



DEPARTMENT of ELECTRICAL and ELECTRONIC ENGINEERING  
EXAMINATIONS 2005

EEE/ISE PART III/IV: M.Eng., B.Eng. and ACGI

## COMMUNICATION SYSTEMS

There are FOUR questions (Q1 to Q4)

Answer question ONE and TWO other questions.

Question 1 has 20 multiple choice questions, numbered 1 to 20, all carrying equal marks.

Questions 2, 3 and 4 have 6 multiple choice questions each, numbered 1 to 6, all carrying equal marks.

There is only one correct answer per question.

### *Distribution of marks*

*Question-1: 40 marks*

*Question-2: 30 marks*

*Question-3: 30 marks*

*Question-4: 30 marks*

*The following are provided:*

- A table of Fourier Transforms
- A "Gaussian Tail Function" graph

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## Question-Q1

- This question has 20 multiple choice questions numbered 1 to 20, all carrying equal marks.
- Circle the answers you think are correct on the paper itself.
- There is only one correct answer per question.

representative examples:

11) The first TDMA multiplexing level of a 30-channel PCM Telephone system uses

- A) an AMI line code
- B) a polar RZ line code
- C) a Manchester line code
- ☒ D) an HDB3 line code
- E) none of the above.

This indicates that **D** is the answer you think is correct

12) The CCITT standards 32kbits/second Differential PCM are

- ☒ A) for speech signals with bandwidth 3.2 kHz.
- B) for audio signals with bandwidth 7 kHz
- C) specifying a sampling frequency 16 ksamples/second
- D) specifying an 8 levels quantizer
- E) none of the above

This indicates that **A** is the answer you think is correct

## Question-Q2

- This question has 6 multiple choice questions numbered 1 to 6, all carrying equal marks.
- Circle the answers you think are correct on the paper itself.
- There is only one correct answer per question.

representative example:

- 1) A digital communication system having an energy utilisation efficiency (EUE) equal to 30, operates in the presence of additive white Gaussian noise of double-sided power spectral density  $\text{PSD}_n(f) = 0.5 \times 10^{-6} \text{ W/Hz}$ . If the channel capacity  $C$  is 16 kbits/s and the channel bandwidth  $B$  is 4 kHz, then the data bit rate  $r_b$  is

A) 1.5 kbits/sec

☒ B) 2 kbits/sec

C) 3.5 kbits/sec

D) 4 kbits/sec

E) none of the above.

This indicates that (B) is the answer you think is correct

### Question-Q3

- This question has 6 multiple choice questions numbered 1 to 6, all carrying equal marks.
- Circle the answers you think are correct on the paper itself.
- There is only one correct answer per question.

2) A digital communication system having an energy utilisation efficiency (EUE) equal to 30, operates in the presence of additive white Gaussian noise of double-sided power spectral density  $\text{PSD}_n(f) = 0.5 \times 10^{-6} \text{ W/Hz}$ . If the channel capacity  $C$  is 16 kbits/s and the channel bandwidth  $B$  is 4 kHz, then the data bit rate  $r_b$  is

- A) 1.5 kbits/sec
- ☒ B) 2 kbits/sec
- C) 3.5 kbits/sec
- ☒ D) 4 kbits/sec
- E) none of the above.

This indicates that ☒ D should be ignored and ☒ B is the answer you think is correct

### Question-Q4

- This question has 6 multiple choice questions numbered 1 to 6, all carrying equal marks.
- Circle the answers you think are correct on the paper itself.
- There is only one correct answer per question.

- 3) A digital communication system having an energy utilisation efficiency (EUE) equal to 30, operates in the presence of additive white Gaussian noise of double-sided power spectral density  $\text{PSD}_n(f) = 0.5 \times 10^{-6} \text{ W/Hz}$ . If the channel capacity  $C$  is 16 kbits/s and the channel bandwidth  $B$  is 4 kHz, then the data bit rate  $r_b$  is

- A) 1.5 kbits/sec
- ☒ B) 2 kbits/sec
- C) 3.5 kbits/sec
- ☒ D) 4 kbits/sec
- E) none of the above.

In this case the correct answer (B) will be ignored.  
The wrong answer (D) will be taken into account.