ELIZADE UNIVERSITY

FACULTY: Basic and Applied Sciences
DEPARTMENT: Physical and Chemical Sciences
SECOND SEMESTER EXAMINATIONS
2016/2017 ACADEMIC SESSION

COURSE CODE: PHY 418 **COURSE UNITS: 2 UNITS**

COURSE TITLE: INTRODUCTION TO TELECOMMUNICATION SYSTEMS.

DURATION: 2 HOURS

HOD's SIGNATURE

TOTAL MARKS: 60

Matriculation Number: _____

INSTRUCTIONS:

1. Write your matriculation number in the space provided above and also on the cover page of the exam booklet.
2. This question paper consists of 2 pages with printing on both sides.
3. Answer all questions in the exam booklet provided.
4. More marks are awarded for problem solving method used to solving problems than for the final numerical answer.
5. Attempt any 4 of the 6 questions
6. Each question attracts 15 points.

1(a) Briefly discuss the following terms as applicable to communication system:

i. Input Transducer
ii. Transmitter
iii. Channel
iv. Receiver
v. Output Transducer

(b) (i) The period of a signal is 100 ms. What is its frequency in KHz?

(ii) What is Modulation index for AM.?

2(a) What is Modulation? Discuss five reasons why modulation is required in communication system?

(b) A non-periodic composite signal has a bandwidth of 200 KHz, with a middle frequency of 140 KHz and peak amplitude of 20V.The two extreme frequencies have an amplitude of zero. Draw the frequency domain graph of the signal?

3(a) Differentiate between Amplitude modulation and Frequency modulation?

(b) Show that the total power, p_t, in a modulated wave is given as:

$$P_t = \left[\frac{m^2}{2} + 1\right] p_{carrier}$$ where m = Modulation index and $p_{carrier}$ = Carrier power

4(a) (i) What are the advantages of digital transmission?

(ii) What do you understand by a transverse electromagnetic wave (TEM)

(b) A lossless transmitting line is $80cm$ long and operates at a frequency of $600Hz$ .The line parameter are $L = 0.25\mu H/m$, and $C = 100nF/m$. Find

(i) the characteristic impedance

(ii) the phase constant

(iii) the attenuation constant

(iv) the velocity on the line.

The input impedance for $Z_c = 100\Omega$.

5(a)(i) What do you understand by RADAR.

(ii) List parts of a telephone and write briefly on any two of them.

(b A S-band radar transmitting at 3GHz radiates 200KW. Determine the signal power density of ranges 100 and 400 nautical miles. If the effective area of the radar antenna is $9m^2$, with a $20m^2$ target at 300 nautical miles, calculate the power of the reflected signal at the antenna.

6(a) (i) List and discuss three types of data network configuration (Topology) with reference to their advantages and limitations.

(ii) What is noise in communication system, and list four causes of noise.

(b) A $20k\Omega$ resistor is connected at the input of an amplifier operating over a frequency range of 10 to 11 MHz. Compute the rms noise voltage at the input of the amplifier, if the ambient temperature is 24^0C .