Hall Ticket Number:

Code No. : 12027 AS N (C)

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. (CBCS) II-Semester Advanced Supplementary Examinations, July-2019
Quantum Mechanics & Semiconductor Physics
(EEE & ECE)

Time: 3 hours

Max. Marks: 60

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. List the postulates of quantum mechanics
2. What is the concept of De Broglie waves
3. What quantum mechanics phenomena explain the Alpha decay
4. Explain Born interpretation of wave function.
5. What are the limitations of classical free electron theory?
6. What are the main assumptions of Somerfield theory?
7. Compare intrinsic and extrinsic semiconductors
8. Define hall effect
9. Define drift and diffusion currents
10. What is diffusion coefficient

Part-B (5 × 8 = 40 Marks)

11.	a)	Derive formula for de-Broglie wavelength of a particle and for an electron.	[5]
	b)	Describe wave function and explain its physical significance.	[3]
12.	a)	Derive time in dependent Schrodinger wave equation.	[6]
	b)	What do you mean by free particle	[2]
13.		Explain the salient features of kronig-penny model and how it lead to band theory of solids.	[8]
14.	a)	What is N-type semiconductor? Show that the carrier concentration in N-type semiconductor is proportional to square root of its donor concentration.	[5]
	b)	Derive the expression for Hall coefficient and Hall voltage.	[3]
15.	a)	Determine the behavior of diode in equilibrium without any bias conditions.	[5]
	b)	Explain the terms "diffusion length" and "carrier life time".	[3]
16.	a)	Define wave function and explain its significance.	[4]
	b)	Analyze the concept of potential barrier and tunneling in quantum mechanics	[4]
17.		Answer any *two* of the following:	
	a)	Explain the formation of Ohmic and Schotkky junctions.	[4]
	b)	Examine how doping will improve the conductivity of semiconductors.	[4]
	c)	Identify the importance of continuity equation.	[4]

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