

SECTION A : 60 MARKS
BAHAGIAN A : 60 MARKAH

INSTRUCTIONS:

This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi EMPAT (4) soalan berstruktur. Jawab SEMUA soalan.

QUESTION 1
SOALAN 1

CLO1
C1

- (a) State the IEEE standard related to Wireless Personal Area Network (WPAN), Wireless Local Area Network (WLAN) and Wireless Metropolitan Area Network (WMAN).

Nyatakan piawaian IEEE bagi Wireless Personal Area Network (WPAN), Wireless Local Area Network (WLAN) dan Wireless Metropolitan Area Network (WMAN).

[3 marks]
[3 markah]

CLO1
C2

- (b) Referring to the evolution of Wireless Wide Area Network (WWAN) technology, explain **THREE (3)** differences between Third Generation (3G) and Fourth Generation (4G) in terms of technology standards, types of services and its speed.

Merujuk kepada evolusi Wireless Wide Area Network (WWAN), terangkan TIGA (3) perbezaan antara Generasi ke-3 (3G) dan Generasi ke-4 (4G) berdasarkan piawaian teknologi, jenis perkhidmatan dan kelajuannya.

[6 marks]
[6 markah]

CLO1
C2

- (c) The Institute of Electrical and Electronics Engineers Standard Association (IEEE-SA) is an international non-profit association of engineers. Explain **THREE (3)** functions of IEEE-SA.

Institut Electrical dan Electronics Engineers Standard Association (IEEE-SA) merupakan Badan Antarabangsa yang bukan mendapat keuntungan kewangan. Terangkan TIGA (3) fungsi IEEE-SA.

[6 marks]
[6 markah]

QUESTION 2
SOALAN 2

CLO1
C2

- (a) Explain briefly **THREE (3)** objectives of multiple access techniques used in wireless communication.

Terangkan dengan ringkas TIGA (3) objektif teknik capaian pelbagai yang digunakan di dalam komunikasi.

[3 marks]
[3 markah]

CLO1
C3

- (b) Time Division Multiple Access (TDMA) is one of the multiple access techniques used in wireless communication. Interpret the features of Time Division Multiple Access (TDMA).

Time Division Multiple Access (TDMA) adalah salah satu daripada teknik capaian pelbagai yang digunakan di dalam komunikasi tanpa wayar. Terjemahkan ciri-ciri Time Division Multiple Access (TDMA).

[6 marks]
[6 markah]

CLO1
C3

- (c) Using a suitable diagram, interpret the Orthogonal Frequency Division Multiple Access (OFDMA) as one of the multiple access techniques in cellular communication system.

Dengan menggunakan gambarajah yang sesuai, terjemahkan Orthogonal Frequency Division Multiple Access (OFDMA) sebagai salah satu teknik capaian pelbagai dalam sistem komunikasi selular.

[6 marks]
[6 markah]

QUESTION 3
SOALAN 3

CLO1
C2

- (a) Describe the types of GSM channel as an element connected between mobile to base station and base station to mobile.

Terangkan jenis-jenis saluran GSM sebagai satu elemen hubungan diantara mobile ke base station dan base station ke mobile.

[3 marks]
[3 markah]

CLO1
C3

- (b) Illustrate Hard Handoff as one of handoff process in cellular communication system.

Ilustrasikan Hard-Handoff sebagai satu proses hand-off dalam sistem komunikasi selular.

[6 marks]
[6 markah]

CLO1
C3

- (c) Long Term Evolution (LTE) is a standard for high-speed wireless communication for mobile phones and data terminals. Interpret the function of **TWO (2)** main elements in LTE network architecture.

*Long Term Evolution (LTE) merupakan satu piawaian untuk komunikasi tanpa wayar berkelajuan tinggi bagi telefon mudah alih dan data. Terjemahkan fungsi **DUA (2)** elemen utama dalam rangkaian arkitektur LTE.*

[6 marks]
[6 markah]

QUESTION 4
SOALAN 4

CLO1
C1

- (a) List **THREE (3)** applications of Bluetooth technology.

*Senaraikan **TIGA (3)** kegunaan teknologi Bluetooth.*

[3 marks]
[3 markah]

CLO1
C2

- (b) With an aid of a suitable diagram, explain the process for establishing connection between Bluetooth devices (Master & Slave).

Dengan bantuan gambarajah yang sesuai, terangkan proses penyambungan antara komponen-komponen Bluetooth (Master & Slave).

[5 marks]
[5 markah]

CLO1
C3

- (c) Illustrate each component for Radio Frequency Identification (RFID) by using a suitable diagram.

Gambarkan setiap komponen Radio Frequency Identification (RFID) dengan menggunakan gambarajah yang sesuai.

[7 marks]
[7 markah]

SECTION B : 40 MARKS
BAHAGIAN B : 40 MARKAH

INSTRUCTIONS:

This section consists of **TWO (2)** essay questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi DUA (2) soalan esei. Jawab SEMUA soalan.

QUESTION 1

SOALAN 1

CLO2
C3

GSM1800 cellular radio system is designed with 30W transmission power from Base Transceiver Station (BTS 501). The BTS 501 is located 15 km away from mobile phone and the height of the antenna for BTS 501 and mobile phone are 200m and 3m respectively. The gain of BTS 501 and handphone antenna are 6dB and 2dB respectively. Assuming plane earth loss is between BTS 501 and mobile phone, calculate the power received signal (Watt and dBm) level at mobile phone by using Two Ray Model. Then, compute the power change if the mobile phone is moving at a distance of 30 km.

Sistem selular radio GSM1800 direka dengan kuasa pemancar 30W daripada Tapak Station Pemancar (BTS501). BTS501 berada pada jarak 15 km daripada telefon bimbit dengan ketinggian antenna untuk BTS501 adalah 200m dan ketinggian antenna telefon bimbit adalah 3m. Gandaan kuasa antenna BTS501 dan telefon bimbit masing-masing adalah 6dB dan 2dB. Dengan menganggap "plane earth loss" di antara BTS501 dan telefon bimbit, kirakan kuasa pemancar pada telefon bimbit dengan menggunakan formula "Two Ray Model". Kemudian, kirakan berapa nilai kuasa pemancar pada telefon bimbit jika jarak telefon bimbit ke BTS501 adalah 30 km.

[20 marks]
[20 markah]

QUESTION 2**SOALAN 2**CLO1
C3

Bluetooth technology is a Personal Area Network (PAN) standard that operates in the 2.4 GHz Industry, Scientific & Medical (ISM) band at a data rate of 1 Mbps. With the aid of a diagram, interpret the function of each layer in the Bluetooth Protocol Stack.

Technologi Bluetooth adalah standard Personal Area Network (PAN) yang beroperasi pada 2.4 GHz, jalur Industry, Scientific & Medical (ISM) pada kadar data 1 Mbps. Dengan bantuan gambarajah, terjemahkan fungsi setiap lapisan Bluetooth Protocol Stack.

[20 marks]
[20 markah]

SOALAN TAMAT