

POLITEKNIK
Jabatan Pengajian Politeknik

EXAMINATION AND EVALUATION DIVISION
DEPARTMENT OF POLYTECHNIC EDUCATION
(MINISTRY OF HIGHER EDUCATION)

ELECTRICAL ENGINEERING DEPARTMENT

FINAL EXAMINATION
JUNE 2012 SESSION

EP301: COMMUNICATION SYSTEM FUNDAMENTALS

DATE : 24 NOVEMBER 2012 (SATURDAY)
DURATION : 2 HOURS (11.15 AM TO 1.15 PM)

This paper consists of ELEVEN (11) pages including the front page.

Section A1 : Objective (10 Question)
Section A2 : Fill in the blank (10 Question)
Section B : Structured (10 Question)
Section C : Essay (2 Question)

Answer all questions

CONFIDENTIAL

**DO NOT OPEN THIS QUESTION PAPER UNTIL INSTRUCTED BY THE
CHIEF INVIGILATOR**

(The CLO stated is only for reference)



SECTION A OBJECTIVE (20 MARKS)**SECTION A1 (QUESTION 1 – QUESTION 10)****MULTIPLE CHOICE QUESTIONS (10 marks)**

Instruction: This section consists of 10 questions. Mark your answers in the answer booklet.

1. What equipment is used to acquire the transmitted signal from the transmission medium and convert back to the original information signal? [CLO1]
 - A. Channel
 - B. Receiver
 - C. Modulator
 - D. Transmitter

2. Which of this electromagnetic wave has the shortest wavelength? [CLO1]
 - A. Radio wave
 - B. Infrared wave
 - C. Microwave
 - D. X-ray wave

3. What is an Amplitude Modulation (AM) process? [CLO2]
 - A. A process of changing the amplitude of a relatively high frequency carrier signal with the instantaneous of the modulating signal.
 - B. A process of changing the amplitude of a relatively high frequency modulating signal with the instantaneous of the carrier signal.
 - C. A process of changing the frequency of a carrier signal with the instantaneous of the modulating signal
 - D. A process of changing the amplitude of a relatively low frequency carrier signal with the instantaneous of the modulating signal

4. The percentage of modulation index is 100% when, [CLO2]

- A. $V_m < V_c$
- B. $V_m > V_c$
- C. $V_m = V_c$
- D. $V_m = 1$

5. Refer to **Figure 1**, what is the type of pulse modulation technique? [CLO2]

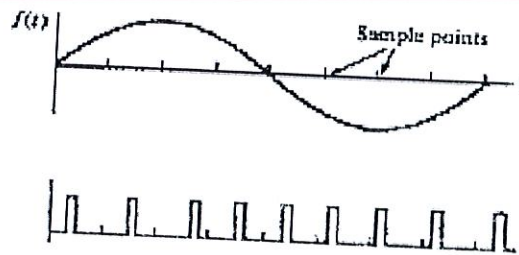


Figure 1

- A. Pulse width modulation
 - B. Pulse position modulation
 - C. Pulse amplitude modulation
 - D. Pulse frequency modulation
6. Which of the following is NOT a type of multiplexing (MUX) technique? [CLO2]
- A. Time Division Multiplexing
 - B. Frequency Division Multiplexing
 - C. Amplitude Division Multiplexing
 - D. Wavelength Division Multiplexing

7. Differentiate between Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH). [CLO 2]

A	SDH is a multiplexer that multiplexes signal from multiple electrical sources and creates the corresponding Optical Carrier signal.	PDH is a demultiplexer that demultiplexes an Optical Carrier signal into corresponding electric signals.
B	SDH is a device that uses the services of a SONET network.	PDH is the optical link connecting two neighboring devices.
C	SDH is a portion of the network between two multiplexers.	PDH is the end-to-end portion of the network between two STS multiplexers.
D	SDH is a synchronous network using synchronous TDM multiplexing. All clocks in the system are locked to a master clock.	PDH used to transport the data on SDH are tightly synchronized across the entire network by using atomic clocks.

