Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016

COURSE NAME	:	DIGITAL AUDIO AND VIDEO BROADCASTING
COURSE CODE	:	BEB41903
PROGRAMME	:	BEJ
EXAMINATION DATE	:	JUNE /JULY 2016
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	ANSWER **4** QUESTIONS **ONLY**

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

Q1 (a) A video will be absolutely impossible to realise without the shortfalls of human eyes. Relate the phrase "Persistence of vision of human eyes" towards the creation of video.

(6 marks)

(b) Explain what is flicker and the ways to overcome this phenomena.

(6 marks)

(c) Compare between the technology behind progressive and interlaced scanning in terms of flicker.

(3 marks)

(d) In Phase Alternating Line (PAL), 49 lines out of the total 625 lines are reserved, leaving 576 lines available. Sketch this condition.

(5 marks)

(e) Point out two reasons why the YIQ (or YUV) signaling system is a preferred system during the transition from monochrome television to chromatic television.

(5 marks)

Q2 (a) Aliasing is not desirable in digital signaling. Construct a condition when signal aliasing occurs.

(6 marks)

(b) Choose between these three colour resolutions 4:4:4, 4:2:2, and, 4:1:1 that has the best data compression in illustrations.

(2 marks)

(c) Distinguish between High-Definition Television (HDTV) and Standard-Definition Television (SDTV) on how both can be broadcasted.

(5 marks)

(d) Explain the need of video compression. List one type of compression method for both the redundancy and irrelevance compression in Moving Picture Experts Group 2 (MPEG 2).

(5 marks)

(e) Briefly summarise the methods found in MPEG 2 compression in a work flow.

(7 marks)

Q3 (a) Briefly describe the process inside a Digital Video Broadcasting for Satellite (DVB-S) modulator.

(5 marks)

(b) Digital signaling success almost depends on the error corrections. Express why error correction is so crucial in digital transmission especially in DVB-S where two levels of error protections are required.

(5 marks)

(c) Differentiate between Quadrature Phase-Shift Keying (QPSK) and 8-Phase-Shift Keying (8PSK) in terms of symbol rate, data rate, and their respective constellation diagrams.

(5 marks)

(d) An engineer decided to broadcast a video with a data rate of 130Mbit/s before compression. The compression technology resulted in a code rate of 7/10. Investigate what happens when the medium of broadcast was capped at a data rate of 300 Mbit/s.

(5 marks)

(e) An engineer discovered that if the error entering a DVB-S receiver exceeds 3 bits per 1 million bits, the receiver will fail. Based on **Figure Q3**, recommend a modulation technique and justify.

(5 marks)

Q4 (a) Illustrate and label two types of broadcast media for Digital Video Broadcasting for Cable (DVB-C). Name the advantages and disadvantages between the two media.

(3 marks)

(b) In DVB-C, only one level of error correction is sufficient. Analyse why two level of error corrections are not necessary.

(6 marks)

(c) 256 Quadrature Amplitude Modulation (QAM) has the highest symbol rate and data rate in the family of QAM and is highly prone to signal degradation if not broadcasted carefully. Discover why that since it is so vulnerable to degradation, it is still applied in DVB-C.

(6 marks)

(d) The nature of interference affecting DVB-C can be observed by looking at the constellation diagrams. Based on **Figure Q4**, investigate each noise affecting the signal in DVB-C.

(10 marks)

Q5 (a) The selection of appropriate modulation technique in Digital Video Broadcasting for Terrestrial (DVB-T), is mainly determined by multipath reception which leads to location and frequency-selective fading. In DVB-T, according to the Digital Video Broadcasting standard, it was decided that the most appropriate modulation method to cope with this problem would be Coded Orthogonal Frequency Division Multiplexing (COFDM). Compare the benefits of COFDM with that of standalone 64 Quadrature amplitude modulation (QAM) as in Digital Video Broadcasting for Cable (DVB-C).

