NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF ELECTRONIC ENGINEERING

ANALOGUE COMMUNICATIONS ENGINEERING

TEE 3121

Examination Paper

December 2014

This examination paper consists of 2 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: N/A

Examiner's Name: Mrs. M.B. Nleya

INSTRUCTIONS

1. Answer any five (5) questions
2. Each question carries 20 marks
3. Use of calculators is permissible

MARK ALLOCATION

QUESTION	MARKS
1.	**20**
2.	**20**
3.	**20**
4.	**20**
5.	**20**
TOTAL	**100**

QUESTION 1

Explain how a super group signal is generated using two stages of multiplexing with the aid of suitable diagrams. [20]

QUESTION 2

a) An amplifier has a noise figure of 3.5dB. Determine its noise factor, noise temperature and noise power density. [6]
b) What is flicker or 1/f noise? [6]
c) Define the signal-to-noise (SNR) ratio. [8]

QUESTION 3

Draw the structure of coaxial cable and optical fibre and compare these two types of transmission medium. [20]

QUESTION 4

a) Classify telecommunications signals objectively [10]
b) Describe the operation of super-heterodyne AM receiver by the use of the diagram [10]

QUESTION 5

Discuss the signal processing tasks performed by the transmitter in a communication system. Indicate why each process is required and how it is reversed at the receiver to recover the original message signal. [20]

QUESTION 6

An audio signal $v_m(t) = 30 \sin (5000\pi t)V$ modulates the amplitude of a carrier $v_c(t) = 65\sin(50000\pi t)V$. Sketch the AM waveform and calculate the modulation index. [20]

QUESTION 7

Briefly discuss Amplitude Modulation methods stating their advantages and disadvantages. [20]

QUESTION 8

a) Sketch three cycles of waveforms for the following functions: $V_1(t) = 10\sin (2\pi t - \pi/2)$ and $V_2(t) = 20\sin (4\pi t + 30^o)$ [10]
b) Discuss the roles of modulation in communication systems. [10]

End of the paper