Seat No.: _____ Enrolment No._____

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.**

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

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