



FINAL EXAMINATION QUESTION PAPER

Term: (☒ Fall / ☐ Spring)

Academic Year: 1436 / 1437 H

Student Name :

Student ID:

Section Number:

Level : 9

Course Name : Network Architecture Design

Course Code : CNET-442

Exam Date : 28th December-2015

Exam Day : Monday

Exam Duration: 2 Hours. Start Time: 8:00 AM

Maximum Marks: 40

MARKS DISTRIBUTION					
SECTION	Qn. No.	MARKS in numbers	MARKS	TOTAL MARKS	
				in Numbers	in Words
A			INTERNAL (40)		
B			FINAL PRACTICAL (20)		
			FINAL THEORY (40)		
C			FINAL PRACTICAL (20) + FINAL THEORY (40)		
TOTAL MARKS (40)			TOTAL (100)		
COURSE TEACHER (EVALUATOR) (Name, Signature & Date)			GRADE		

اقرأ التعليمات التالية بدقة:

- (1) اقرأ ورقة الأسئلة جيدا ثم أجب في كراسة الإجابة.
- (2) بعد نهاية الاختبار سلم ورقة الأسئلة وكراسة الإجابة للمراقب.
- (3) أحضر معك مايلزم من المتعلقات الشخصية التي تحتاجها في الاختبار مثل الأقلام والآلة الحاسبة.
- (4) يجب إبراز بطاقةك الجامعية والهوية الوطنية.

COURSE COORDINATOR
(Name, Signature & Date)
Kaif Jamal Gilani

TRACK LEADER
(Name, Signature & Date)
Sikandar Shah

DEPARTMENT HEAD /CEO
(Name, Signature & Date)
Mohiuddin Ali Khan

Answer ALL Questions. Each Question carries ONE Mark.

1 (a) Choose the correct answer:

(10 Marks)

i) Fiber Optics transmits information by sending _____ through optical fiber.

[a] pulses of current

[b] pulses of light

[c] pulses of air

[d] All of these

ii) Photo detectors is the device used to convert _____.

[a] Optical to electrical signals

[b] Electrical to optical signals

[c] Optical to light signals

[d] Light to optical signals

iii) WDM stands for _____.

[a] Wavelength Division Multiplexing

[b] Wavelength Duration Multiplexing

[c] Weight Division Multiplexing

[d] Wave Duration Multiplexing

iv) Queuing systems are found inside _____.

[a] Switches

[b] Access point

[c] Routers

[d] Repeaters

v) Frame relay is _____ packet switching protocol.

[a] physical layer

[b] data link layer

[c] transport layer

[d] network layer

vi) In CIR if the PVC is 28 kbps, the throughput will be _____.

[a] 56 kbps

[b] 28 kbps

[c] 112 kbps

[d] 14 kbps

vii) ATM is _____ cell switching WAN protocol.

[a] Connectionless oriented

[b] Connection oriented

[c] Network layer

[d] both of these

viii) _____ measures how much data is required to be transmitted in a specific time.

[a] Delay

[b] Jitter

[c] Lost packet

[d] Throughput

ix) The time taken by packets to travel across the service provider's network is known as _____.

[a] Media access delay

[b] Serialization delay

[c] Network delay

[d] All of these

x) _____ is the amount of time system is working when compared to the measured lifetime of the system.

[a] Availability

[b] Reliability

[c] Scalability

[d] Maintainability

1 (b) Fill in the Blanks:

(5 Marks)

xi) The LMI(Local Management Interface) is the signaling standard between the DTE and the frame relay switch.

xii) Data loss in fiber optics is less than 0.2dB/km.

xiii) ATM Adaptation layer converts user data supplied by higher layer into the 4 byte block of data.

xiv) The Deterministic parameters are based on specific traffic contract with conformance verifiable on a unit by unit basis.

xv) Response Time is the time required from users request to its response.

SECTION – B

(5 x 3 = 15 Marks)

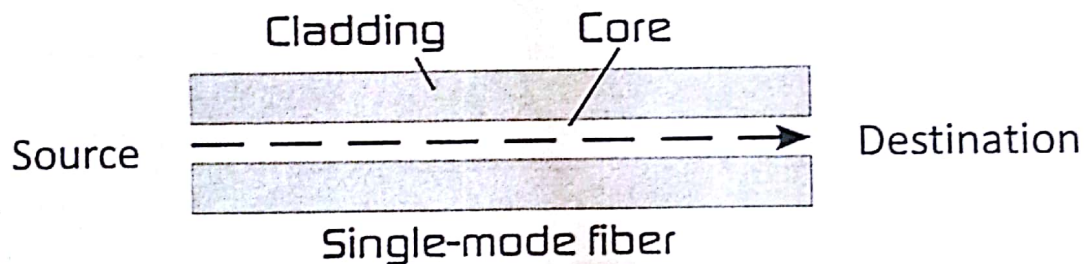
Answer any FIVE Questions. Each Question carries THREE Marks.

2. Briefly describe the two types of propagation mode in fiber optics with a suitable figure.
3. What is Quality of Service? Give the factors on which Quality of Service depends.
4. Describe the two types of virtual circuits in frame relay.
5. Briefly describe the network delay elements.
6. Explain different types of requirement categories.
7. What do mean by maintainability of the network?

