

- N.B. (1) Question No. 1 is compulsory.  
 (2) Attempt any four questions out of six remaining questions.  
 (3) Illustrate answers with suitable sketches and diagrams.  
 (4) Assume suitable data wherever necessary.

1. (a) Between a pager, a cellular phone, and a cordless phone which device will have longest battery life between charging? Why? 5  
 (b) Explain N-Amps and ETACS in short. 5  
 (c) Explain security algorithm in GSM. 5  
 (d) Write a note on adaptive power control and discontinuous transmission. 5
2. (a) Discuss IMT 2000 system. 10  
 (b) Using 2-Ray model prove that received power at mobile terminal is- 10

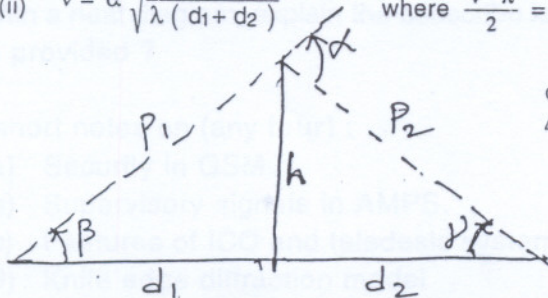
$$P_r = P_t G_t G_r \frac{h^2}{d^4}$$

where  $P_t$  = transmitted power  
 $G_t$  = transmitter gain  
 $G_r$  = Receiver gain

3. (a) Explain with suitable block diagram, modulation process on Forward IS95 channel. 10  
 (b) Explain DECT standard w.r.t. following terms. 10  
 (i) Radio and Signalling Aspects.  
 (ii) Architecture.
4. (a) List out various statistical models available for multipath fading channels. Explain any one of them in detail. 10  
 (b) List and explain specifications of radio transmission in GSM system. 10
5. (a) For the knife-edge geometry in following figure show that- 12

(i)  $\phi = \frac{2\pi\Delta}{\lambda} = \frac{2\pi}{\lambda} \left[ \frac{h^2}{2} \left( \frac{d_1 + d_2}{d_1 d_2} \right) \right]$  and

(ii)  $v = \alpha \sqrt{\frac{2 d_1 d_2}{\lambda (d_1 + d_2)}}$  where  $\frac{v^2 \pi}{2} = \phi$



$d_1 d_2 \gg h, \quad h \gg \lambda$  and  
 $\Delta = P_1 P_2 - (d_1 + d_2)$

- (b) Explain data security and data privacy in GSM. 8
6. (a) Define following parameters for CDMA based mobile systems- 12  
 (i) Power control subchannel.  
 (ii) Orthogonal covering.  
 (iii) Direct sequence spreading in reverse traffic channel.  
 (b) Explain umbrella cell approach and cell dragging. 8
7. Write short notes on :- 20  
 (a) Features of ICO and Teledesic.  
 (b) Subscriber Identify Module.  
 (c) Sectorization for Capacity Improvement.  
 (d) Modulation Process in Amps.