

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019****Subject Code: 2173902****Date: 26/11/2019****Subject Name: Spintronics****Time: 10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		<b>MARKS</b>
<b>Q.1</b>	(a) Write down wave function equation in the vicinity of Quantum Mechanics.	<b>03</b>
	(b) Draw the ferromagnetic and antiferromagnetic configurations of magnetic multilayers film.	<b>04</b>
	(c) Write a short note on early history of electron spin.	<b>07</b>
<b>Q.2</b>	(a) Sketch spin based silicon transistor with necessary notation.	<b>03</b>
	(b) Explain normal magneto resistance:	<b>04</b>
	(c) Explain : Spin Hall Effect	<b>07</b>
	<b>OR</b>	
	(c) Write a short note on simple free electron theory.	<b>07</b>
<b>Q.3</b>	(a) Define : Elastic Collision at the surfaces	<b>03</b>
	(b) Draw three different type of geometry in spin LED.	<b>04</b>
	(c) Explain resistance change in multilayer structure in the vicinity of spintronics devices.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Write down various reasons for the spin scattering in spintronics devices.	<b>03</b>
	(b) Explain: periodic super lattice in the vicinity of spintronics.	<b>04</b>
	(c) Write a short note on electron transport theory covering Boltzmann equation.	<b>07</b>
<b>Q.4</b>	(a) List out various problems associated with spin-LED for real life application.	<b>03</b>
	(b) Draw current flows mechanism in CPP (Current perpendicular to plane) geometry for the multilayer GMR Devices.	<b>04</b>
	(c) Write a short note on Ratchet effect in domain wall.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Define : current driven domain wall motion	<b>03</b>
	(b) What do you mean by domain wall scattering?	<b>04</b>
	(c) Explain working of Spin LED with necessary diagram.	<b>07</b>
<b>Q.5</b>	(a) Draw the schematic illustration of the magnetization reversal process in a ferromagnetic wire.	<b>03</b>
	(b) Write a short note on Oxide-based tunnel injectors.	<b>04</b>
	(c) Write a short note on Domain wall velocity measurements.	<b>07</b>
	<b>OR</b>	
<b>Q.5</b>	(a) Define: Quantum Dot.	<b>03</b>
	(b) Write a short note on Spin and exchange effect in quantum dot.	<b>04</b>
	(c) Write a short note on spin photo electronic devices.	<b>07</b>

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