TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN ELECTRICAL ENGINEERING

EEE2101: COMMUNICATION SYSTEMS II

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2019

TIME: 2 HOURS

DATE: Pick DateSelect MonthPick Year

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of FIVE questions. Attempt ANY THREE.

Do not write on the question paper.

Question ONE

a) Define the following terms

i. Aspect ratio

ii. Vertical and Horizontal Resolution (4marks)

(b) Use diagrams to Differentiate between Progressive and Interlace scanning (6marks)

(c) Explain why digital TVs are more preferred than the analogue type. (4marks)

(d) With the aid of a circuit diagram explain the operation of an HDTV transmitter (6marks)

Question TWO

(a) Define the term Noise in communication systems. (2marks)

(b) Briefly describe any two type of internal and one type of external Noise. (6marks)

(c) Show that for three systems in cascade the overall system Noise Factor is given by: F_{sys}

$$= 1+\left(F_1 -1\right)\frac{N_{IN}}{N_{ae}} + \frac{\left(F_2 -1\right)}{G_1}\frac{N_{IN}}{N_{ae}} + \frac{\left(F_3 -1\right)}{G_1 G_2}\frac{N_{IN}}{N_{ae}}$$

(12marks)

Question THREE

a) State any three advantages and one disadvantage of satellites communication.(4 marks)

b) With the aid of diagrams describe the two common types of the satellite stabilization methods (6marks)

c) For the Earth station of example 1.1 determine the range of the satellite and the elevation angle of the antenna. Take radius of earth= 6371km height of geostationary satellite =36000km (4marks)

d) Use diagrams to describe the operation of the following modes of access

i. FDMA

ii. TDMA (10marks)

Question FOUR

a) Differentiate between the following terms as applied in satellites

i. Geostationary (Geo) and Synchronous Orbit (GSO).

ii. Apogee and Perigee (4marks)

b) With the aid of diagram explain the operation of the Ground segment in satellites. (9marks)

c) A geostationary satellite is located 83˚W. Calculate the azimuth angle for an earth station located at altitude 35˚ N and longitude 100˚W (7marks)

Question FIVE

a) Explain the following Radar tracking methods.

i. Lobe switching and

ii. Canonical scanning (6marks)

b) (i). With the aid of a diagram explain the operation of a pulsed non coherent radar system

(ii) State the Functions of radar beacons (9marks)

c) A low power short range radar has a noise figure of 4.77dB.If the antenna diameter is 1 m, the IF bandwidth is 500kHz,the operating frequency is 8GHz and the radar set is supposed to be capable of detecting targets of $5m^2$ cross sectional area at a minimum distance of 12km,Determine the peak transmitted power. (5marks)