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Subject Code:- BEC0102

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: 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. **SECTION-A** 20 1. Attempt all parts:-1-a. Consider a circuit with two unequal resistances in parallel, then (CO1) (K1) 1 large current flows in large resistor (a)

- (b) current is same in both
- (c) potential difference across each is same
- (d) smaller resistance has smaller conductance
- 1-b. Three 2 ohm resistors are connected to form a triangle. The resistance between 1 any two corners is (CO1) (K1)
 - (a) 6**Ω**
 - (b) 2**Ω**
 - (c) 3/4Ω
 - (d) 4/3**Ω**

1-c. A doped semiconductor is also known as (CO2) (K1)

- (a) Intrinsic semiconductor
- (b) Diffused semiconductor
- (c) Extrinsic semiconductor
- (d) None of the above

1-d. Ripple factor of Full Wave Rectifier is: (CO2) (K1)

(a) 0.483

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Max. Marks: 100

1

1

	(b)	0.383		
	(c)	0.283		
	(d)	0.83		
1-e.	In	the saturated region, the transistor acts like a (CO3) (K1)	1	
	(a)	poor transistor		
	(b)	amplifier		
	(c)	open switch		
	(d)	closed switch		
1-f.	In a BJT, which of the following layers is heavily doped? (CO3) (K1)			
	(a)	Collector		
	(b)	Emitter		
	(c)	Base		
	(d)	Electron		
1-g.	To use FET as a voltage controlled resistor, in which region it should operate? (CO4) (K1)			
	(a)	Ohmic region		
	(b)	cut off		
	(c)	Saturation		
	(d)	cut off and saturation		
1 - h.	In a p-channel JFET, the charge carriers are(CO4) (K1)			
	(a)	electrons		
	(b)	holes		
	(c)	both electrons and holes		
	(d)	none of the above		
1-i.	W	That is the ideal voltage gain of an op-amp? (CO5) (K1)	1	
	(a)	0		
	(b)	1		
	(c)	∞		
	(d)	It varies depending on the op-amp model		
1-j.	In an inverting amplifier configuration, if the input voltage is positive, what is the polarity of the output voltage? (CO5) (K1)			
	(a)	Positive		
	(b)	Negative		
	(c)	Zero		
	(d)	It depends on the op-amp		
2. Atte	empt a	all parts:-		
2.a.	D	efine unilateral and bilateral elements. (CO1) (K1)	2	
2.b.	W	That is the value of knee voltage for Si and Ge diodes. (CO2)(K1)	2	

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2.c.	Why BJT is called a current controlled device? (CO3) (K1)	2
2.d.	Justify JFET is voltage controlled device. (CO4) (K1)	2
2.e.	Define input offset current and write down its formula. (CO5) (K1)	2
<u>SECTION-B</u>		30
2		

6

6

50

3. Answer any five of the following:-

3-a. Calculate currents in all the resistance of the circuit using nodal analysis method.(CO1)(K2)



3-b. For the given circuit, find the branch currents I_1 , I_2 and I_3 using mesh analysis. 6 (CO1) (K3)



- 3-c. Explain the following terms: (a) Potential Barrier (b) Knee Voltage (c) Forward 6 biased (d) Reverse biased (CO2) (K2)
- 3-d. Write short note no (i) Avalanche breakdown (ii) Zener breakdown (CO2) (K2) 6
- 3.e. Draw and explain the input and output characteristics of common emitter (CE) 6 configuration using NPN bipolar junction transistor. Indicate all the region of operations also. (CO3) (K2)
- 3.f. Sketch the V-I characteristics of JFET. Define pinch off voltage and mark it on the 6 characteristics. Explain its importance. (CO4)(K2)
- 3.g. Explain the characteristics of an ideal Op-Amp. Give value for these for IC741.(CO5) (K2)

SECTION-C

4. Answer any <u>one</u> of the following:-

4-a. State and prove maximum power transfer theorem. (CO1) (K3) 10

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4-b. Using mesh equation method, find current in the resistance R1 of the network shown in Figure (CO1) (K3)

10



- 5. Answer any one of the following:-
- 5-a. Draw and explain the V-I characteristics of ideal and practical PN junction diode. 10 (CO2) (K2)
- 5-b. Determine the value of VR,VL and IL and IZ for below figure. (CO2) (K3) 10



- 6. Answer any one of the following:-
- 6-a. Explain with neat diagram the CE, CC, CB Configuration for BJT. (CO3) (K2) 10
- 6-b. Explain the operation of collector to base bias circuit and write down the approximate10 equation of I_B , Ic and Vce operations also. (CO3) (K2)
- 7. Answer any one of the following:-
- 7-a. Explain construction and working of N/P channel JFET with their 10 symbol.(CO4)(K2)
- 7-b. Explain the construction and working of N channel depletion type MOSFET. 10 (CO4) (K2)
- 8. Answer any one of the following:-
- 8-a. Derive expression for inverting configuration. An inverting amplifier has an input 10 voltage of 1V. The input resistance $R1=2K\Omega$ and feedback resistance is $20K\Omega$. Find the output voltage and voltage gain of the amplifier.(CO5) (K3)
- 8-b. Explanation, how a Successive Approximation ADC operates, including the 10 successive approximation process? What are its application and disadvantages? (Draw suitable diagram) (CO5)(K2)