

Logarithm homework, 1372

Solve the following equations:

1)  $m^{2.3} = 25$  Solve for  $m$

2)  $x = \log_3 2187$  Solve for  $x$

3)  $L_1 = ((L_2)^2)^{\frac{1}{3}}$  Solve for  $L_2$

4)  $I = (V/L)te^{Sct}$  Solve for  $Sc$

5)  $I_k = AT^2e^{-(B/T)}$  Solve for a)  $A$  and b)  $B$

- 1) An amplifier is rated as having a 90-dB gain. What power ratio does this represent?
  
- 2) An amplifier has a gain of 60 dBm. If the input power is 1mW, what is the output power?
  
- 3) The manufacturer of a high-fidelity 100-W power amplifier claims that hum and noise in the amplifier is 90 dB below full power output. How much hum and noise power does this represent?
  
- 4) A network has a loss of 80 dB. What power ration corresponds to this loss?
  
- 5) An amplifier has an input impedance of 600 ohms and an output impedance of 6000 ohms. The power output is 30-W when 1.9 V is applied across the input.
  - a) What is the voltage gain of the amplifier?
  
  - b) What is the power gain in decibels?
  
  - c) What is the power input?

- 6) The noise level of a telephone line used for wired music programs is 60 dB down from the program level of 12.5 mW. How much noise power is represented by this level?
- 7) A crystal microphone is rated at -80dB. There is on hand a final AF amplifier rated at 60dB. How much gain must be provided by a pre-amp in order to drive the final amplifier to full output if an attenuator pad between the microphone and the pre-amp has a loss of 20 dB?
- 8) An amplifier has a normal output of 30W. A selector switch is arranged to reduce the output in 5 dB steps. What power outputs correspond to reductions of 5, 10, 15, 20, 25, & 30 dB?

- 9) A two-stage video RF amp has a  $300\mu\text{V}$  input signal into 75 ohms. The second stage has a gain of 50dB. When matched input-output impedances are used, the voltage output of the second stage must be 4.22 V to allow distribution of the signal. Determine:
- a) The input voltage of the second stage.
  - b) The dB gain of the first stage.
  - c) The overall gain of the two amplifiers when all impedances are 75 ohms
- 10) A video tuner amplifier has an input impedance of 300 ohms and an output impedance of 3500 ohms. When a 300mV signal is applied at the input, a 250V signal appears at the output.
- a) What is the power output of the amplifier?
  - b) What is the power gain in dB?
  - c) What is the voltage gain of the amplifier?

- 11) Given the following specifications for a 2N45 transistor what is the power input?
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|-------------------|-----------|
| Collector voltage | -20V      |
| Emitter current   | 5mA       |
| Input impedance   | 10 ohms   |
| Source impedance  | 50 ohms   |
| Load impedance    | 4500 ohms |
| Power output      | 45mW      |
| Power gain        | 23dB      |
- 12) The input power to a 50 Km line is 10mW. The output of this line is 40  $\mu$ W. What is the attenuation of this line per kilometer?
- 13) What is the dB gain necessary to produce a 60  $\mu$ W signal in 600 ohm telephones if the received signal supplies 9  $\mu$ V to the 80 ohm line that feeds the receiver?
- 14) In problem 13, if the overall gain is increased to 96dB what received signal will produce the 60 $\mu$ W signal in the telephones?
- 15) The voltage across a 600 ohm telephone is adjusted to 1.73 volts. When an audio filter is installed in the circuit, the voltage drops to 1.44 volts. What is the insertion loss of the filter?