8. A _____ is a network that connects users who are in the areas that are spread out geographically. [CLO2]

- A. Local Area Network (LAN)
- B. Small Area Network (SAN)
- C. Wide Area Network (WAN)
- D. Metropolitan Area Network (MAN)

9. Below are the applications of unguided transmission medium, **EXCEPT**:

[CLO2]

- A. Telephone Network
- B. Broadcast Radio
- C. Terrestrial Microwave
- D. Satellite Microwave

10. “Travels through the first layer of the atmosphere, hugging the earth.”
The statement above is **BEST** described as [CLO2]
- A. Sky propagation
 - B. Light propagation
 - C. Line-of-sight propagation
 - D. Ground propagation

SECTION A2: FILL IN THE BLANK (QUESTION 11 – QUESTION 20)

Instruction: This section consists of **TEN (10)** objective questions. Write your answer's in the answer booklet.

11. _____ is an unwanted signal from the other sources than the transmitted signal which does not convey any information. [CLO1]
12. The process that converts the modulated signal back to the original information signal is called as _____. [CLO1]
13. _____ process is removing the carrier from a fully modulated AM systems. [CLO1]
14. One of the advantages of _____ is reducing the noise and interference during the transmission. [CLO2]
15. _____ is a binary modulation technique similar to phase modulation, in which the transmitter varies the starting point of the signal. [CLO 2]

16. _____ is a technique which transforms an analogue telephone circuit into a digital signal, and involves three consecutive processes: sampling, quantization and encoding. [CLO 2]
17. Based on Figure 2, it describes _____ connection. [CLO 2]

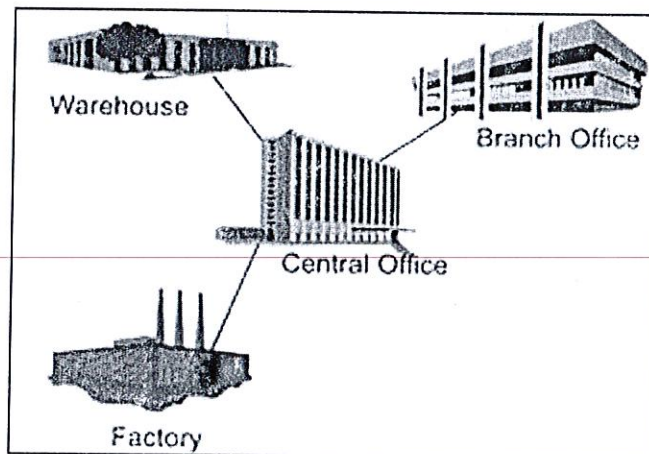


Figure 2

18. A network _____ is a physical schematic that shows interconnection of the many users. [CLO 2]
19. Radio waves use _____ antennas that transmit signals in all directions. [CLO 2]
20. Two types of fiber optic light sources are the Light Emission Diode (LED) and _____. [CLO 2]

SECTION C**ESSAY (50 marks)**

Instruction: This section consists of 2 essay questions. Answer **ALL** questions.

QUESTION 1

- a) List **THREE (3)** importances of modulation in telecommunication system. [CLO 2]
(6 marks)
- b) For an FM modulator with a modulation index $m_f = 0.5$ and carrier signal $v_c(t) = 10 \sin(2\pi \times 10^5 t)$. [CLO 2]
- i. Determine the amplitude of each sideband by using Bessel Function Table. (6 marks)
 - ii. Draw and label the frequency spectrum. (5 marks)
- c) Explain **FOUR (4)** functions of MODEM [CLO 2]
(8 marks)

QUESTION 2

- a) Signals are usually transmitted over some transmission media that are broadly classified into two categories. Explain the **TWO (2)** categories? [CLO 2]
(6 marks)
- b) Describe the characteristics of twisted pairs, coaxial and fiber optic cables. [CLO 2]
(9 marks)
- c) State the advantages and disadvantages of satellite communication system. [CLO 2]
(4 marks)
- d) Briefly describe **THREE (3)** main network topologies. [CLO 2]
(6 marks)