Roll No. ....   Total No. of Printed Pages : 4

Code No. : B04-301

Fourth Semester Online Examination, May-June, 2022

M. Sc. PHYSICS

Paper III

SPECIAL PAPER - III ELECTRONICS - I

Time : Three Hours]   [Maximum Marks : 80

Note : ● Part A and B of each equation in each unit consist of very short answer type questions which are to be answered in one or two sentences.

   ● Part C (Short answer type) and D (Long answer type) of each question should be answered within the word limit 200-250 and 400-450 words.

Unit-I

1. (A) Define amplitude modulation and modulation index. 2

   (B) A 400 watt carrier is modulated to a depth of 75 percent. Calculate the total power in the modulated wave. 2

(C) Draw the block diagram of the phase discrimination method for generating SSB modulated waves and explain it. 4

Or

Explain time division multiplexing with pulse amplitude modulation system.

(D) Define the carrier amplitude and carrier frequency. Explain the standard form of amplitude modulation in following section : 12

   (i) Time-Domain Description.

   (ii) Frequency-Domain Description.

Or

Draw the black diagram of receiver and explain super heterodyne receiver in detail.

Unit-II

2. (A) Define the frequency spectrum of the frequency modulation wave. 2

   (B) What is modulation channel width ? 2

   (C) What do you understand by Quantization of signal ? Explain in detail. 4

Or

Explain Intersystem comparisons of frequency and phase modulation.

(D) Explain fully the difference between frequency and phase modulation, beginning with the definition of each type and the meaning of the modulation index in each case. 12

Or

Of the various advantages of frequency modulation and amplitude modulation, identify and discuss those due to the intrinsic qualities of frequency modulation.

Unit-III

3. (A) Define the pulse modulation. 2

(B) What do you mean by quantization noise ? 2

(C) Explain non-coherent detection of FSK. 4

Or

Explain the sampling theorem for band-limited signals of finite energy in two equivalent parts.

(D) Derive the signal to quantization noise power ratio in PCM technique. 12

Or

What is pulse code modulation (PCM) ? Discuss the differential pulse code modulation technique. Write its advantages and limitations.

Unit-IV

4. (A) What do you mean by data communication system ? 2

(B) Define two broadcast networks : 2

(i) Bus (ii) Ring

(C) Discuss the working of wide-area-network (WAN). 4

Or

Explain the working of metropolitan area network (MAN).

(D) What is packet switched technology for data communication ? Explain the working of Time Division Multiple Access (TDMA).

Or

What is Multiple Access ? Explain the working of Frequency Division Multiple Access (FDMA).

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