KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF ELECTRICAL ENGINEERING

EE 418 INTRODUCTION TO SATELLITE COMMUNICATIONS EXAMINATION I
November 19, 2006

NAME :	
I.D. # :	

Q.1 Answer the following questions. (a question may have more than one answer).

1) Which of the following parameters are needed to find the look angles for a geo-stationary satellite?
   a. Earth station latitude b. Earth station longitude
   c. Satellite range d. Satellite longitude

2) An azimuth angle is given as 270^{o}. What compass direction is this?
   a. North b. East c. South d. West

3) An earth station is located in the Equador, which is in the southern hemisphere, at a longitude of 80^{o} west. In which part of the sky would you locate a satellite with a sub-satellite point longitude of 115^{o} west.
   a. North b. North- East c. East d. South- East
   e. South f. South- West g. West h. North- West

4) The TT&C sub-system allows an earth station controlling the satellite to:
   a. Send commands to the satellite b. Change the satellite orbit
   c. Receive mobile satellite services d. Receive status data
5) The space segment of the basic satellite system consists of:
   a. The satellite b. The TT&C earth station
   c. FSS earth station d. Any VSAT connected to the system

Q.2 Calculate the look angles for an earth station at Dhahran, Saudi Arabia to establish communications with ARABSAT 2A at 26.0^{o} East. Dhahran location is 26.180^{o} North and 50.08^{o} East.

Q.3 The radiation intensity of an antenna is defined in the region $0^{\circ} \le \theta \le 180^{\circ}$ & $0^{\circ} \le \phi \le 180^{\circ}$ and is given by: $U(\theta,\phi) = \frac{25}{\pi}\sin\theta \sin^{3}\phi$. Calculate the following:

i) The radiated power P_{rad} in W and dBW.
ii) The directivity of the antenna (D_0).
iii) The gain of the antenna if the antenna efficiency is 85%
iv) The half-power beamwidth (HPBW) in the elevation plane (y-z plane)

PROBLEM #	Q. 1	Q.2	Q.3	TOTAL
Marks				
Maximum	30	30	40	100