

# J & K BOARD OF TECHNICAL EDUCATION

ROLL No: \_\_\_\_\_

2MJ23

Class: - 2<sup>nd</sup> Semester (NEP)

Subject: - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Max. Marks: - 100

Branch: - COMPUTER ENGG/IT

Time Allotted: - 3-Hrs

Note: There are THREE sections in the paper A, B, and C.

- I. Answer all the 10 parts of the question in Section -A. Each part carries Two mark and all the 10 parts have objective type questions.
- II. Answer any 4 questions out of 8 questions in Section -B. Each question carries 05 marks.
- III. Answer any 4 questions out of 8 questions in Section -C. Each question carries 15 marks.
- IV. Solve all the question of a section consecutively together.

## Section A (10x2=20 marks)

### Q1. Multiple Choice Questions

Q1	Objective Type questions	Marks
I.	The ammeter is the instrument used to measure <del>(A)</del> Current (B) Voltage (C) Power (D) Resistance	2
II.	In parallel connections, the _____ is the same at all resistances. <del>(A)</del> Voltage (B) Current (C) Power	2
III.	Weber is the SI unit for <del>(A)</del> Permiabilty (B) Permanence <del>(C)</del> Flux (D) Flux Density	2
IV.	Lenz's Law is used to find <del>(A)</del> Direction of Induced EMF (B) Direction of Motion (C) Direction of Magnetic field (D) None	2
V.	In Lead Acid battery the Electrolyte is <del>(A)</del> Sulphuric Acid (B) Nitric Acid (C) Hydrochloric Acid (D) Water	2
VI.	A group of cells is called <del>(A)</del> Battery (B) Vent cap (C) Hydrometer (D) Inverter	2
VII.	A Zener diode is made to operate in <del>(A)</del> Reverse bias (B) Forward Bias	2
VIII.	How many PN junctions a transistor have? (A) 1 <del>(B)</del> 2 (C) 3 (D) 0	2
IX.	Penstock is a part of (A) Turbine (B) Transformer (C) Alternator <del>(D)</del> Hydroelectric Power Plant	2
X.	The unit of frequency is <del>(A)</del> Hz (B) Weber (C) Watt (D) Ampere	2



2MJ23

## J &amp; K BOARD OF TECHNICAL EDUCATION

ROLL No: \_\_\_\_\_

## SECTION B (Attempt any four) (4x5=20Marks)

<del>Q1</del>	What is OHM's Law? Write down its expression.	5
<del>Q2</del>	Compare magnetic & electric circuit.	5
<del>Q3</del>	Describe the features and application of solar cell	5
<del>Q4</del>	Differentiate between AC and DC	5
Q5	Describe the forward and reverse bias characteristics of diode. Draw and label these characteristics	5
Q6	Why is the common emitter configuration commonly used?	5
Q7	Differentiate between transistor and FET	5
Q8	Draw the circuit used to determine characteristics of NPN transistor in CE configuration. Also define various parameters in CE configuration.	5

## SECTION C (Attempt any four) (15x4=60 Marks)

<del>Q1</del>	State Kirchhoff's current and Voltage laws. Explain them with suitable circuits.	15
<del>Q2</del>	Explain the following terms: i) Magnetic flux ii) Flux Density iii) Relative permeability iv) MMF and v) Magnetic leakage	15
Q3	Explain the construction and working of Lead Acid battery. Give its applications	15
Q4	Explain the terms RMS value, Average value, Form factor and peak factor in AC	15
<del>Q5</del>	List various types of Power stations, Explain hydroelectric power station in detail,	15
<del>Q6</del>	Explain the difference between conductors, insulators and semiconductors with the help of Energy level diagrams.	07
Q7	a) Write short notes on Intrinsic and Extrinsic semiconductors. b) Compare CE, CB and CC configurations	08
Q8	Draw the schematic symbol of N channel JFET, Also draw and explain circuit used to determine characteristics of FET	15

# J & K BOARD OF TECHNICAL EDUCATION

2MJ23

ROLL No: \_\_\_\_\_

Class: - 2<sup>nd</sup> Semester (NEP)

Branch: - ALL

Subject: APPLIED MATHEMATICS -II

Max. Marks: - 100

Time Allotted: - 3-Hrs

Note: There are THREE sections in the paper A, B, and C.

- I. Answer all the 10 parts of the question in Section -A. Each part carries Two mark and all the 10 parts have objective type questions.
- II. Answer any 4 questions out of 8 questions in Section -B. Each question carries 05 marks.
- III. Answer any 4 questions out of 8 questions in Section -C. Each question carries 15 marks.
- IV. Solve all the question of a section consecutively together.

