



**Mahatma Gandhi Mission's College of Engineering, Nanded**  
**Electronics and Telecommunication Engg. [202X-2X]**

**Periodic Test 1**

**Subject:**

**Name of Course Instructor :**

**Year:** Fifth Year - B. Tech-ETC-A (Odd Sem)

**Marks:** 20

**Date:** DD/MM/YYYY

**Duration:** 60 Mins

*Note: All questions are COMPULSARY and carries EQUAL marks.*

*Figures to the right indicate full marks. Draw neat diagram wherever necessary.*

*Assume suitable data if necessary, stating it clearly.*

| Sr. No.    | Question                             | Marks       | Course Outcome | Blooms Level |  |
|------------|--------------------------------------|-------------|----------------|--------------|--|
| <b>1</b>   | <b>All questions are COMPULSARY.</b> |             |                |              |  |
| <b>1.1</b> |                                      | <b>5.00</b> | CO__           | BT__         |  |
| <b>1.2</b> |                                      | <b>5.00</b> | CO__           | BT__         |  |
| <b>1.3</b> |                                      | <b>5.00</b> | CO__           | BT__         |  |
| <b>1.4</b> |                                      | <b>5.00</b> | CO__           | BT__         |  |

**Sample Copy of Periodic Test 1 (Internal) Marks distribution Scheme.**

Mr/Ms/Mrs.. \_\_\_\_\_

**Name of Course  
Instructor**

\_\_\_\_\_

**Module Coordinator**

**Dr. K.P. Paithane**

**Head of Department**



**Mahatma Gandhi Mission's College of Engineering, Nanded**  
**Electronics and Telecommunication Engg. [202X-2X]**

**Periodic Test 2**

**Subject:**

**Name of Course Instructor :**

**Year/Sem: (Odd/ Even Sem)**

**Marks: 20**

**Date: DD/MM/YYYY**

**Duration: 60 Mins**

**Note: All questions are COMPULSARY and carries EQUAL marks.**

**Figures to the right indicate full marks. Draw neat diagram wherever necessary.**

**Assume suitable data if necessary, stating it clearly.**

| Sr. No.    | Question                             | Marks       | Course Outcome | Blooms Level |  |
|------------|--------------------------------------|-------------|----------------|--------------|--|
| <b>1</b>   | <b>All questions are COMPULSARY.</b> |             |                |              |  |
| <b>1.1</b> |                                      | <b>5.00</b> | CO__           | BT__         |  |
| <b>1.2</b> |                                      | <b>5.00</b> | CO__           | BT__         |  |
| <b>1.3</b> |                                      | <b>5.00</b> | CO__           | BT__         |  |
| <b>1.4</b> |                                      | <b>5.00</b> | CO__           | BT__         |  |

**Sample Copy of Periodic Test 2 (Internal) Marks distribution Scheme.**

Mr/Ms/Mrs.. \_\_\_\_\_

**Name of Course  
Instructor**

**Module Coordinator**

**Dr. K.P. Paithane**

**Head of Department**



**MGM's College of Engineering, Nanded**  
**DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING**  
**CLASS: TY (ECT) SAMPLE MID SEM QUESTION PAPER**

**SUB: A.Y-202X-2X Sem-I Or II Date: DD/MM/YYYY Time: 60 Min**

| Sr. No. | Questions                                     | Blooms Taxonomy | CO No. | Marks |
|---------|-----------------------------------------------|-----------------|--------|-------|
| Q.1     | Attempt following questions:                  |                 |        | 6M    |
|         | 1. MCQ Based Question<br>a.<br>b.<br>c.<br>d. | BT__            | CO__   |       |
|         | 2. MCQ Based Question<br>a.<br>b.<br>c.<br>d. | BT__            | CO__   |       |
|         | 3. MCQ Based Question<br>a.<br>b.<br>c.<br>d. | BT__            | CO__   |       |
|         | 4. MCQ Based Question<br>a.<br>b.<br>c.<br>d. | BT__            | CO__   |       |
|         | 5. MCQ Based Question<br>a.<br>b.<br>c.<br>d. | BT__            | CO__   |       |
|         | 6. MCQ Based Question<br>a.<br>b.<br>c.<br>d. | BT__            | CO__   |       |
| Q.2     | Attempt any two of the following questions:   |                 |        | 6 M   |
|         | a)                                            | BT__            | CO__   |       |
|         | a)                                            | BT__            | CO__   |       |
|         | b)                                            | BT__            | CO__   |       |
| Q.3     | Attempt any one of the following questions:   |                 |        | 8 M   |
|         | a)                                            | BT__            | CO__   |       |
|         | b)                                            | BT__            | CO__   |       |