(10 marks)

(b) Demonstrate how a hierarchical modulation plays an important role to ensure that reliable reception is still guaranteed even in poor conditions, e.g. a signal/noise ratio, (SNR) which is too bad.

(10 marks)

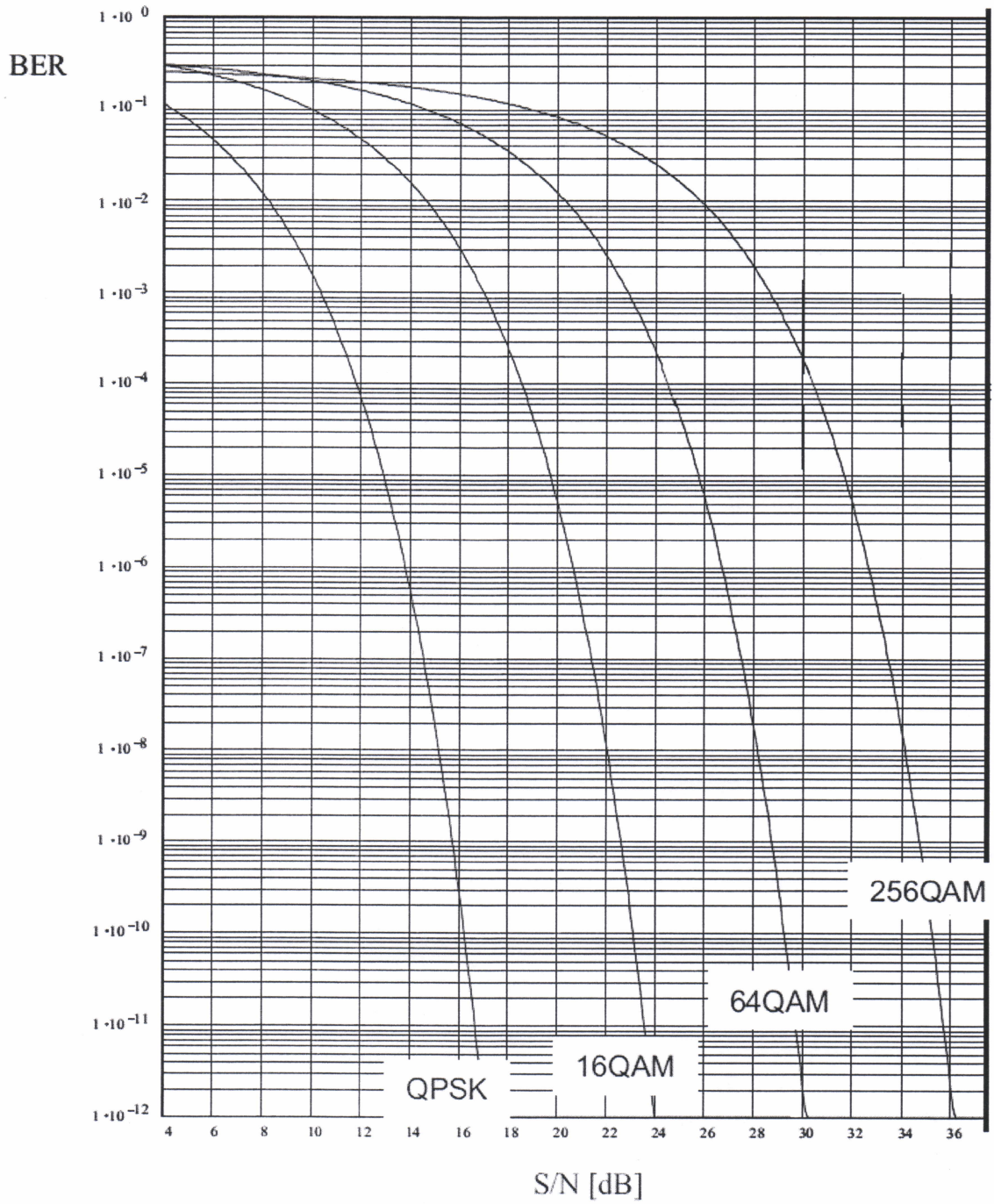
(c) Predict the interferences on the DVB-T transmission link and its effects.

