UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018

COURSE NAME	:	BROADCASTING TECHNOLOGY
COURSE CODE	:	BNF 32503
PROGRAMME CODE	:	BNF
EXAMINATION DATE	:	JUNE / JULY 2018
DURATION	:	2 HOURS AND 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

TERBUKA

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

BNF 32503

Q1 (a) Define Shannon's Law based on the perspective of communication capacity.

(2 marks)

(b) Convert 50 Watt to:

(i) dB
(ii) dBm
(iii) dBW
(iv) dB μ V

(4 marks)

(c) Define the frequency range of analog radio broadcasting and analog television broadcasting.

(2 marks)

(d) Define the bandwidth of AM and FM band allocation.

(2 marks)

(e) Differentiate between modulator and demodulator in analog radio modulation.

(4 marks)

(f) Describe **THREE (3)** advantages and **ONE (1)** disadvantage of AM radio broadcasting

(4 marks)

(g) Describe **TWO (2)** disadvantages of analog radio broadcasting over digital radio broadcasting.

(2 marks)

Q2 (a) Illustrate the complete block diagram of a superheterodyne FM-radio receiver.

(6 marks)

(b) Differentiate between the function of amplitude limiter and frequency discriminator in the superheterodyne FM-radio receiver.

(2 marks)

(c) Differentiate between the analog radio broadcasting and digital radio/audio broadcasting (DAB).

TERBUKA

(2 marks)

(d) An analog signal carries 4 bits per signal element. If 1000 signal elements are sent per second, compute the bit rate.

(2 marks)

(e) An analog signal has a bit rate of 8000 bps and a baud rate of 1000 baud. Compute the data elements carried by each signal element. Analyze the total signal elements that is needed.

(4 marks)

(f) A channel has a bandwidth of 400 kHz which spans from 400 to 800 kHz. Analyze the carrier frequency and the bit rate if the modulated data are using ASK with $d = 1$.

(2 marks)

(g) Compute the bandwidth for a signal transmitting at 24 Mbps for QPSK. The value of $d = 1$.

(2 marks)

Q3 (a) Differentiate between existing analog terrestrial television and digital terrestrial television.

(2 marks)

(b) Describe **FOUR (4)** benefits of digital terrestrial television.

(4 marks)

(c) Compute the bit rate for a 3000-baud 16-QAM signal.

(2 marks)

(d) Differentiate between amplitude shift keying and frequency shift keying in digital broadcasting.

(4 marks)

(e) Illustrate the spectrum of Orthogonal Frequency Division Multiplexing (OFDM).

(2 marks)

(f) Differentiate between Orthogonal Frequency Division Multiplexing (OFDM) and Coded Orthogonal Frequency Division Multiplexing (COFDM).

(4 marks)

(g) List **TWO (2)** advantages of OFDM.

(2 marks)

Q4 (a) Describe **TWO (2)** advantages of Direct Broadcast Satellite (DBS).

(4 marks)

(b) Define the uplink and downlink frequency range of the DBS in Ku-band.

(2 marks)

(c) List **THREE (3)** modulation techniques used in DBS.

(3 marks)

(d) Illustrate satellite network topologies for:

(i) Simplex transmission
(ii) Mobile antenna service

(4 marks)

3

(e) Compute the EIRP of the ground station if:

(i) High power amplifier output, $P_o = 150W$
(ii) Waveguide loss = 1.5 dB
(iii) Cessagrain antenna gain = 42 dBi

(3 marks)

(f) Give **TWO (2)** differences between MEASAT-3 and AFRICASAT under Malaysia MEASAT fleet.

(4 marks)

Q5 (a) Define the function of an antenna.

(2 marks)

(b) From **Figure Q5(b)**, analyze the characteristics of the radiation pattern of a Spiral antenna.

(i) Type of radiation pattern
(ii) Gain
(iii) Half-power beamwidth
(iv) Front to back lobe ratio
(v) Front to side lobe ratio

(5 marks)

(c) Illustrate and name **THREE (3)** type of antennas for satellite earth station.

(6 marks)

(d) Describe the function of low noise block (LNB) in DBS television receiver.

(3 marks)

(e) Differentiate between Omni-directional and Directional radiation pattern in antenna characteristic.

(4 marks)

- END OF QUESTIONS -

TERBUKA

FINAL EXAMINATION

SEMESTER / SESSION : SEM II / 2017/2018 PROGRAMME : BNF
COURSE   : BROADCASTING TECHNOLOGY COURSE CODE : BNF 32503

Figure Q5(b)

TERBUKA