**Sample Copy of Mid Sem Exam (External) Marks distribution Scheme.**

\_\_\_\_\_  
Name of Course Instructor

\_\_\_\_\_  
Module Coordinator

**Dr. K.P. Paithane**  
Prof. & Head of Dept.

| <b>DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE</b><br><b>Regular &amp; Supplementary Semester Examination – Summer 2023</b><br><b>Course: B. Tech.                      Branch : E&amp;TC and allied                      Semester :IV</b><br><b>Subject Code &amp; Name: BTBS 404/ Probability Theory and Random Processes</b><br><b>Max Marks: 60                      Date:26/07/2023                      Duration: 3 Hr.</b> |                                                                                                                                                                                                                                                                                                                             |               |           |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|----|----|----|----|----|---|----|----|----|---|----|----|---------------|----------|
| <b>Instructions to the Students:</b><br>1. All the questions are compulsory.<br>2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.<br>3. Use of non-programmable scientific calculators is allowed.<br>4. Assume suitable data wherever necessary and mention it clearly.                                                            |                                                                                                                                                                                                                                                                                                                             |               |           |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                             | (Level/CO)    | Marks     |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
| <b>Q. 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Solve Any Two of the following.</b>                                                                                                                                                                                                                                                                                      |               | <b>12</b> |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
| <b>A)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     | For a certain binary communication channel probability that transmitted '0' received as '0' is 0.95 and probability that transmitted '1' received as '1' is 0.9. if probability that '0' transmitted is 0.4. Find the probability that<br>1) A '1' is received<br><br>2) A '1' is transmitted given that '1' was received.  | <b>L2/CO1</b> | <b>6</b>  |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
| <b>B)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     | State and explain Theorem of Total Probability. Also state Bayes' Theorem.                                                                                                                                                                                                                                                  | <b>L1/CO1</b> | <b>6</b>  |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
| <b>C)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     | From 6 positive and 8 negative numbers. 4 numbers are chosen at random (without replacement). What is the probability that product is positive.                                                                                                                                                                             | <b>L2/CO1</b> | <b>6</b>  |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
| <b>Q.2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Solve Any Two of the following.</b>                                                                                                                                                                                                                                                                                      |               | <b>12</b> |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
| <b>A)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     | What are PDF and CDF. State and explain properties of CDF                                                                                                                                                                                                                                                                   | <b>L1/CO2</b> | <b>6</b>  |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
| <b>B)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     | Suppose the density function of X& Y is given by<br>$F(x,y) = 6xy(2-x-y) \quad 0 < x < 1, 0 < y < 1$<br>$= 0$ otherwise<br>Compute condition expectation of X given that Y=y where $0 < y < 1$ .                                                                                                                            | <b>L2/CO2</b> | <b>6</b>  |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
| <b>C)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     | Calculate the correlation coefficient between X& Y from following data<br><table border="1" style="margin-left: 20px;"> <tr> <td>X</td> <td>10</td> <td>14</td> <td>18</td> <td>22</td> <td>26</td> <td>30</td> </tr> <tr> <td>Y</td> <td>18</td> <td>12</td> <td>24</td> <td>6</td> <td>30</td> <td>36</td> </tr> </table> | X             | 10        | 14 | 18 | 22 | 26 | 30 | Y | 18 | 12 | 24 | 6 | 30 | 36 | <b>L2/CO2</b> | <b>6</b> |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10                                                                                                                                                                                                                                                                                                                          | 14            | 18        | 22 | 26 | 30 |    |    |   |    |    |    |   |    |    |               |          |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                             | 18                                                                                                                                                                                                                                                                                                                          | 12            | 24        | 6  | 30 | 36 |    |    |   |    |    |    |   |    |    |               |          |
| <b>Q. 3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Solve Any Two of the following.</b>                                                                                                                                                                                                                                                                                      |               | <b>12</b> |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
| <b>A)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     | State and prove Tchebycheff Inequality.                                                                                                                                                                                                                                                                                     | <b>L1/CO3</b> | <b>6</b>  |    |    |    |    |    |   |    |    |    |   |    |    |               |          |
| <b>B)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     | Bus arrived at a specific stop at 15 min interval starting from 7AM. That is they arrive at 7, 7.15, 7.30, 7.45 and so on. If passenger arrives at a stop at random time that is uniformly distributed between 7 and 7.30 AM Find the probability that he waits<br><br>a) Less than 5 mins for a bus                        | <b>L2/CO3</b> | <b>6</b>  |    |    |    |    |    |   |    |    |    |   |    |    |               |          |