## Section A (10x2=20 marks)

Qno1		Marks
I.	$\int e^x$ is equal to a) 1      b) 0 <del>c) <math>e^x</math></del> d) -1	2
II.	$\int \frac{1}{\sqrt{1-x^2}} dx$ <del>a) <math>\sin^{-1} x</math></del> b) $\cos^{-1} x$ c) $\frac{1}{\sqrt{\cos^{-1} x}}$ d) None of these	2
III.	$\int_1^2 \log x dx$ <del>a) <math>2 \log 2 - 1</math></del> b) $2 \log 2 + 1$ c) $2 \log 2 - 3$ d) none of these	2
IV.	Two lines are said to be perpendicular if the product of their slope is equal to: a) 1 <del>b) -1</del> c) 1/2      d) 0	2
V.	Two lines are said to be parallel if the difference of their slope is a) -1      b) 1 <del>c) 0</del> d) none of these	2
VI.	If A is a skew Symmetric matrix then $A^2$ is a) Null Matrix <del>b) Symmetric</del> c) Skew symmetric      d) none of these	2
VII.	The matrix which follows the conditions $m=n$ is called? <del>a) Square matrix</del> b) Rectangular matrix      c) Scalar matrix      d) Diagonal matrix	2
VIII.	The trace of the matrix is defined as a) Sum of all the elements of the matrix <del>b) Sum of all the elements of leading diagonal of matrix</del> c) Sum of all non-zero elements of matrix      d) none of these	2
IX.	Mode refers to the value within a series that occurs _____ number of times. <del>a) Maximum</del> b) Minimum      c) Zero      d) Infinite	2



# J & K BOARD OF TECHNICAL EDUCATION

ROLL No: \_\_\_\_\_

**2MJ23**

X.	_____ is not a measure of central tendency a) Mode                      b) Mean                      c) Median                      d) Range	2
----	---	---

## Section B (Attempt any four) (4x5=20 Marks)

Section B (Answer any 8 questions)

1	Integrate $\int \sqrt{x} (1-x)^2$	5																
2	Integrate $\int x \sin x \, dx$	5																
3	If A(-2,1), B(2,3) and C(-2,-4) are the points, Find the angle between BA and BC.	5																
4	Determine the equation of the line through the point (-4, -3) and parallel to x-axis.	5																
5	If $A = \begin{bmatrix} 3 & 5 \\ 7 & -9 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & -4 \\ 2 & 3 \end{bmatrix}$ , Find $(4A - 3B)$ .	5																
6	If A and B are symmetric matrices of the same order then show that AB is symmetric if and only if $AB=BA$ .	5																
7	The Arithmetic mean of 7,9,5,2,4, 8, x is given to be 7. Find x.	5																
8	Find the mean from the data <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"><tbody><tr><td style="width: 12.5%;">Class interval</td><td style="width: 12.5%;">0-7</td><td style="width: 12.5%;">7-14</td><td style="width: 12.5%;">14-21</td><td style="width: 12.5%;">21-28</td><td style="width: 12.5%;">28-35</td><td style="width: 12.5%;">35-42</td><td style="width: 12.5%;">42-49</td></tr><tr><td>Frequency</td><td>19</td><td>25</td><td>36</td><td>72</td><td>51</td><td>43</td><td>28</td></tr></tbody></table>	Class interval	0-7	7-14	14-21	21-28	28-35	35-42	42-49	Frequency	19	25	36	72	51	43	28	5
Class interval	0-7	7-14	14-21	21-28	28-35	35-42	42-49											
Frequency	19	25	36	72	51	43	28											

(15 15 60 Marks)

## Section C (Attempt any four) (4x15=60 Marks)

Section C (Attempt any four) (4x15=60 Marks)

