions.
(2) Attempt question in serial order.

| Q. NO. | Questions | Marks | Levels of Bloom's taxonomy | COs |
|---|---|---|---|---|
| 1. | Draw low frequency h parameter model for CE configuration with resistive load and calculate the expression of $A_i$, $A_V$, $R_i$, $R_O$, $A_{VS}$ and $A_{IS}$. | [8] | Understanding | 1 |
| 2. | For the CE amplifier circuit shown in the figure 1. Find $A_i$, $R_i$, $A_v$, $A_{vs,\ and}$ $R_o$, Using miller and dual miller method. | [8] | Apply | 1 |
| 3. | What do you mean by cascaded amplifier? Find the expression for gain of an n stage cascaded amplifier. | [8] | Apply | 1 |
| 4. | For the given circuits in figure 2. Find the value of input resistance, output resistance, voltage gain and current gain. The parameter are $h_{ie}$ =1.1K, $h_{fe}$=50, $h_{oe}$=25x10-6 A/V, $h_{re}$=2.5x10-4. | [8] | Apply | 2 |
| 5. | Describe transistor RC coupling in brief. | [8] | Apply | 2 |
| 6. | Write a short note on Hybrid PI model. | [8] | Understanding | 2 |

Fig 1.

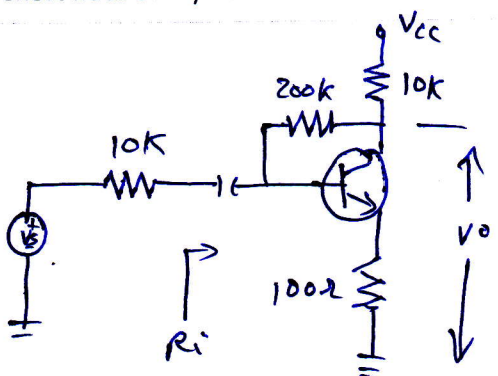


Fig 2.