Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2013/2014

COURSE NAME	:	ELECTRONIC COMMUNICATION SYSTEM
COURSE CODE	:	BNR 20903
PROGRAMME	:	BND
EXAMINATION DATE	:	JUN 2014
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1 (a) Transmission impairments is defined as any undesired effect on the signals while traveling from a transmitter to a receiver. With your knowledge in communication, explain three transmission impairments in communication systems.

(6 marks)

(b) For a three stage system $P_{in} = -30dBm$ and power gains of the three stages as $AP_1 = 20dB, AP_2 = 10dB$, and $AP_3 = -8dB$. Determine the output power in dBm and watts

(4 marks)

(c) In AM broadcast system, the sine wave of the carrier signal is given by $v_c = V_c \sin(2\pi f_c t)$. A sine wave of the modulating signal is given by $v_m = V_m \sin(2\pi f_m t)$ Derive the complete expression of the AM signal showing the expression for carrier, lower sideband and upper sideband.

(10 marks)

Q2 (a) Explain the needs of modulation in an electronic communication system.

(6 marks)

(b) For an AM DSBFC modulator with a carrier frequency f_c = 100 kHz and a maximum modulating signal frequency $f_{m(max)}$ = 5 kHz, determine

(i) freqeuncy limits for the upper and lower sidebands.

(4 marks)

(ii) bandwidth

(2 marks)

(iii) upper and lower side frequencies produced when the modulating signal is a single-frequency 3-kHz tone

(4 marks)

(iv) draw the output frequency spectrum

(4 marks)

Q3 (a) The public switched telephone network (PSTN) uses the FSK, PSK, and QAM modulation schemes in transmitting data over band limited channels. Briefly discuss their strengths and weaknessess.

(6 marks)

(b) The analogue signal in **Figure Q3(b)** is sampled with the sampling frequency which is 25% higher than the minimum sampling frequency of

the Nyquist rate. The bit rate of this Pulse code modulation (PCM) transmission is fixed at 54 kbps.

(i) Determine the quantization level.

(4 marks)

(ii) Based on the quantization level that you state in part (i), calculate the corresponding voltage for each quantization level.

(2 marks)

(iii) Calculate the bandwidth, BW

(2 marks)

(iv) Suggest a method to improve the quality of the recovered waveform.

(2 marks)

(v) State two drawbacks of this scheme and give two encoder schemes that can overcome the problem.

(4 marks)

Q4 (a) Describe the best technique in noise measurement.

(2 marks)

(b) A series of 20 noise values are measured in mV with a voltmeter as 16, -16, 22, -23, 32, 26, 36, -11, -19, -31, 5, 13, -31, 23, -21, -40, 24, -15, 22 and -17. Compute the rms noise value.

(5 marks)

(c) From your observation in (b) discuss the advantage of using the rms noise value.

(3 marks)

(d) Define thermal noise.

(3 marks)

(e) Calculate the noise power at the temperature of 30°C when the bandwidth is 1.9 kHz. If the measured noise is 70 nV, find the equivalent noise resistance. Given Boltzmann's constant, k = 1.38 x 10-23 J/K.

(7 marks)

Q5 (a) Satellite navigation system provides autonomous geo-spatial positioning with global coverage. List **TWO (2)** parameters that you have to consider in designing the navigation system such as GPS.

(2 marks)

(b) Geosynchronous satellites appear to remain in a fixed location on earth surface (sometimes called stationary or geostationary). Discuss the advantages and disadvantages of the geosynchronous.

(10 marks)

(c) Differentiate between terrestrial TV and satellite TV systems? Discuss why most of the developed countries are changing from analog to digital terrestrial broadcasting?

(8 marks)

- END OF QUESTION -

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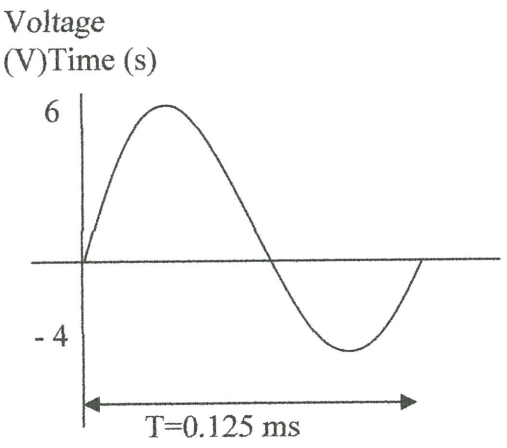

FIGURE Q3 (b)