

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2018****Subject Code: 2173902****Date: 19/11/2018****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.

		MARKS
<b>Q.1</b>	(a) Write down Schrödinger equation for a single particle in the vicinity of spintronics.	<b>03</b>
	(b) Draw the Ferromagnetic and Antiferromagnetic configurations of magnetic multilayers film.	<b>04</b>
	(c) In brief explain history of Spin and Quantum Mechanics of spin.	<b>07</b>
<b>Q.2</b>	(a) What do you mean by Periodic Superlattice? Draw the schematic representation.	<b>03</b>
	(b) Draw current flows mechanism in CIP (current in plane) geometry for the multilayer GMR Devices.	<b>04</b>
	(c) Write a short note on Spin Orbital Interaction.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(c) Explain : Resistor Network Theory of GMR	<b>07</b>
	(a) Give the name of various magnetic semiconductor used in spintronics devices.	<b>03</b>
	(b) Draw three different type of geometry in spin LED.	<b>04</b>
	(c) Write a short note on resistance change in multilayer structure.	<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) Draw the Schematic drawing of Spin based silicon transistor.	<b>04</b>
	(c) Write a short note on Electron transport theory covering Boltzmann equation.	<b>07</b>
<b>Q.4</b>	(a) What do you mean by current-driven domain wall motion?	<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) Write down various issues associated with spin-LED devices during the actual operation.	<b>03</b>
	(b) What do you mean by Domain wall scattering?	<b>04</b>
	(c) Explain working of Spin LED.	<b>07</b>
<b>Q.5</b>	(a) Give the example few Heusler alloys for Spintronics Device.	<b>03</b>
	(b) What do you mean by Schottky 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) Draw the vertical quantum dot with three-dimensional electron gas.	<b>03</b>
	(b) Explain 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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