

Reg.No. _____



Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : **14EC2002**
Sub. Name : **Electron Devices**

Semester : **2016-17 ODD**
Duration : **3hrs**
Max. marks : **100**

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	Calculate the probability that a state in the conduction band is occupied by an electron and calculate the thermal equilibrium electron in silicon at 300k. Assume the Fermi energy is 0.25eV below the conduction band. N_c for silicon at $T=300K$ is $2.8 \times 10^{19} \text{ cm}^{-3}$.	CO1	8
	b.	With the energy band structure of compensated semiconductor derive the mathematical equation for electron concentration.	CO1	12
(OR)				
2.	a.	Derive the thermal equilibrium concentration of electrons (n_0) with the band structure showing the distribution of electrons and holes.	CO1	20
3.	a.	Explain the principle of Hall Effect and derive the expression of Hall voltage and Hall Coefficient.	CO1	12
	b.	Draw the p-n junction showing all the current components and define large signal current gain.	CO1	8
(OR)				
4.	a.	Explain how depletion region is formed when P and N material are brought together. Derive the potential energy of open circuited junction in terms of electron volt.	CO1	15
	b.	Differentiate drift and diffusion current.	CO1	5
5.	a.	Derive the continuity equation for holes and electrons in the body of a semiconductor as a function of time and distance.	CO2	14
	b.	Define the small signal parameters with the small signal equivalent PN diode model.	CO2	6
(OR)				
6.	a.	With neat circuit and V-I characteristic curve explain the functional operation of PN junction diode. Also mention the applications of the same.	CO2	15
	b.	What do you mean by indirect recombination?		5
7.	a.	Explain the construction and working principle of Junction Field Effect Transistor. Also plot the drain and transfer characteristics of the circuit.	CO2	15
	b.	List out the advantages of JFET over BJT	CO3	5
(OR)				
8.	a.	With neat circuit diagram, analyze the input and output characteristics of Common Base Bipolar Junction Transistor configuration.	CO3	15
	b.	Plot the curve between emitter current and base voltage in UJT and mark the negative resistance region.	CO3	5
Compulsory:				
9.	a.	With neat diagram explain the operation of TRIAC with its dc characteristics.	CO3	9

	b.	How electrical energy is converted to light energy in Light Emitting Diode	CO3	6
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ALL THE BEST