



**FINAL EXAMINATION / PEPERIKSAAN AKHIR
SEMESTER I – SESSION 2021 / 2022
PROGRAM KERJASAMA**

COURSE CODE : DDWC 1673
KOD KURSUS

COURSE NAME : DATA COMMUNICATION AND NETWORKING/
NAMA KURSUS : KOMUNIKASI DATA DAN RANGKAIAN

YEAR / PROGRAMME : 1 DDWD/DDWZ
TAHUN / PROGRAM

DURATION : 3 HOURS (INCLUDING SUBMISSION HOUR)
TEMPOH : 3 JAM (TERMASUK MASA PENGHANTARAN)

DATE : DECEMBER 2021
TARIKH : DISEMBER 2021

INSTRUCTION / ARAHAN:

1. The question paper consists of **2 PARTS**: A and B.
Kertas soalan terdiri daripada 2 BAHAGIAN: A dan B.
2. Answer **ALL** questions and write your answers on the answer sheet.
Jawab SEMUA soalan dan tulis jawapan anda pada kertas jawapan.
3. Write your name, matric no., identity card no., course code, course name, section no. and lecturer's name on the first page (in the upper left corner) and every page thereafter on the answer sheet.
Tulis nama anda, no. matrik, no. kad pengenalan, kod kursus, nama kursus, no. seksyen dan nama pensyarah pada muka surat pertama (penjuru kiri atas) kertas jawapan dan pada setiap muka surat jawapan.
4. Each answer sheet must have a page number written at the bottom right corner.
Setiap helai kertas jawapan mesti ditulis nombor muka surat pada bahagian bawah penjuru kanan.
5. Answers should be handwritten, neat and clear.
Jawapan hendaklah ditulis tangan, kemas dan jelas menggunakan huruf cerai.

WARNING / AMARAN

Students caught copying / cheating during the examination will be liable for disciplinary actions and the faculty may recommend the student to be expelled from sitting for exam.
Pelajar yang ditangkap meniru / menipu semasa peperiksaan akan dikenakan tindakan disiplin dan pihak fakulti boleh mengesyorkan pelajar diusir dari menduduki peperiksaan.

This examination paper consists of **6** pages including the cover.
Kertas soalan ini mengandungi 6 muka surat termasuk kulit hadapan.

**ONLINE EXAMINATION RULES AND REGULATIONS
PERATURAN PEPERIKSAAN SECARA DALAM TALIAN**

1. Student must carefully listen and follow instructions provided by invigilator.
Pelajar mesti mendengar dan mengikut arahan yang diberikan oleh pengawas peperiksaan dengan teliti.
2. Student is allowed to start examination only after confirmation of invigilator if all needed conditions are implemented.
Pelajar dibenarkan memulakan peperiksaan hanya setelah pengesahan pengawas peperiksaan sekiranya semua syarat yang diperlukan telah dilaksanakan.
3. During all examination session student has to ensure, that he is alone in the room.
Semasa semua sesi peperiksaan pelajar harus memastikan bahawa dia bersendirian di dalam bilik.
4. During all examination session student is not allowed to use any other devices, applications except other sites permitted by course lecturer.
Sepanjang sesi peperiksaan pelajar tidak dibenarkan menggunakan peranti dan aplikasi lain kecuali yang dibenarkan oleh pensyarah kursus.
5. After completing the exam student must inform invigilator via the set communication platform (eg. WhatsApp etc.) about completion of exam and after invigilator's confirmation leave examination session.
Selepas peperiksaan selesai, pelajar mesti memaklumkan kepada pengawas peperiksaan melalui platform komunikasi yang ditetapkan (contoh: Whatsapp dan lain-lain) mengenai peperiksaan yang telah selesai dan meninggalkan sesi peperiksaan selepas mendapat pengesahan daripada pengawas peperiksaan.
6. Any technical issues in submitting answers online have to be informed to respective lecturer within the given 30 minutes. Request for re-examination or appeal will not be entertain if complains are not made by students to their lecturers within the given 30 minutes.
Sebarang masalah teknikal dalam menghantar jawapan secara dalam talian perlu dimaklumkan kepada pensyarah masing-masing dalam masa 30 minit yang diberikan. Permintaan untuk pemeriksaan semula atau rayuan tidak akan dilayan sekiranya aduan tidak dibuat oleh pelajar kepada pensyarah mereka dalam masa 30 minit yang diberikan.
7. During online examination, the integrity and honesty of the student is also tested. At any circumstances student is not allowed to cheat during examination session. If any kind of cheating behaviour is observed, UTM have a right to follow related terms and provisions stated in the respective Academic Regulations and apply needed measures.
Semasa peperiksaan dalam talian, integriti dan kejujuran pelajar juga diuji. Walau apa pun keadaan pelajar tidak dibenarkan menipu semasa sesi peperiksaan. Sekiranya terdapat sebarang salah laku, UTM berhak untuk mengikut terma yang dinyatakan dalam Peraturan Akademik.

