

Preparatory Test

Dept: EC	Sem / Div: 3 A & B	Sub: Electronic Devices	S Code: 18EC33
Date: 24-02-2021	Time: 9:30-12:30 pm	Max Marks: 100	Elective: N
Note: Answer any 2 full questions, choosing one full question from each part.			

QN	Questions	Marks	RBT	COs
Module 1				
1	a Explain the effects of temperature and doping on mobility.	7	L2	CO1
	b Calculate the value of resistivity of intrinsic silicon at room temperature.	7	L3	CO1
	c Explain classification of material based on conductivity and energy band diagram.	6	L2	CO1
OR				
2	a What are direct and indirect band gap semiconductors? Explain with examples.	7	L2	CO1
	b What are the types of bonding forces in solids? Explain.	5	L2	CO1
	c What is the magnitude of Hall voltage in a N type Germanium bar having a majority carrier concentration $N_D=10^{17} \text{ cm}^3$. Assume $B=0.2 \text{ Wb/m}^2$, $d=2 \text{ mm}$ and $E=10 \text{ V/cm}$	8	L3	CO1
Module 2				
3	a What is injection electro-luminescence and what are its applications?	7	L2	CO2
	b Explain the qualitative description of current flow at pn junction under equilibrium and biased condition.	8	L2	CO2
	c Illustrate the working of a photodetector.	5	L2	CO2
OR				
4	a With the help of I-V characteristics explain the optical generation of carriers in a pn junction.	8	L2	CO2
	b Explain the I-V characteristics of an illuminated solar cell.	6	L2	CO2
	c Distinguish between Zener breakdown and avalanche breakdown.	6	L2	CO2
Module 3				
5	a Explain the effect of base narrowing on the characteristics of a BJT.	6	L2	CO3
	b Explain the process flow for double polysilicon, self aligned npn BJT.	9	L2	CO3
	c Explain the switching operations in common emitter transistor.	5	L2	CO3
OR				
6	a With the help of I-V characteristics and schematic diagram explain the operation of pnp transistor.	7	L2	CO3
	b Write a note on the coupled diode model and derive the Ebers-Moll equations.	7	L2	CO3
	c Discuss the various factors involved in transistor amplification.	6	L2	CO3
Module 4				
7	a Draw the energy band diagrams of a MOS capacitor with n-type substrate in accumulation, depletion, and inversion mode.	7	L2	CO3
	b Explain P-channel enhancement and depletion type MOSFET with their circuit symbols.	6	L2	CO3
	c Draw the structure of a n-channel JFET and discuss the V-I characteristics	7	L2	CO3
OR				

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8	a	Sketch the C-V characteristics of an MOS capacitor with n-type substrate under the low-frequency condition and explain.	7	L2	CO3
	b	With a neat diagram explain the small signal equivalent circuit of a n-channel JFET.	8	L2	CO3
	c	Discuss the frequency limitation factors of a JFET and define the cutoff frequency.	5	L2	CO3

Module 5

9	a	What is rapid thermal processing? Explain in brief.	8	L2	CO4
	b	Classify the ICs based on their use and method of fabrication	6	L2	CO4
	c	Discuss the advantages of ICs in terms of miniaturization.	6	L2	CO4
OR					
10	a	With a schematic diagram explain the ion implantation system.	7	L2	CO4
	b	Explain the thermal oxidation process used in the fabrication of pn junctions	7	L2	CO4
	c	Illustrate the common fabrication steps used for CMOS integrated circuits.	6	L2	CO4