**Printed Page:- 04** 

#### Subject Code:- BEC0101Z

Roll. No:

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

**B.Tech** 

### SEM: I - THEORY EXAMINATION (2024 - 2025) Subject: Basic Electrical and Electronics Engineering

#### **Time: 3 Hours**

#### **General Instructions:**

**IMP:** *Verify that you have received the question paper with the correct course, code, branch etc.* 1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice *Questions (MCQ's) & Subjective type questions.* 2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked. DEC-202A

### **SECTION-A**

1. Attempt all parts:-

- 1-a. Correct form of ohm's law. (CO1, K1)
  - I = VR(a)
  - (b)  $V \propto I$
  - (c) V = IR
  - (d) B & C

The superposition theorem is applicable to (CO1, K1) 1-b.

- Linear, nonlinear and time variant responses (a)
- Linear and nonlinear resistors only (b)
- Linear responses only (c)
- None of the above (d)

1-c. Maximum efficiency of Half Wave Rectifier is: (CO2, K1)

- 0.25 (a)
- 0.41 (b)
- (c) 0.65
- 0.85 (d)

1-d. In a BJT, if the collector-base junction and the base-emitter junction are both reverse-biased, which region is the BJT operating in?(CO2, K1)

- Saturation region (a)
- Active region (b)

#### Page 1 of 4

Max. Marks: 100

20

1

1

1

1

	(c)	Cut off region	
	(d)	Reverse active region	
1-e.	W	That is the 2's complement of the binary number 010110? (CO3, K1)	1
	(a)	101001	
	(b)	101010	
	(c)	101100	
	(d)	110010	
1-f.	Т	he logical sum of two or more logical product terms is called (CO3, K1)	1
	(a)	SOP	
	(b)	POS	
	(c)	OR operation	
	(d)	NAND operation	
1-g.	Ir th	a combinational circuit, the output at any time depends only on the at at time. (CO4, K1)	1
	(a)	Voltage	
	(b)	Intermediate values	
	(c)	Input values	
	(d)	Clock pulses	
1-h.	A 	logic circuit which determines if one input is equal to another is called a (CO4, K1)	1
	(a)	comparator	
	(b)	multiplexer	
	(c)	encoder	
	(d)	PROM	
1-i.	The T flip flop obtained from JK flip flop by(CO5, K1)		
	(a)	connecting its J & K terminal together	
	(b)	connecting its J & K terminal with NOT gate	
	(c)	connecting its J & K terminal with SR flip flop	
	(d)	None of These	
1-j.	How many different states does a 3-bit asynchronous down counter have?(CO5, K1)		1
	(a)	2	
	(b)	4	
	(c)	6	
	(d)	8	
2. Att	empt a	all parts:-	
2.a.	D	efine Active & Passive elements. (CO1, K1)	2
2.b.	If	the value of $\alpha$ is equal to 0.9 what will be the value of $\beta$ ?(CO2, K1)	2

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## Page 2 of 4

2.c.	Why NAND and NOR are called universal Gate? (CO3, K1)	2
2.d.	Differentiate between mux and demux (CO4, K1)	2
2.e.	What is the difference between combinational and sequential circuit?(CO5, K1)	2
<u>SECTIO</u>	<u>N-B</u>	30
3. Answe	er any <u>five</u> of the following:-	
3-a.	Explain the general layout and components of power system with neat sketch. (CO1, K1)	6
3-b.	Use the loop (Mesh analysis) method to find the current in 5 $\Omega$ resistance of the circuit given below:- (CO1, K3)	6
	$20V = \begin{cases} 1\Omega & 4.5\Omega & 4\Omega \\ W & W & W \\ \hline \\$	
3-c.	Draw the V-I characteristics of pn junction diode and explain it. (CO2, K2)	6
3-d.	Define $\alpha$ and $\beta$ with respect to BJT and derive the relationship between them.	6
3.e.	(CO2, K2) make the following conversions:(CO3, K2) $(1011100001)_2=()_{10}$	6
	$(110101)_2=()_{BCD}$ $(25C)_{16}=()_2$ $(517)_8=()_2$	
	$(21AB7)_{16}=()_{10}$ $(345.25)_{10}=()_{2}$	
3.f.	Implement the function using 4:1 MUX. F=min(0,2,3,5,7) (CO4, K2)	6
3.g.	Explain the working of parallel in parallel out (PIPO) shift register in detail.(CO5, K2)	6
<b>SECTIO</b>	<u>DN-C</u>	50
4. Answe	er any <u>one</u> of the following:-	
4-a.	State and prove maximum power transfer theorem. (CO1, K2)	10
4-b.	<ul> <li>A household uses the following electric appliances:(a) Refrigerator of rating 400 W for ten hours each day. (CO1, K2)</li> <li>(b) Two electric fans of rating 80 W each for twelve hours each day.</li> <li>(c) Six electric tubes of rating 18 W each for 6 hours each day.</li> <li>Calculate the electricity bill of the household for the month of June if the cost per unit of electric energy is ₹ 3.00.</li> </ul>	10

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5. Answer any one of the following:-

<ul> <li>5-a. With the help of circuit diagram, explain the functioning of Bridge Rectifier.Give the comparision of HWR and FWR. (CO2, K2)</li> <li>5-b. Why biasing is necessary for transistor? List the name of various methods of biasing and explain voltage divider biasing. (CO2, K3)</li> <li>6. Answer any one of the following:-</li> <li>6-a. Draw the logic circuit and make truth table for : F(A,B,C) = A'+A'C+B(A'+C) (CO3, K2)</li> <li>6-b. Minimize the following boolian function using K-map and impliment various logic gate. f(A,B,C,D)= Σm(0,3,5,6,9,10,12,15) (CO3, K2)</li> <li>7. Answer any one of the following:-</li> <li>7-a. Design and explain full adder How can it be realized using two half-adders. (CO4, K2)</li> <li>8. Answer any one of the following:-</li> <li>8-a. Draw circuit of SR flip flop using NAND gate and write its truth table, characteristic table, characteristic equation and excitation table. (CO5, K2)</li> <li>8-b. Discuss in detail:- a)RAM b)ROM c)PROM d)EPROM (CO5, K1)</li> </ul>		6	
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