SECTION A / BAHAGIAN A

10 QUESTIONS/10 MARKS / 10 SOALAN/10 MARKAH

INSTRUCTION: Answer 'TRUE' for true statement and 'FALSE' for false statement. Answer in the space provided.

ARAHAN: Jawab 'BENAR' untuk pernyataan benar dan 'SALAH' untuk pernyataan salah.

1. Telecommunications is the transmission of voice and video as well as data and implies transmitting a longer distance than in a data communication network.
Telekomunikasi adalah perpindahan suara dan video begitu juga data dan penghantaran yang lebih jauh berbanding dengan komunikasi data rangkaian
2. An application architecture is the way in which the functions of the application layer are performed solely by the clients in the network.
Senibina aplikasi adalah satu cara dimana fungsi lapisan aplikasi dihasilkan semata-mata oleh pelanggan dalam rangkaian
3. The physical layer is a layer where two communicating nodes are directly connected.
Lapisan fizikal adalah satu lapisan dimana dua nod berkomunikasi secara sambungan terus.
4. Media access controls refer to the need to control when computers transmit.
Kawalan capaian media merujuk kepada keperluan kawalan apabila komputer menghantar.
5. Several different protocols exist that specify how network and/or transport layer packets are organized.
Beberapa protokol berbeza wujud yang menentukan bagaimana rangkaian dan/atau paket lapisan pengangkutan diatur.
6. Three layers of a network model are the components required for a typical network, including local area networks.
Tiga lapisan dalam model rangkaian adalah komponen yang diperlukan bagi rangkaian tipikal termasuk rangkaian kawasan setempat.
7. Wireless LANs serve the same purpose as wired LANs.
LAN tanpa wayar menyediakan tujuan yang sama seperti LAN berwayar.
8. A backbone network is a high-speed network that connects many networks
Tulang belakang rangkaian adalah rangkaian berkelajuan tinggi yang menyambungkan banyak rangkaian.

9. In building Wide Area Networks, many organizations do not build their own long distance communication circuits

Dalam bangunan rangkaian WAN banyak organisasi tidak membina litar komunikasi jarak jauh.

10. The Internet is one large network.

Internat adalah satu rangkaian yang besar.

SECTION B: SUBJECTIVE [90 MARKS]
BAHAGIAN B: SUBJEKTIF [90 MARKAH]

1. State the basic components of a wireless network. **[3M]**
Nyatakan komponen asas rangkaian tanpa wayar.

2. Briefly explain the definition of routing? **[3M]**
Terangkan secara ringkas definisi penghalaan

3. Describe SEVEN (7) function of seven layers in the OSI network model. **[3M]**
Terangkan tujuh fungsi lapisan dalam model rangkaian OSI.

4. Briefly explain the meaning of multipoint circuit and a point-to-point circuit **[3M]**
Terangkan secara ringkas maksud litar pelbagai pot dan litar titik –ke-titik.

5. Explain the differences among analog data, analog transmission, digital data, and digital transmission. **[3M]**
Terangkan perbezaan diantara data analog, penghantaran analog, data digital dan penghantaran digital.

6. Show amplifiers differ from repeaters **[3M]**
Tunjukkan penguat berbeza dari pengulang

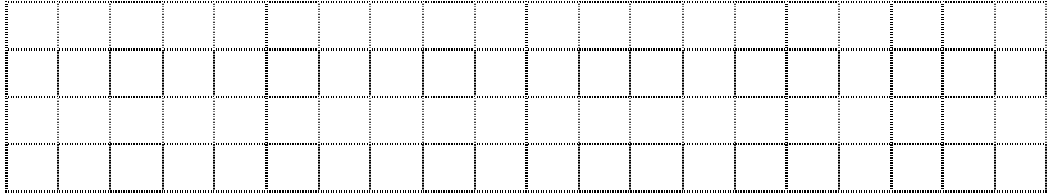
7. Illustrate decentralized routing differ from centralized routing. **[3M]**
Ilustrasi perbezaan penghalaan tak perpusat dan penghalaan berpusat

8. Briefly explain static routing and dynamic routing. When would you use static routing and dynamic routing? **[3M]**
Terangkan secara ringkas penghalaan statik dan dinamik. Bilakah penghalaan static dan dinamik boleh digunakan?

