



UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF MARINE ENGINEERING TECHNOLOGY

FINAL EXAMINATION
JANUARY 2016 SEMESTER

COURSE CODE : LEB 30203

COURSE NAME : ELECTRONIC COMMUNICATION 2

PROGRAMME NAME : BACHELOR OF MARINE ELECTRICAL ELECTRONIC
(FOR MPU: PROGRAMME LEVEL)

DATE : 25th MAY 2016

TIME : 2.00PM

DURATION : 3 HOURS

INSTRUCTIONS TO CANDIDATES

NOTE: Instructions below to be edited to suit the needs of the intended course/examination.

1. Please **CAREFULLY** read the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of **TWO (2)** sections; Section A and Section B.
4. Answer **ALL** questions in Section A. For Section B, answer **THREE (3)** questions **WITH AT LEAST ONE (1)** question from question 4 or question 5.
5. Please write your answers on the answer booklet provided.
6. Answer all questions in English / Bahasa Melayu language **ONLY**.
7. Trigonometry table has been appended for your reference.

THERE ARE 8 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

INSTRUCTION: Answer ALL questions.
Please use the answer booklet provided.

Question 1

(a) Describe 2 (TWO) main difference between synchronous and asynchronous data transmission in an electronic communication system.

(4 marks)

(b) Explain the important of 'framing' in asynchronous and synchronous communication systems?

(4 marks)

(c) Figure 1 shows a signal transmission process. Describe the characteristic of the signal transmission and produce 2 (TWO) advantages of that system.

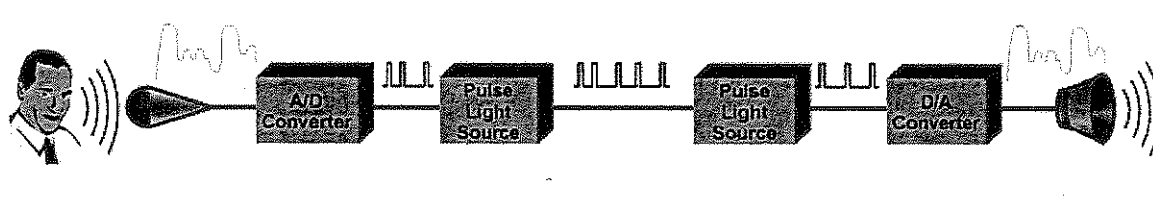


Figure 1

(6 marks)

(d) Interpret Figure 2 in terms of its operation and output signal. The answer should describe the number of bits and the clock operation of the circuit.

(6 marks)

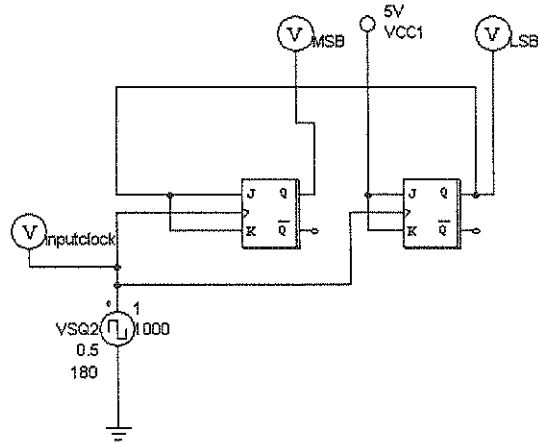


Figure 2

Question 2

(a) How does Ethernet operate in a network? Thus describe a collision occurs on an Ethernet network segment?

(6 marks)

(b) In a Local Area Network Topologies, all data are divided into 'packets' during its transmission. With the aid of the suitable diagrams, describe the 3 (THREE) Local Area Network (LAN) topologies that are commonly used today and derive the term 'packets' mentioned earlier in the text.

(9 marks)

(c) An Ethernet hub connects to each terminal of a network. There is another device that can do the same work called switch. Explain hubs and switches when they are connected in a network.

(5 marks)

SECTION B (Total: 60 marks)**INSTRUCTION: Answer THREE (3) ONLY from FOUR (4) questions.****Please use the answer booklet provided****Question 3**

- (a) There are 2 methods for channel establishing in a network which includes 'circuit switching' and 'packet switching'. Discuss the difference between circuit switching and packet switching in channel establishing during the signal transmission.
- (4 marks)
- (b) The Open System Interconnection is not a protocol itself but a description of how protocols should work. Different protocols accomplish each layer at different tasks. Describe the lowest level of the layer and show its examples.
- (5 marks)
- (c) Most wide-area networks use lines provided by telephone companies rather than network users. Determine the characteristics of leased lines technologies in terms of their speed and CPE requirements.
- (8 marks)
- (d) Some multiple access methods are quite common used in a network. Briefly define time division multiple access (TDMA) technique, thus give 1 (ONE) its advantage.
- (3 marks)

Question 4

(a) When a satellite lands on the orbit, it does not fall off. Discuss the reason behind this incident.

(2 marks)

(b) Satellite transponder acts like a repeater. Give four (4) main functions of a satellite transponder and draw its block diagram.

(4 marks)

(c) The 2-line element of a satellite is shown in Figure 3.

```

1 26548U 00057D 13090.14654058 .00001116 00000-0 14429-3 0 6105
2 26548 064.5520 116.0360 0050651 260.6514 162.3960 14.852866678677177
    
```

Figure 3

Thus, determine the following:-

- i) Apogee height
- ii) Perigee height

(6 marks)

(d) The TIUNGSAT1 satellite has the elements shown in Figure 4.

```

TIUNGSAT 1
1 26548U 00057D 06248.76165082 .00000114 00000-0 32216-4 0 5880
2 26548 064.5588 342.5136 0044210 235.6294 124.0627 14.83011838321352
    
```

Figure 4

Assuming that the mean earth radius is 6371 km, determine

(i) Semi-major axis

(2 marks)

(ii) Apogee and perigee height

(3 marks)

- (iii) Maximum and minimum speed of the satellite

(3 marks)

Question 5

- (a) Briefly explain the basic concept of the Global Maritime Distress and Safety System (GMDSS) which applies to vessels subject to the International Convention for the Safety of Life at Sea (SOLAS Convention).

(4 marks)

- (b) Differentiate the equipment carriage requirement needed for all seas areas which includes Sea Area A1, A2, A3 and A4.

(8 marks)

- (c) The most common carrier frequencies used for satellite communications are 6/4GHz (C-band) and 14/12GHz (Ku-band) bands, especially for voice and data communications. Explain the main reason of having different carrier frequencies between the system links.

(4 marks)

- (d) The actual sampling rate depends on the application and complexity channel bandwidth. Describe the theory of Nyquist sampling rate with a signal broadcast at 10 kHz.

(4 marks)

Question 6

- (a) Describe the main purpose of cladding in an optical fiber? Discuss its density relative to the core.

(5 marks)

(b) Describe both types of fiber optic that known as step-index fiber and graded index fiber optic. Includes the dispersion results produced by both types of fiber optic.

(5 marks)

(c) Describe the important features of Optical Emitters used in optical fiber communication which includes light emitting diodes and laser diodes.

(5 marks)

(d) Explain the characteristic of optical detectors that can be used with fiber optic system. Illustrate your answer with a cross-sectional diagram of the optical detector.

(5 marks)

End of question paper.