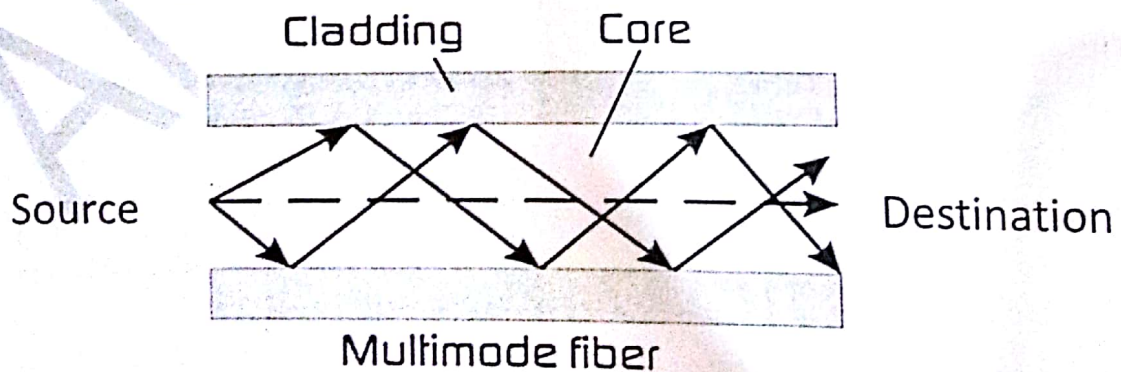
ANSWER

Q (2)

Single Mode: - This mode is called as single mode because the light is travelling in the lateral direction. There is only one angle that is straightway as the core of the diameter is very less.



Multimode : - Multimode fiber optic cable has a large diameter core, so multiple modes of light propagate in it. It has more data carrying capacity due to multiple reflection inside.



Q (3)

Quality of Service means the service received by the user from the communication system. It is directly dependent upon the nature of signals. As the signals are good, the quality is good.

QOS depends on the following factors: -

- 1) Transmission delay
- 2) Error rates, and
- 3) Signal strength (bandwidth)

Q (4)

The two types of virtual circuits in frame relay are: -

- (1) Permanent Virtual Circuit (PVC): - It is a dedicated circuit link established between the two facilities. This is preconfigured by the service provider. Ex., STC, Mobily, etc.
- (2) Switched Virtual Circuit (SVC): - It is a virtual circuit that is dynamically established on demand and disconnects when the transmission completes. Ex., downloading a file

Q (5)

The network delay elements are as follows: -

- Media Access Delay : It means to take access the media of LAN.
- Serialization Delay : The time it takes to output onto a serial link.
- Network Delay : The time it takes for a packet / frame / cell to travel across the service provider's network.

Q (6)

Requirement are classified into three different categories, they are as follows

- Business Requirements
- Security Requirements
- Manageability Requirements

Business requirements are concerned of the following items.

- Timeline
- Staffing
- Training
- Budgets and
- Project approval

Security requirements are very critical to most business, it includes the following.

- Who can access the network?
- Each resource.
- What can be accessed and when?
- Determine the appropriate security level for the resources and network you are trying to protect.

Manageability Requirements can vary across the board from simple PING program documentation that each device in the network is alive to full blown network management system.

Q (7)

Maintainability: Maintainability is defined as the measure of effort a user or network provider must put into the network to maintain its operating efficiency.

Maintainability includes these factors: -

- Defining how the designer will expand as requirements increase
- Expandability and flexibility of the hardware platform
- Ease of software upgrades

SECTION – C

(2x 5 = 10 Marks)

Answer any TWO Questions. Each Question carries FIVE Marks.

8. What is SONET? Explain its networking equipments.
9. Describe the variables on which traffic characteristics are dependant.
10. What are the two different types of connectivity? Explain their points to be examined.

ANSWER

Q (8)

SONET means Synchronous Optical Network. It is used for optical transmission. SONET used time domain multiplexing so as to send the bandwidth signals into one high-capacity signal that can be sent over optical fiber.

Its networking components are as follows: -

- 1) O-E-O Regenerators : - It used to regenerate optical signals that travel for long distances. The most straightforward way to regenerate is to convert the electrical domain and then back to the optical domain. SONET O-E-O regenerator differs form protocol-independent O-E-O regenerator by implementing additional performance monitoring function.

- 2) Add-drop multiplexers (ADMs) : - These are most versatile piece of SONET networking gear as they can add and drop any amount of SONET traffic as desired by the network operations.

SONET ADMs are used to create SONET transport networks consisting of SONET rings and point to point connections.

- 3) Terminal Multiplexers(TMs) : - These are specialized class of ADMs used at the edges of SONET networks. They have the capability to multiplex lower bandwidth signals coming from SONET or NON-SONET access networks. Terminal muxes are used to aggregate lower-bandwidth traffic into higher bandwidth SONET pipes for transmission over optical fiber.

Q (9)

The traffic characteristic depends upon four network variables they are, delay, loss, jitter and throughput.

Characteristics

Definition

Delay

It is the time for a packet to travel between two network devices [Round trip delay Ex. Ping]

Jitter

Measures the difference in one way delay over time for different packets sent between two network points.

Lost Packet

Measure the number of packets deleted or dropped in the network due to any error.

Throughput

Measures how much data is required to be transmitted in a specified time Ex. In bits/sec

Q (10)

The two different types of connectivity and their points to be examined are given below: -

1) User-to-network connectivity: -

The following points are to be examined for user-to- network connectivity.

- What is minimum speed required for connectivity?
- What types of devices will be connected?
- What type of data rates can they transmit?
- What is distance involved between user equipment and data communication equipment?
- What are the vendors software and hardware vendor specifics?
- What mode of addressing is required for access?
- What are protocols required for basic connectivity?

2) Network-to-Network connectivity: -

Once the user-to-network interface has been defined, any network-to-network connectivity requirements for new or existing networks can also be defined

- To what extent is everywhere connectivity required?
- Will the connectivity be homogenous or heterogeneous?
- Will private, public or hybrid network access be required?
- What type of technology will be used for network interfaces and internetworking?