UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET

COURSE CODE	: BNS 4183
COURSE	: OPTIMIZING CONVERGED NETWORKS
SEMESTER/SESSION	: 2 - 2024/2025
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer ALL questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, rise up your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 6 PRINTED PAGE INCLUDING COVER PAGE

QUESTION 1

a) Give the definition of the term below;

i) Latency (2 marks)

ii) Reliability (2 marks)

iii) Jitter (2 marks)

b) State **TWO (2)** techniques of encapsulation. (2 marks)

c) Give **FOUR (4)** basic components of VoIP. (4 marks)

d) Justify on **TWO (2)** statements on why UDP is the best protocol compare to TCP in VoIP. (4 marks)

e) ISDN is a set of standards that allow data and voice to be carried on copper wire from the telephone exchange to customer premises. Answer the following question related to ISDN.

i) Give full acronym of ISDN. (2 marks)

ii) Describe the functions of ISDN compare to PSTN or PTT (POTS) in a converged network area. (4 marks)

QUESTION 2

a) Based on Figure 1 and 2, describes the basic voice encoding of Converting Analog Signals to Digital Signals and vice versa. (6 marks)

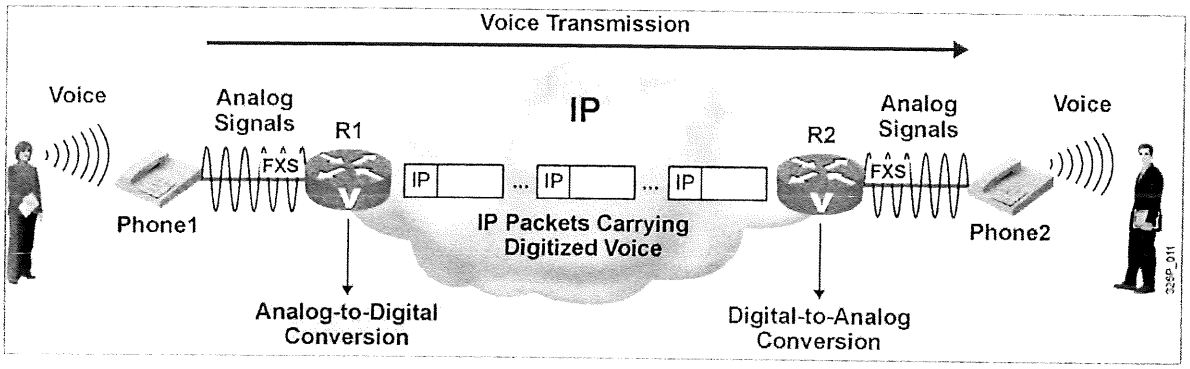

Figure 1: Basic Voice Encoding: Converting Analog Signals to Digital Signals

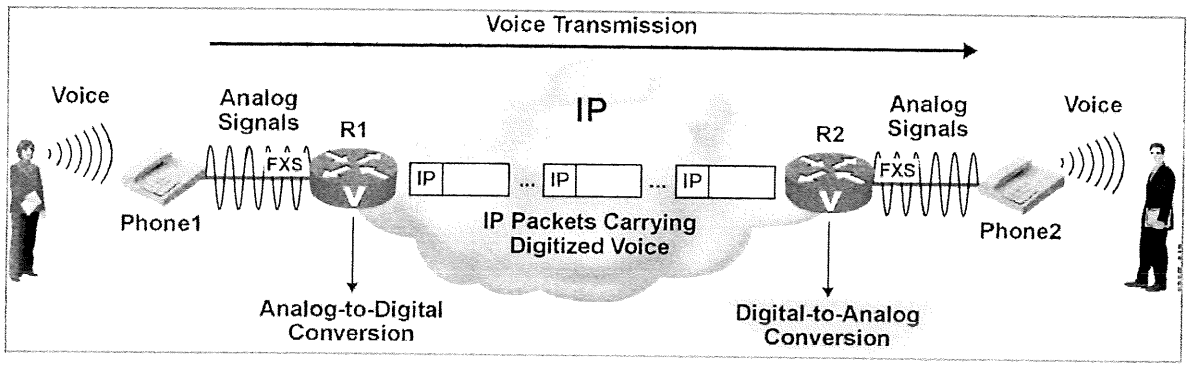

Figure 2: Basic Voice Encoding: Converting Digital Signals to Analog Signals

b) Human speech uses 200–9000 Hz. Human ear can sense 20–20,000 Hz and traditional telephony systems were designed for 300–3400 Hz. Answer the following question;

i) How about the sampling rate for digitizing voice? (1 mark)

ii) How many frequencies are allowed? (1 mark)

c) Illustrate the sampling idea based on your understanding. (2 marks)

d) Define the term below;

i) Quantization (2 marks)

ii) Companding (2 marks)

e) State **TWO (2)** methods of companding. (2 marks)

f) Distinguish between Pulse Code Modulation (PCM) and Adaptive Differential Pulse Code Modulation. (A D PCM). (4 marks)

g) Give **THREE (3)** examples of converged network traffic. (3 marks)

QUESTION 3

Voice over Internet Protocol (VoIP) is a technology that allows you to make voice calls using a broadband Internet connection instead of a regular (or analog) phone line.

a) Describe **THREE (3)** benefits of a VoIP network. (6 marks)

b) Explain **THREE (3)** stages of a VoIP call process. (6 marks)

c) What causes jitter in voice communication? (2 marks)

QUESTION 4

Quality of Service (QoS) is a set of technologies that work on a network to guarantee its ability to dependably run high-priority applications and traffic under limited network capacity. QoS technologies accomplish this by providing differentiated handling and capacity allocation to specific flows in network traffic.

a) Explain **FOUR (4)** major quality issues with converged networks. (8 marks)

b) Describe packet loss and give **THREE (3)** ways to prevent or reduce packet loss in the network. (6 marks)

c) Explain why converged networks require QoS from a manager perspective? (4 marks)

d) List the **THREE (3)** types of delay in network performance. (3 marks)

QUESTION 5

a) Explain the **THREE (3)** of Quality of Service (QoS) ~~model.~~ models (6 marks)

b) Determine the **TWO (2)** phases of comprehensive QoS deployment. (4 marks)

c) Construct the command line interface (CLI) in Cisco router to enable the instruction as following,

i) Enable an auto discovery (1 mark)

ii) Trust (rely on) the diff serv code point (DSCP) markings (1 mark)

iii) See auto discovery result (1 mark)

iv) Stop auto discovery (1 mark)

v) Enables AutoQoS VoIP for the low-speed Frame Relay-to-ATM links (1 mark)

d) When running Auto Discovery, observe **TWO (2)** restrictions that cannot be done within the auto discovery time running. (4 marks)

e) Outline **ONE (1)** step taken by Cisco AutoQoS on Routers and Switches to commission the QoS level. (1 mark)

---------- **END OF QUESTIONS** ----------