Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION(S), OCTOBER 2019

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)	Explain sol-gel process and how you can fabricate a quantum wire using the technique.	(10)
	b)	Explain quantum mechanical coherence.	(5)
2	a)	Starting from Schrodinger equation, show that the density of states in a 2D nano material is independent of energy.	(10)
	b)	Explain the precipitation of quantum dots.	(5)
3	a)	Explain the different types of PVD techniques.	(10)
	b)	Explain any ten properties of graphene.	(5)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	Define the term Photoluminescence. Discuss with neat diagrams PL spectroscopy in detail.	(10)
	b)	Compare electron and optical microscope.	(5)
5	a)	Illustrate the working of SEM .Explain the different specimen interactions.	(10)
	b)	Explain how conductivity is increased in 2D electron gas in AlGaAs-GaAs structure.	(5)
6	a)	Compare MQW with superlattice structure.	(8)
	b)	Explain modulation doping and why mobility of carrier increases in modulation doped structure.	(7)

PART C

Answer any two full questions, each carries 20 marks.

7	a)	Derive Landauer Formula and explain its significance.	(9)
	b)	Explain Landau levels and its variation with magnetic field.	(6)
	c)	Explain perpendicular transport in quantum structure.	(5)

8	a)	Explain the Shubnikov-de Hass effect of magnetic fields on the electronic and transport properties of the 2D systems.	(10)
	b)	Explain Resonant Tunnel Effect and the operation of Resonant Tunnel Diodes.	(10)
9	a)	Illustrate the working of a quantum well optical modulator.	(8)
	b)	With the help of a neat schematic diagram explain MODFETs.	(8)
	c)	Explain the concept of hot electrons.	(4)

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