

編號：E 418 系所：電信管理研究所乙組

科目：通訊導論

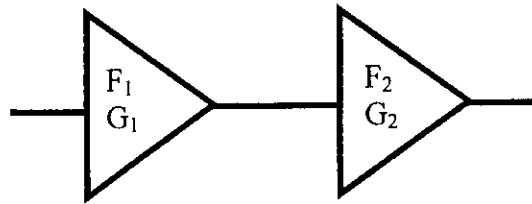
本試題是否可以計算機： 可使用， 不可使用（請命題老師勾選）

1. Please explain the following terms in detail.

- (a) FDD (4%)
- (b) TDD (4%)
- (c) FDMA (4%)
- (d) TDMA (4%)
- (e) CDMA (4%)

2. (a) What is Noise Figure? Please explain it in detail. (5%)

(b) Describe the functions of Low Noise Amplifier? (5%)

(c) If we have a cascade amplifier shown below, where  $F_1=3$  dB,  $G_1=20$  dB,  $F_2=10$  dB,  $G_2=10$  dB, find the overall noise figure. (10%)3. A source emits one of four symbols  $S_0$ ,  $S_1$ ,  $S_2$ , and  $S_3$  with probabilities  $1/3$ ,  $1/6$ ,  $1/4$ , and  $1/4$ , respectively. The successive symbols emitted by the source are statistically independent.

(a) Find the amount of information gained by observing the source emitting each of these symbols. (10%)

(b) Calculate the entropy of the source. (10%)

4. (a) What is RAKE receiver? Please explain it in detail. (5%)

(b) Sketch the block diagram of a RAKE receiver. (5%)

(c) Describe the principles and advantages of RAKE receiver. (10%)

5. Please explain the principles of the following modulation methods in detail.

- (a) Binary ASK (5%)
- (b) Binary FSK (5%)
- (c) QPSK (5%)
- (d) QAM (5%)

Note:  $\log_{10}(2)=0.3010$ ,  $\log_{10}(3)=0.4771$ ,  $\log_{10}(5)=0.6990$ ,  $\log_{10}(7)=0.8451$ , $\ln(2)=0.6931$ ,  $\ln(3)=1.0986$ ,  $\ln(5)=1.6094$ ,  $\ln(7)=1.9459$ , $\log_{10}(e)=0.4343$ ,  $\log_a(b)=\log_x(b)/\log_x(a)$