اختبارات وقياسات كهربية

Kaferelsheikh University
Faculty of Engineering
Department of Electrical Engineering
Year: 3rd communication
Subject: Electronic Measurements & Testing(1), ECE3006
Name:

Date: 23/ 5 /2018
Time allowed: 3h
Full Mark: 85 degree
Final Exam: 2 page
Academic Number:

This exam measures ILOs no a.4, a. 5. , a.6 , a.8 ,a.12 , a.13 a.14 , a.17, a.23 and a.26 b.2, b.3, b.4 , b.5 , b.6 , b.8 , b.9 ,b.11, b.12 , b14, and b.16 c1 , c.3 ,c.4,c.5, c.6, c.15, c.16, c.17 andc.18 d.1, d.3, d.6.

Question 1 (25) Degrees

a. **Design** a notch filter at f_c=100 Hz, and k_{PB}=1.(9 degrees)

b. **Sketch Nyquist** criterion to determine the stability of the open loop gain. Aβ(S)=2/S(S+1)(2S+1) by gain margin. Then estimate the range of stability with unity feedback by Routh. .(9 degrees)

c. **Sketch a block** diagram for a practical phase shift oscillator for amplifier stabilization at 6.5GHz, Explain the function of each component. .(7 degrees)

Question 2 (17)Degrees

a. **Sketch a block** diagram for a practical implementation of the active filter tuned oscillator. **Explain** the function of each component. .(9 degrees)

b. **Sketch a block** diagram of pierce oscillator, **explain** the principle operation of it briefly .(8 degrees)

Question 3[measures ILOs ofa4, a8,a14, b4 and b5]

a- Explain with aid of sketches, the demodulation of AM using rectifier detector.

b- Sketch the modulator and demodulator block diagrams of the single side band amplitude modulation

c- The AM signal : $s(t) = A_c[1 + k_a\, m(t)]cos(2.pi.f_c.t)$ is applied to the system in figure 1. Assuming that the message signal is limited to the interval $-W \le f \le W$ and the carrier frequency $f_c > 2W$ show that m(t) can be obtained from the square rooter

Fig.1

d- A DSB-SC AM signal is modulated by the signal : $m(t)=2\cos 2000\pi t$ .The carrier signal is $c(t)=100\cos 2\pi\times 10^6\ t$

i- Sketch the modulated signal in time domain.

ii- Determine and sketch the spectrum of the AM signal.

iii- Calculate the average power of the AM signal.

Question 2[measures ILOs ofa14, b4, b5,b8, b12,c1 and c5]

a- Explain, with aid of diagram, the demodulation of WBFM using phase locked loop (PLL).

b- The carrier $c(t)= A\cos 2\pi 10^6 t$ is angle modulated (PM or FM) by the sinusoid signal $m(t)=2\cos 2000\pi t$. The deviation constants are $k_p=1.5$ rad/V and $k_f= 3000$ Hz/V.

- Write general form equation in each case.
- Determine the bandwidth in each case

c- A signal m(t) band limited to 5 kHz is sampled at a rate 30% higher than the Nyquist rate. The maximum acceptable error in the sample amplitude is 0.5% of the peak amplitude. The quantized samples are binary coded. Find the minimum band width of the channel required to transmit the encoded binary signal.