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**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2014/2015**

COURSE NAME : ELECTRONIC  
COMMUNICATION SYSTEM  
COURSE CODE : BNR 20903  
PROGRAMME : 2 BND & 2 BNF  
EXAMINATION DATE : JUNE 2015 / JULY 2015  
DURATION : 3 HOURS  
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

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- Q1** (a) Briefly explain what are:
- Electronic communication
  - Subsystem synchronization
  - Transmission impairments
- (6 marks)
- (b) Given: A three-stage system comprised of two amplifiers and one filter. The input power  $P_{in} = 0.1$  mW. The absolute power gains are  $A_{P1} = 100$ ,  $A_{P2} = 40$ , and  $A_{P3} = 0.25$ . Determine:
- the input power in dBm,  
(2 marks)
  - output power ( $P_{out}$ ) in watts and dBm,  
(6 marks)
  - the dB gain of each of the three stages,  
(6 marks)
  - the overall gain in dB.  
(5 marks)
- Q2** (a) Noise is an important factor in the operation of any communication system. Explain what noise is and give **TWO (2)** of its effects.  
(4 marks)
- (b) Differentiate between correlated noise and uncorrelated noise.  
(6 marks)
- (c) The input signal to a telecommunications receiver consists of  $100 \mu\text{W}$  of signal power and  $1 \mu\text{W}$  of noise power. The receiver contributes an additional  $80 \mu\text{W}$  of noise,  $N_D$ , and has a power gain of 20 dB. Compute the input SNR, the output SNR and the receiver's noise figure.  
(15 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 weaknesses.  
(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
- frequency limits for the upper and lower sidebands. (4 marks)
  - bandwidth (2 marks)
  - upper and lower side frequencies produced when the modulating signal is a single-frequency 3-kHz tone (4 marks)
  - draw the output frequency spectrum (4 marks)
- (c) Calculate the noise power at the temperature of  $30^\circ\text{C}$  when the bandwidth is 1.9 kHz. If the measured noise is 70 nV, find the equivalent noise resistance. Given Boltzmann's constant,  $k = 1.38 \times 10^{-23}$  J/K. (5 marks)
- Q4** (a) Using a Smith Chart, determine the input impedance and SWR for a transmission line  $1.25 \lambda$  long with a characteristic impedance  $Z_0 = 50 \Omega$  and a load impedance  $Z_L = 30 + j40 \Omega$ . (12 marks)
- (b) Differentiate between Local Area Network (LAN) and Wide Area Network (WAN) in terms of definition, speed, data transfer rate, bandwidth use and data transmission error. (10 marks)
- (c) Satellite navigation system provides autonomous geo-spatial positioning with global coverage. List **THREE (3)** parameters that you have to consider in designing the navigation system such as GPS. (3 marks)

- END OF QUESTION -