Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth Semester B.Tech Degree Examination June 2022 (2015 Scheme)

Course Code: EC402

Course Name: NANOELECTRONICS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks. Marks

1 a) Show that density of states in a 2D nanostructure is independent of energy. (10)

b) Explain quantum mechanical coherence. (5)

2 a) Illustrate the process of molecular beam epitaxy for fabricating nano layers. (10)

b) List any five properties of graphene (5)

3 a) Differentiate between dry and wet oxidation methods for fabricating nano layers. (5)

b) Explain Sol-Gel process for fabricating nano particles (10)

PART B

Answer any two full questions, each carries 15 marks.

4 a) Write notes on Si Ge heterostructures and why it is used for fabricating high frequency transistors. (10)

b) With the aid of diagrams, explain the concept of multiple quantum well and its types. (5)

5 a) Explain the different interactions taking place between specimen and electron beam in a SEM. (10)

b) Explain the concept of zone folding in superlattice. (5)

6 a) Illustrate the working principle and modes of operation of Scanning Tunneling Microscope. (10)

b) Explain how band gap can be calculated using UV visible absorption spectroscopy? (5)

PART C

Answer any two full questions, each carries 20 marks.

7 a) Explain Coulomb blockade effect. Draw the schematic and equivalent circuit diagrams and explain the working of single electron transisitor. (10)

	b)	Illustrate the working of quantum dot LED.	(5)
	c)	With the help of neat schematic diagram, explain MODFETs.	(5)
8	a)	Explain the process of quantum transport in nanostructures, Derive Landauer formula and explain its significance.	(10)
	b)	Explain the effect of magnetic field in the energy levels and density of states in a 2D system.	(5)
	c)	Explain (a) velocity overshoot effect (b) real space transfer	(5)
9	a)	Explain CNT transistors and its types.	(10)
	b)	Explain Aharanov – Bohm effect	(5)
	c)	Explain perpendicular transport in quantum structures.	(5)

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