1	Evaluate $\int \log(1+x^2)dx$	15																
2	Evaluate $\int \frac{dx}{x(x+1)}$ by partial fraction method.	15																
3	Find the equation of the parabola whose focus is the point (0,0) and whose directrix is the straight line $3x-4y+2=0$	15																
4	Find the centre and radius of the circle $x^2 + y^2 - 4x + 6y = 12$ .	15																
5	Using properties of determinants, prove that $\begin{vmatrix} y+z & z & y \\ z & z+x & x \\ y & x & x+y \end{vmatrix} = 4xyz$	15																
6	Find the inverse of the matrix $A = \begin{bmatrix} 2 & -3 \\ -4 & 7 \end{bmatrix}$	15																
7	Find out the standard deviation for the following data 5, 8,7,11,9,10,8,2,4,6,7.	15																
8	Find Mean, Median and Mode from the data <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"><tr><td style="width: 12.5%;">Class interval</td><td style="width: 12.5%;">0-7</td><td style="width: 12.5%;">7-14</td><td style="width: 12.5%;">14-21</td><td style="width: 12.5%;">21-28</td><td style="width: 12.5%;">28-35</td><td style="width: 12.5%;">35-42</td><td style="width: 12.5%;">42-49</td></tr><tr><td>Frequency</td><td>19</td><td>25</td><td>36</td><td>72</td><td>51</td><td>43</td><td>28</td></tr></table>	Class interval	0-7	7-14	14-21	21-28	28-35	35-42	42-49	Frequency	19	25	36	72	51	43	28	15
Class interval	0-7	7-14	14-21	21-28	28-35	35-42	42-49											
Frequency	19	25	36	72	51	43	28											

2MJ23

Class: - 2<sup>nd</sup> Semester (NEP)

Branch: - ELTX &amp; COMM/MED ELTX

Subject: - DIGITAL ELECTRONICS

Time Allotted: - 3-Hrs

Max. Marks: - 100

- Note: There are THREE sections in the paper A, B, and C.
- I. Answer all the 10 parts of the question in Section –A. Each part carries Two mark and all the 10 parts have objective type questions.
  - II. Answer any 4 questions out of 8 questions in Section –B. Each question carries 05 marks.
  - III. Answer any 4 questions out of 8 questions in Section –C. Each question carries 15 marks.
  - IV. Solve all the question of a section consecutively together.

---

**Section A (10x2=20 marks)**

---

**Q1. Multiple choice questions.**

1. The radix or base for hexadecimal is:  
a. 10   b. 2   c. 8   ~~d. 16~~
2. Which gate is known as universal gate?  
a. AND   b. OR   ~~c. NAND~~   d. EX-OR
3. The binary equivalent of decimal 10 is:  
a. 1110   ~~b. 1010~~   c. 1011   d. 0100
4. The binary number equivalent of FF is:  
a. 10110011   b. 01001011   ~~c. 11111111~~   d. 11101101
5. The binary number equivalent to gray code 10111 is:  
~~a. 11010~~   b. 10101   c. 01101   d. 11101
6. The BCD for the number 90 is:  
~~a. 10010000~~   b. 11000011   c. 10101011   d. 11010001
7. The NOT gate has how many inputs?  
a. 2   b. 4   c. 3   ~~d. 1~~
8. A 4-variable Karnaugh map for SOP form has how many cells?  
a. 14   b. 10   c. 12   ~~d. 16~~
9. A half adder is used to add how many bits?  
a. 4   b. 3   c. 5   ~~d. 2~~
10. An 8x1 multiplexer has how many select lines?  
a. 4   b. 2   c. 1   ~~d. 3~~



**Section B (Attempt any four) (4x5=20 Marks)**

~~Q1.~~ What are digital and analog signals? Explain with example. (5)

~~Q2.~~ Compare between analog and digital signals.

Q3. Convert  $(FFFF)_{16}$  to decimal equivalent.

~~Q4.~~ How can a universal NOR gate be used as:

a. NOT    b. AND    c. OR    (Any Two)

Q5. Use Boolean law and prove:

$$XY + YZ + \bar{Y}Z = XY + Z$$

Q6. What is the difference between combinational and sequential circuits?

Q7. Give a brief description of multiplexers and demultiplexers.

Q8. Differentiate between a latch and a Flip Flop.

**Section C (Attempt any four) (4x15=60 Marks)**

~~Q1.~~ a. Add 11001101 and 01011100

b. Add 1111 and 1010

c. Subtract 11010 from 11101 using 2's complement method.

~~Q2.~~ Draw the symbols and truth table for 2 input AND, OR, NOT, EX-OR and NAND gates.

Q3. State and prove De-Morgan's theorem with suitable examples.

Q4. Minimize the logic function

$$Y(A, B, C, D) = \sum m(0,1,2,3,5,7,8,9,11,14)$$

Use Karnaugh map. Draw logic circuit for the simplified function.

~~Q5.~~ Design a full adder circuit and discuss its working. Draw the truth table.

Q6. What is multiplexer? Draw and explain the logic diagram for 4:1 multiplexer.

~~Q7.~~ What do you understand by flip flop? Explain JK flip flop. (15)

Q8. Draw and describe 4 bit Asynchronous ripple counter. (15)

$$\begin{array}{r}
 +1111 \\
 11001101 \\
 01011100 \\
 \hline
 00101001
 \end{array}$$