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Pages: 1

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth semester B.Tech degree examinations, September 2020

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 de-Broglie wavelength & Screening length in mesoscopic systems.	(5)
	b)	Explain parabolic & triangular quantum wells with neat diagrams.	(10)
2	a)	Explain the process of Physical Vapour Deposition in the fabrication of nano-layers.	(7)
	b)	Explain laser ablation.	(8)
3	a)	Explain Quantum wells, wires & dots & compare each.	(5)
	b)	Explain the process of grinding with iron balls in the fabrication of nanoparticles.	(5)
	c)	Write short notes on: i) Carbon nanotubes ii) Sol-gel process	(5)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	Differentiate between electron & optical microscope.	(4)
	b)	Explain the principle of Scanning Tunnelling Microscope with neat diagrams.	(6)
	c)	Explain X-Ray Diffraction analysis.	(5)
5	a)	Write notes on Modulation doped hetero-junctions.	(5)
	b)	Explain SEM with suitable diagrams.	(10)
6	a)	Compare STM and AFM.	(3)
	b)	Write short notes on PL & UV spectroscopy.	(7)
	c)	Explain the structure & energy band diagram of MOSFET.	(5)

PART C

Answer any two full questions, each carries 20 marks.

7	a)	Explain the resonant tunnelling effect with neat diagrams.	(6)
	b)	Explain Coulomb blockade in nanostructures.	(6)
	c)	Derive Landauer formula for Quantum transport in nanostructures.	(8)
8	a)	Explain the structure of Single electron transistor with neat diagrams.	(10)
	b)	Write short notes on i) Quantum dot Laser ii) CNT transistors.	(10)
9	a)	Explain the electron Scattering mechanism for parallel transport in semiconductor nanostructures.	(10)
	b)	Explain the structure of MODFET.	(6)
	c)	Write short notes on i) NEMS.	(4)

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