



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2016/2017**

TERBUKA

COURSE NAME : DIGITAL AUDIO AND VIDEO BROADCASTING
COURSE CODE : BEB41903
PROGRAMME : BEJ
EXAMINATION DATE : DECEMBER 2016 / JANUARY 2017
DURATION : 3 HOURS
INSTRUCTION : ANSWER **FOUR (4)** QUESTIONS **ONLY**

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

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- Q1**
- (a) The Y signal is obtained from the combination of red (R), green (G), and blue (B). Please state the equation for Y. (6 marks)
 - (b) Show the reason that the values of the terms R, G, and B is not the same in the equation Y that you state in **Q1 (a)**. (8 marks)
 - (c) Compare between the YIQ and YUV signals. (4 marks)
 - (d) Point out **TWO (2)** reasons why the YIQ (and YUV) signaling system is a preferred system during the transition from monochrome television to chromatic television. (7 marks)
- Q2**
- (a) Aliasing is not desirable in digital signaling. Construct a condition when signal aliasing occurs. (4 marks)
 - (b) Illustrate these three colour resolutions 4:4:4, 4:2:2, and, 4:1:1 to demonstrate which has the best data compression and show how in illustrations. (5 marks)
 - (c) Distinguish between High-definition television (HDTV) and Standard-definition television (SDTV) on how both can be broadcasted. (8 marks)
 - (d) Explain the need of video compression. List one type of compression method each for redundancy and irrelevance compression in Moving Picture Experts Group (MPEG) 2. (5 marks)
 - (e) Briefly summarises the methods found in MPEG 2 compression in a work flow. (3 marks)

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- Q3**
- (a) Show the reason that the Digital Video Broadcasting for satellite (DVB-S) modulator uses QPSK instead of AM modulation.
(6 marks)
 - (b) The success of digital signaling depends on the error corrections but there is no error correction in analogue signals. Identify why error correction in analogue signal is impossible.
(6 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.
(6 marks)
 - (d) A raw MPEG2 video at a data rate of 280 Mbit/s will be broadcasted at a code rate of $\frac{3}{4}$. Investigate what happens when the medium of broadcast was capped at a data rate of 200 Mbit/s.
(7 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)

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- 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. Explain frequency-selective fading.
(7 marks)
 - (b) 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).
(4 marks)
 - (c) 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 which is too bad.
(8 marks)
 - (d) Predict the interferences on the DVB-T transmission link and its effects.
(6 marks)

- END OF QUESTION -



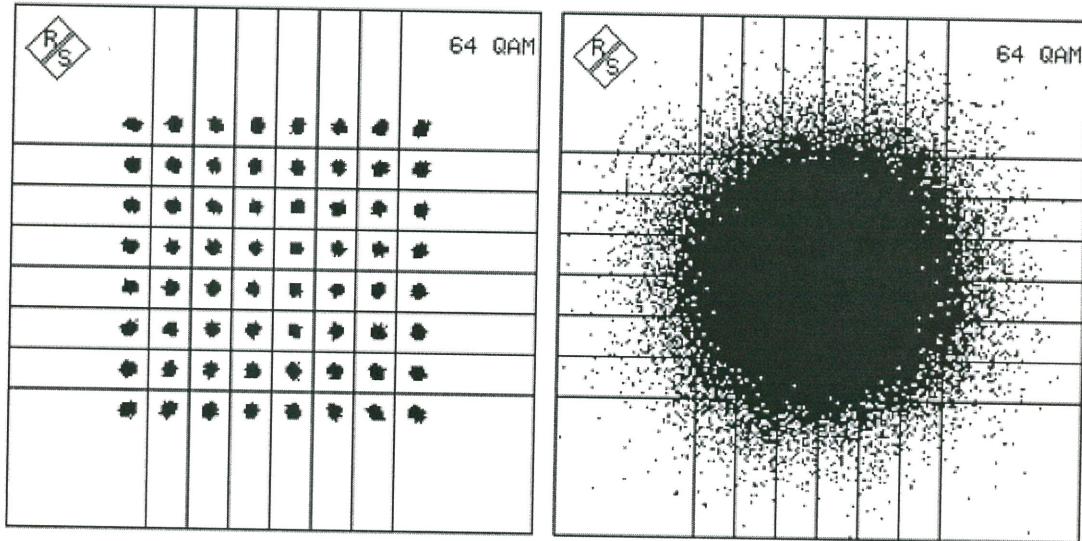
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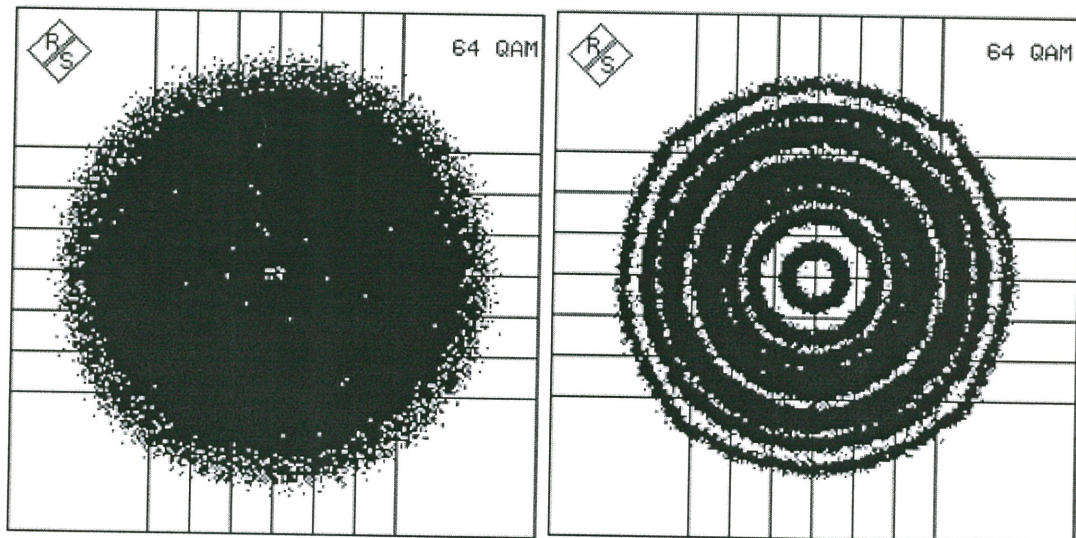
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(a)

(b)



(c)

(d)

FIGURE Q4

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