



Kafrelsheikh University - Faculty of Engineering			
Course	Communication systems (1)	Date	19/1/2020
Time	3 Hours	Mark	85
Students	3 th year Electronics and Electrical Communications		

Answer all the following questions:
Clarify your answer with the suitable diagrams.

Q1.a Explain the following wired channels. (5 Marks)

a- Coaxial cable b- Optical Fiber

Q1.b Compare between the following Modes of channel operation including Examples. (5 Marks)

a- Simplex b- Half Duplex c- Full Duplex

Q2.a Prove that the bandwidth requirement for the DSB-SC is $W=2f_m$, where f_m is the maximum frequency of the message signal $m(t)$. Assume and draw the spectrum of the modulating signal $M(f)$, then draw the DSB-SC signal $U(f)$. (10 Marks)

Q2.b Explain How to construct a Full AM demodulator using an envelope detector. (5 Marks)

Q3. The output signal from an AM modulator is (10 Marks)

$$u(t) = 10 \cos 3800\pi t + 40 \cos 4000\pi t + 10 \cos 4200\pi t$$

a-Determine the modulating signal $m(t)$ and the carrier $c(t)$.

b-Determine the modulation index.

c-Determine the ratio of the power in the sidebands to the power in the carrier.

Q3.b Draw and Explain the switching modulator for AM modulation. (5 Marks)

Q4.a An angle-modulated signal has the form $u(t)=100 \cos[2\pi f_c t + 4 \sin 2\pi f_m t]$ where $f_c =10$ MHz and $f_m=1000$ Hz. If this is an FM signal, determine the modulation index and the transmitted signal bandwidth. (10 Marks)

Q4.b Draw and explain How to generate a narrow band angle modulation, then draw and explain how to expand it to get a wideband FM signal. (5 Marks)

Q5.a Explain the superheterodyne receiver in FM radio broadcast. (10 Marks)

Q5.b Explain the image frequency phenomena in the superheterodyne AM receiver. What is the effect of the image frequency on the received signals? How to eliminate the image frequency? (5 Marks)

Q6.a Explain the FM Stereo Broadcasting in Radio communications. (10 Marks)

Q6.b Explain why, in the FM Stereo Broadcasting used in Radio communication, the sum and difference between the composite signal $m_l(t)+m_r(t)$ and $m_l(t)-m_r(t)$ are sent instead of each composite signal individually. (5 Marks)