

**GEOGRAPHIC INFORMATION SYSTEMS
GEOGRAPHIC INFORMATION CENTER
PO BOX 5839
MC ALLEN, TEXAS 78502-5839**

1-800-522-0139

**kh@acnet.net
Copyright 2010**

***** EXAMINATION *****

SPIN TRANSFER TORQUE AND DYNAMICS

1. **Ferromagnets are properties that can be used to store**
 - a) information in form of magnetic tapes
 - b) information in form of magnetic disk drives
 - c) information in form of magnetic random access memory
 - d) all of the above

2. **When a current flows through a ferromagnet, it becomes spin**
 - a) transfer torque and carries orbital angular momentum
 - b) polarized and carries angular momentum
 - c) integer and carries angular momentum
 - d) half-integer and carries angular momentum

3. **A simplest way to get a small cross sectional area is**
 - a) through a mechanical contact
 - b) through a chemical contact
 - c) through an organic contact
 - d) through an electrical contact

4. **A system at finite temperature will find its ground state**
 - a) over a short measurement time
 - b) over a long enough measurement time
 - c) over an indefinite measurement time
 - d) over a definite measurement time

5. **Frequency distribution of the noise is typically described**
 - a) by the signal spectrum density
 - b) by the soundwave spectrum density
 - c) by the power spectrum density
 - d) by the heat spectrum density

6. **The width of the hysteretic region depends on the**
 - a) measurement time and temperature
 - b) measurement thickness and length
 - c) measurement capacity and volume
 - d) measurement resistance and capacity

7. **Measurement of a thickness dependence show that the critical**
- a) current increase as thickness of the free layer increases
 - b) current increase as thickness of the fixed layer increases
 - c) current decrease as thickness of the free layer increases
 - d) current decrease as thickness of the fixed layer increases
8. **Causing the spin current for different magnetic configuration**
- a) is the domain of classical calculations of the transport
 - b) is the domain of semiclassical calculation of the transport
 - c) is the domain of semiclassical calculation of the current
 - d) is the domain of classical calculation of the current
9. **In atomic physics, the exchange interaction causes most**
- a) atoms to have ferromagnetic moments
 - b) atoms to have ferromagnetic fall out
 - c) atoms to have magnetic moments
 - d) atoms to have magnetic fall out
10. **The simplest treatment of the leads is**
- a) to treat them as sensors
 - b) to treat them as reservoirs
 - c) to treat them as transmitters
 - d) to treat them as capacitors
11. **If the magnetization is uniform across the interface,**
- a) the accumulated spins are aligned
 - b) it will lead to spin-transfer torques
 - c) they return and scatter from the interface
 - d) the spins will rotate and scatter from any location
12. **The behavior of the magnetization can be measures as**
- a) a function of current
 - b) an applied field
 - c) the geometry of the device
 - d) All of the above
13. **As a result of the action of the stochastic field,**
- a) magnetization motion displays steadiness
 - b) magnetization motion displays fluctuations
 - c) temperature motion displays increase
 - d) temperature motion displays fluctuations
14. **The magnitude of the torque depends on the polarization of the**
- a) current flowing from the fixed layer to diffusion length
 - b) current flowing from the free layer to diffusion length
 - c) current flowing from the fixed layer to the free layer
 - d) current flowing from the free layer to the fixed layer

15. **A model that describe the system when the magnetization**
- a) remains uniform during the sampling is the macrospin model
 - b) remains uniform during the sampling is the static model
 - c) remains uniform during the sampling is the dynamic model
 - d) remains uniform during the sampling is the numeric model
16. **The standard form used to describe damping in all of the**
- a) calculations is numerical
 - b) calculations is electrological
 - c) calculations is chronological
 - d) calculations is phenomenal
17. **The ultimate driving force for magnetic effects is**
- a) external interaction
 - b) exchange interaction
 - c) angular interaction
 - d) lateral interaction
18. **The reflection and transmission of electrons with moments at**
- a) arbitrary angles to the magnetization establish the torque
 - b) arbitrary angles to the magnetization establish the lateral
 - c) arbitrary angles to the magnetization establish the domain
 - d) arbitrary angles to the magnetization establish the spin
19. **The behavior of spin currents at interfaces is dominated by**
- a) the spin dependent reflection of angular dependence
 - b) the spin dependent reflection of precessional states
 - c) the spin dependent reflection of electrons
 - d) the spin dependent reflection of cross sectional area
20. **When the electrons are in the ferromagnet, the different**
- a) spin components have different spin torque
 - b) spin components have different polarization rate
 - c) spin components have different filter effect
 - d) spin components have different wave vectors

GEOGRAPHIC INFORMATION SYSTEMS
 GEOGRAPHIC INFORMATION CENTER
 PO BOX 5839
 MC ALLEN, TEXAS 78502-5839

1-800-522-0139
 kh@acnet.net
 Copyright 2010

*** ANSWER SHEET *** U540 SPIN TRANSFER TORQUE AND DYNAMICS	<u>STATE BOARD</u>	<u>COURSE NO.</u>	<u>VALUE</u>
			8 PDH
Office Use Only			

FILL IN ONE BOX FOR EACH ANSWER.

	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

I hereby certify that I studied the course materials, and the above answers are my own. No one has helped me to complete this exam.

 Signature Date

 Printed or typed name

 Seal or Number

**GEOGRAPHIC INFORMATION SYSTEMS
GEOGRAPHIC INFORMATION CENTER
PO BOX 5839
MC ALLEN, TEXAS 78502-5839**

(800) 522-0139

**kh@acnet.net
Copyright 2010**

Name _____

Company _____

Address _____

City _____ **State** _____ **Zip** _____

Telephone _____ **E-Mail** _____

Fax _____ **24-Hour Fax**

Yes **No** **If fax and telephone are the same number, shall we call first?**

Mail the certificates to above address _____ **check address** _____ **envelope address**

State + Specialty + PE Registration number (i.e. TX EE 12389) _____

State + Professional Land Surveying registration number _____

NC (North Carolina) + Specialty + PE Registration number _____

NC (North Carolina) + Professional Land Surveying registration number _____

Professional Affiliations _____

Return this page with your answer sheet and a check or money order for \$100 per course. Use one check for each registrant (in your company) taking one or more courses. We accept company checks (if they are your employer's). We do not accept third-party checks or checks outside of your city of residence. Using third-party checks that do not include your name or company name may invalidate your professional development hours being reviewed by an audit process. Add \$5 for same day processing and priority shipping.

Make checks or money orders payable to Geographic Information Systems.

