Answers to sample paper

B1. (a) & (b) Refer to Chapter 1

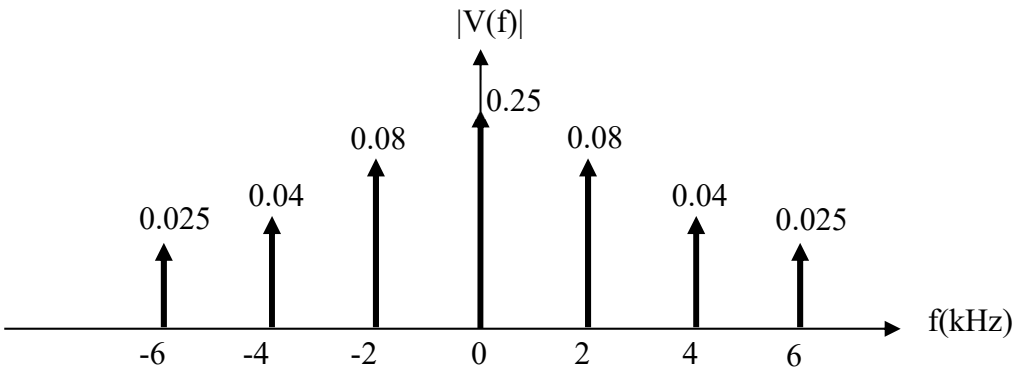
(c) Analog communication systems transmit analog signals using analog transmission methods.
Example : Radio/Television broadcasting system.

Digital communication systems transmit digital signals using digital transmission methods.
Example : Internet, Mobile phone systems.

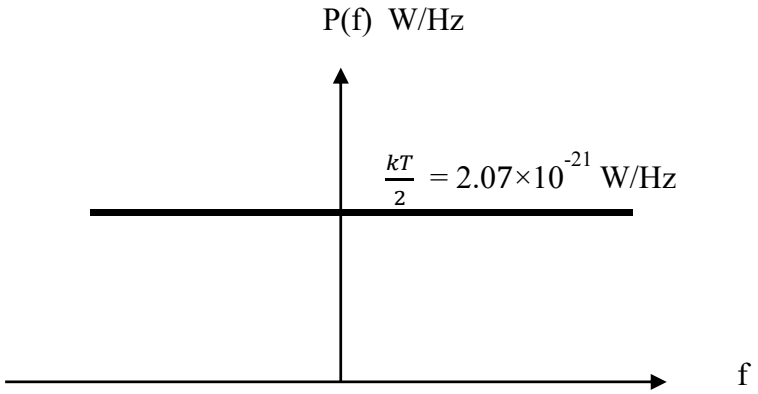
B2. (a) Refer to Chapter 2.

(b) (i) frequency the 2nd harmonic = 4 kHz
peak voltage of the 2nd harmonic = 79.6 mV

(ii)



B3. (a)



(b) R = 2 kΩ
BW = 3.1 kHz
T =273+ 27° = 300°
P_n = kTB = 1.38×10^{-23}×300×3.1×10^{3} = 1.28×10^{-17} Watts

$E_n=\sqrt{4kTBR}=\sqrt{4\times1.28\times10^{-17}\times2\times10^{3}} = 3.2\times10^{-7}$ volts

(c) Since Pni = kT_oB the formula, $F = \dfrac{Psi/Pni}{Pso/Pno}$ can used

Psi/Pni = 20
Pso/Pno = (3mW × 5)/1.2 mW = 12.5
F = 1.6

(d) Refer to Chapter 3.

B4. (a) Refer to Chapter 4.

(b) Minimum antenna length = $0.1\lambda = 0.1\ c/f = (0.3 \times 10^8)/f$
Minimum antenna length required at 88 MHz = 0.34 m
Minimum antenna length required at 108 MHz =0.278 m
The minimum antenna length is 0.34 m

(c) Signals generated by the information sources are known as **baseband signal**.

Baseband signal transmission sends the information signal as it is without modulation while passband signal transmission shifts a baseband signal to a higher frequency through modulation for transmission.

(d) Refer to Chapter 4.

B5. (a) f_s = 1 kHz
f_c = 500 kHz

(b) V_s = 4V
V_c = 6V
$V_{AM}(t) = [6 + 4\sin2000\pi t)]\sin1000000\pi t$