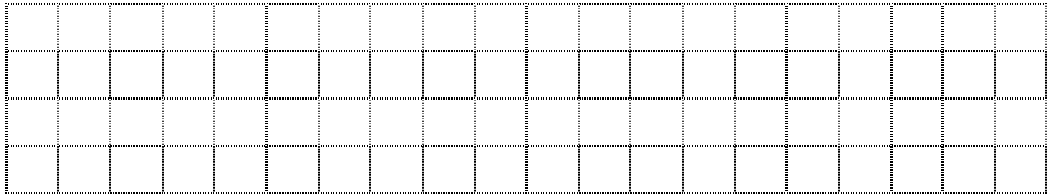
9. Consider a binary sequence 1100111001 flow through a channel. For each method below, draw the wave of the digital to digital conversion.

Pertimbangkan jujukan binari 1100111001 melalui satu saluran. Bagi setiap kaedah di bawah, lukis gelombang pertukaran digital ke digital.

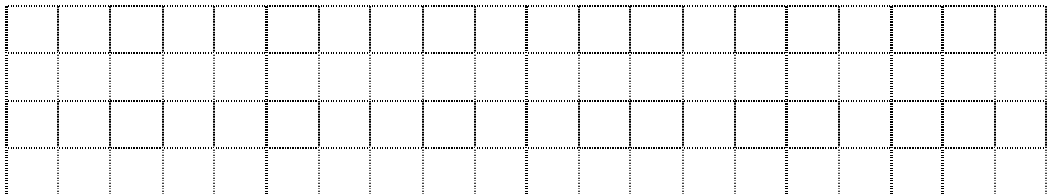
- a) RZ [4M]



- b) NRZ_I [4M]



- c) Differential Manchester [4M]



10. a) The ASCII character A (0100 0001) is transmitted with an even-parity bit appended to it. Show how the receiver would detect an error. [3M]

Aksara A (0100 0001) ASCII dihantar dengan tambahan bit parity genap. Tunjukkan bagaimana penerima mengenalpasti ralat.

- b) Assume the message 1100111 1010101 0101010 0011001 is transmitted. Show how the sender and receiver would detect an error using VRC and LRC error correction scheme. [7M]

Diandaikan mesej 1100111 1010101 0101010 0011001 dihantar. Tunjukkan bagaimana penghantar dan penerima mengenalpasti ralat dengan menggunakan skema pembetulan ralat VRC dan LRC.

11. Answer the following question based on error detection and correction.
Jawab soalan di bawah berdasarkan kaedah pengesanan dan pembetulan ralat.
- a) Construct Hamming code for the bit sequence 10011101. Show how the sender and receiver did. **[7M]**
Hasilkan kod Hamming bagi jujukan bit 10011101. Tunjukkan bagaimana penghantar dan penerima lakukan.
- b) Compute the CRC-4 character for the message 1010011110 using a divisor constant of 1011. Check your answer. Show how the sender and receiver did. **[7M]**
Kira aksara CRC-4 bagi mesej 1010011110 menggunakan pembahagi tetap 1011. Tunjukkan bagaimana penghantar dan penerima lakukan.
12. What does the IP address 192.168.0.0 means? **[3M]**
Apakah maksud alamat IP 192.168.0.0?
13. What is subnet mask? **[3M]**
Apakah yang dimaksudkan dengan topeng subnet?
14. Given a Class A IP address: 44.19.5.153
Diberi suatu alamat IP Kelas A: 44.19.5.153
- a). If a subnet mask of 255.255.0.0 is used with this IP address, gives the resulted network ID and the host ID. **[6M]**
Sekiranya topeng subnet 255.255.0.0 digunakan terhadap alamat IP ini, apakah ID rangkaian dan ID hos yang terhasil.
- b) Based on question (a), what is the maximum hosts number that can be assigned?
Berdasarkan soalan (a), berapakah bilangan maksimum hos yang boleh diumpukkan? **[4M]**
- c). Again from question (a), what is the maximum subnet numbers that can be created?
Juga dari soalan (a), berapakah bilangan maksimum subnet yang boleh dicipta? **[4M]**
- d) What is the effect of assigning a 255.255.255.255 subnet mask to this network?
Apakah kesannya menggunakan topeng subnet 255.255.255.255 terhadap rangkaian ini? **[2M]**

- e) Consider a situation in which a Class C network needs to support three subnets with less than 20 hosts per subnet. Give your idea and recommendation to solve this problem. Show in details all of your calculations. Note: Use network address of 202.44.7.0 as your example. **[8 M]**

Andaikan satu keadaan di mana suatu rangkaian Kelas C yang memerlukan tiga subnet dengan keadaan di mana setiap subnet mempunyai kurang dari 20 hos. Berikan idea dan cadangan anda untuk menyelesaikan masalah ini. Tunjukkan dengan terperinci semua jalan pengiraan anda. Nota: Gunakan alamat rangkaian 202.44.7.0 sebagai contoh anda.

END OF QUESTIONS/SOALAN TAMAT