|             |                                                                                                                                                                                                                                                                  |        |           |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----------|
|             | b) At least 12 mins for the bus                                                                                                                                                                                                                                  |        |           |
| C)          | State and Explain properties of Covariance matrix                                                                                                                                                                                                                | L1/CO3 | 6         |
|             |                                                                                                                                                                                                                                                                  |        |           |
| <b>Q.4</b>  | <b>Solve Any Two of the following.</b>                                                                                                                                                                                                                           |        | <b>12</b> |
| A)          | Explain in detail with proof central limit theorem                                                                                                                                                                                                               | L1/CO4 | 6         |
| B)          | Distinguish between WLLN and SLLN in detail.                                                                                                                                                                                                                     | L1/CO4 | 6         |
| C)          | How to determine convergence in Probability. Elaborate in brief                                                                                                                                                                                                  | L1/CO4 | 6         |
|             |                                                                                                                                                                                                                                                                  |        |           |
| <b>Q. 5</b> | <b>Solve Any Two of the following.</b>                                                                                                                                                                                                                           |        | <b>12</b> |
| A)          | A random process is given by<br>$X(t) = A \cos \omega_0 t + B \sin \omega_0 t$ Where $\omega_0$ is constant. A & B are independent random variables having values -1 and 2 with probabilities 2/3 and 1/3 respectively. Find mean and auto-correlation function. | L2/CO5 | 6         |
| B)          | Explain in brief Strict Sense Stationary process (SSS) and Wide Sense Stationary (SSS) Process                                                                                                                                                                   | L1/CO5 | 6         |
| C)          | Explain power spectral density function with its properties.                                                                                                                                                                                                     | L1/CO5 | 6         |
|             | <b>*** End ***</b>                                                                                                                                                                                                                                               |        |           |

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Summer Examination – 2023

Course: B. Tech. Branch: E&TC Engineering

Semester: VI

Subject Code & Name: BTETPE604A CMOS Design

Max Marks: 60

Date: 26/07/2023

Duration: 2:00 to 5:00 PM

**Instructions to the Students:**

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

|                                                                                                             | (Level/CO) | Marks     |
|-------------------------------------------------------------------------------------------------------------|------------|-----------|
| <b>Q.1 Solve Any Two of the following.</b>                                                                  |            | <b>12</b> |
| A) Explain various steps involved in CMOS inverter n-well fabrication                                       | 3/1        | 6         |
| B) Draw Schematic, stick diagram and layout for 2 input CMOS AND gate<br>With equal rise and fall times     | 3/2        | 6         |
| C) Draw Voltage transfer characteristics for static CMOS Inverter. And<br>explain working of inverter.      | 1/1        | 6         |
| <b>Q.2 Solve Any Two of the following.</b>                                                                  |            | <b>12</b> |
| A) Draw the schematic and layout for two input CMOS NOR gate, Use<br>CMOS Lambda based design rules.        | 2/1        | 6         |
| B) Explain Subthreshold leakage the non-ideal effect in MOSFET                                              | 1/1        | 6         |
| C) Explain leakage power in CMOS inverter. What are ways to reduce it?                                      | 1/1        | 6         |
| <b>Q.3 Solve Any Two of the following.</b>                                                                  |            | <b>12</b> |
| A) Implement AND/NAND gate using CMOS dual rail domino logic                                                | 3/2        | 6         |
| B) Explain Set up, hold time & propagation delay for a sequential circuit<br>in detail                      | 1/1        | 6         |
| C) Draw Truth Table, Gate level diagram and then implement JK Flip-<br>Flop using static CMOS design style. | 3/2        | 6         |
| <b>Q.4 Solve Any Two of the following.</b>                                                                  |            | <b>12</b> |
| A) Write a short note on CMOS scaling                                                                       | 2/1        | 6         |
| B) Implement half adder combinational circuit using static CMOS logic.                                      | 2/2        | 6         |
| C) Explain Channel Length Modulation (CLM) non-ideal effect in<br>MOSFET                                    | 1/1        | 6         |

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|             |                                                                                   |            |           |
|-------------|-----------------------------------------------------------------------------------|------------|-----------|
| <b>Q. 5</b> | <b>Solve Any Two of the following.</b>                                            |            | <b>12</b> |
| <b>A)</b>   | <b>Explain MOSFET parasitic capacitances in detail</b>                            | <b>1/1</b> | <b>6</b>  |
| <b>B)</b>   | <b>Explain Body effect on threshold voltage of the MOSFET</b>                     | <b>1/1</b> | <b>6</b>  |
| <b>C)</b>   | <b>Implement <math>Y = \overline{ABC}</math> using dynamic CMOS design style.</b> | <b>3/2</b> | <b>6</b>  |

**\*\*\* End \*\*\***