INTI
INTERNATIONAL COLLEGE PENANG (507232-U)
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper

(COVER PAGE)

Session	:	April 2014
Programme	:	DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING
Course	:	**EEE2109: Electronic Communication Systems**
Date of Examination	:	26 JULY 2014
Time	:	5.00pm – 7.00pm Reading Time : Nil
Duration	:	2 hours
Special Instructions	:	

This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Materials permitted :

Non Programmable Scientific Calculator

Materials provided :

NIL

Examiner(s) : **V.Meenakshi Sundaram.**

Moderator : **Dr.Mandeep Singh**

This paper consists of 4 printed pages, including the cover page.

INTI INTERNATIONAL COLLEGE PENANG

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING (DEE)

EEE 2109: ELECTRONIC COMMUNICATION SYSTEMS
FINAL EXAMINATION: APRIL 2014 SESSION

Instructions: This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1:

a) Define polarization of electromagnetic wave and how to receive the maximum transmitted signal.

(6 marks)

b) An airplane was stationary at the sky and was detected by radar, the radar is pulsed radar with pulse width of 3μs and pulse repetition time (PRT) of 700μs and the target is detected in 300μs time.

i) Draw the timing for this situation.

(2 marks)

ii) Calculate the maximum unambiguous range (mur) for this pulse radar in miles.

(2 marks)

iii) Calculate the distance range of airplane from the radar in nautical miles.

(2 marks)

c) Calculate the resistive cutoff frequency of a Varactor diode having base resistance of 1.3 ohms and minimum junction capacitance of 5 pF.

(5 marks)

d) Calculate the maximum range of a radar system which operates at 3cm with a peak pulse power of 500 kW, if its minimum receivable power is 10^{-13}W, the capture area of its antenna is $5m^2$, and the radar cross sectional area of the target is $20m^2$.

(8 marks)

Question 2:

a) Draw the block diagram of a monochrome television transmitter and receiver also explain the functions of each blocks.

(10 marks)

b) Define i) Telegraphy

ii) Telemetry (3 marks)

(2 marks)

c) Explain the meaning of modes in waveguide propagation. Mention dominant modes in rectangular waveguide propagation

(5 marks)

d) An antenna has a loss resistance of 8ohms, a power gain of 20 and directivity of 28.Find its efficiency and radiation resistance.

Question 3:

(5 marks)

a) What are the five different signals that fed to the adder in color television transmitter for video signal?

b) Calculate the ratio of the cross section of a circular waveguide to that of a rectangular one if is to have the same cutoff wavelength for its dominant mode. (5 marks)

c) A rectangular waveguide having external dimensions of 30mm×45mm, thickness of 0.5mm on all sides, and has a 9-GHz signal propagated in it. Calculate the cutoff wavelength, the guide wavelength, the group and phase velocities and the characteristic wave impedance for (5 marks)

$TE_{1,0}$ mode and (ii) the $TM_{1,1}$ mode.

(15 marks)

Question 4:

a) Define numerical aperture of an optical fiber also calculate the critical angle of incidence and numerical aperture of an optical fiber having two substances with different refractive indices where n1=1.5 and n2=1.46 respectively.

b) If at 20 km in free space from an isotropic source the power density is $200mW/m^2$, calculate the power density if it is at 100 km away from the isotropic source? (7 marks)

c) Describe the reflex klystron oscillator with the aid of a diagram. (4 marks)

(10 marks)

d) Describe the ground wave propagation method in brief and explain its application

(4 marks)

Question 5:

a) A microwave link consists of repeaters at 50km intervals. Calculate the minimum height of transmitting antenna and receiving antenna to ensure line of sight condition. Given the height of transmitting antenna is twice of the height of receiving antenna.

(4 marks)

b) Define

i) Bandwidth

(2 marks)

ii) Equalizers.

(2 marks)

iii) ISI

(2 marks)

c) In standard telegraphy for a single minute how many words can be transmitted, why?

(6 marks)

d) Name four reasons why optical fibers are more widely used than copper wires in communication networks today. Elaborate your answer.

(9 marks)

Question 6:

a) Explain Laser action.

(6 marks)

b) Discuss about any three environmental factors that can affect the transmission and reception of wave in electronic communication.

(6 marks)

c) With the aid of a block diagram discuss about basic pulsed radar systems.

(9 marks)

d) Define the following terms

i) isotropic source

(2 marks)

ii) isotropic medium

(2 marks)

--THE END--