(5 marks)

- **END OF QUESTION** -

FINAL EXAMINATION

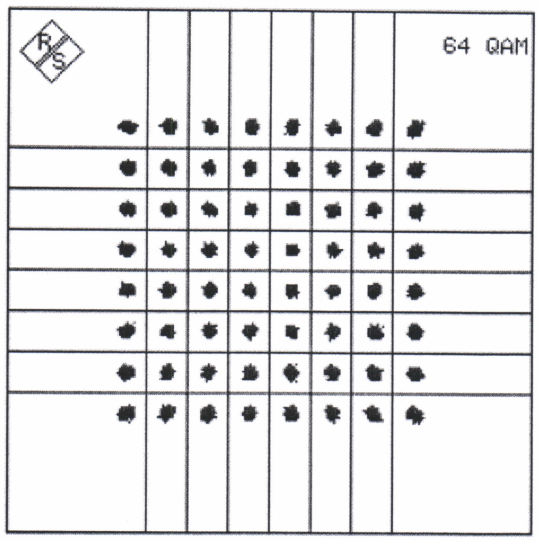
SEMESTER / SESSION : SEM II / 2015/2016
COURSE : DIGITAL AUDIO AND VIDEO BROADCASTING
PROGRAMME : 4 BEJ
COURSE CODE : BEB41903



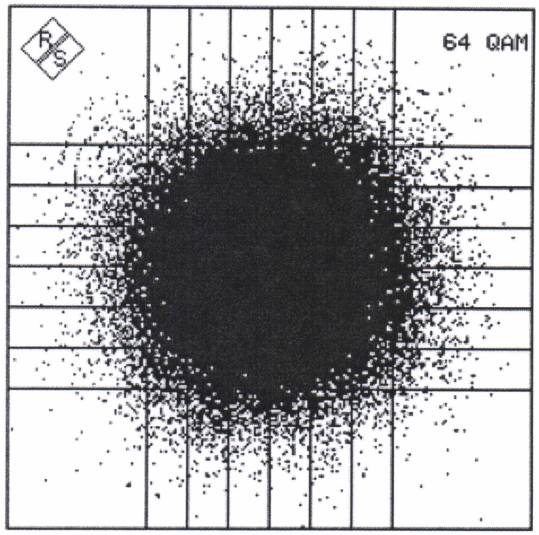
FIGURES Q3

FINAL EXAMINATION

SEMESTER / SESSION : SEM II / 2015/2016
COURSE : DIGITAL AUDIO AND VIDEO BROADCASTING
PROGRAMME : 4 BEJ
COURSE CODE : BEB41903



(a)



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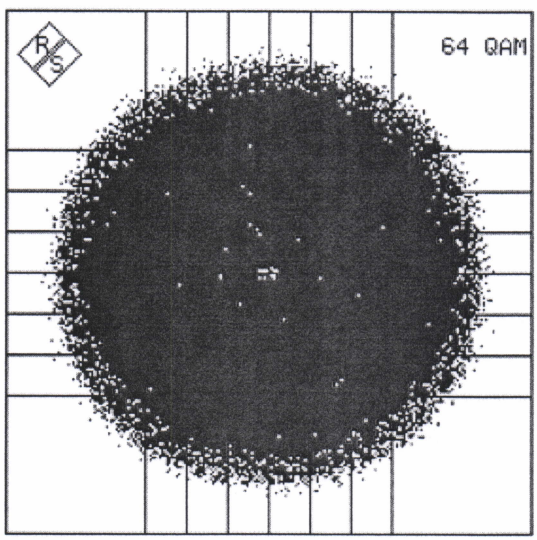

(c)

(d)

FIGURES Q4