

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