Shri Sant Gajanan Maharaj College of Engineering Shegaon

Computer Science & Engineering Department

Course Title & Course Code: Data Communication & Networking (DCN)- 4KS02

Class: Second year CSE

Semester: IV

Name of the Course Teacher: Prof. Ms. K. P. Sable

Title of the Innovative Practice: Content-Based Question Making

Objectives / Goals of the Practice

• To promote deep understanding of DCN concepts through student-created questions.

• To enhance engagement and analytical thinking by encouraging students to frame questions at various cognitive levels.

• To improve exam readiness by familiarizing students with diverse question patterns.

• To support peer learning and collaborative study through shared question banks.

Use of Appropriate Methods

• Students were grouped and assigned specific units/topics from the DCN syllabus.

• Each group designed a set of content-based questions spanning Bloom's levels: Remember, Understand, Apply, Analyze, Evaluate, Create.

• Questions covered MCQs, short answers, long answers, and scenario/case-based formats.

• Question sets were peer-reviewed and refined under faculty guidance.

• Select questions were used in quizzes and classroom discussions for validation.

• A question bank was compiled and shared as a study aid for exam preparation.

Significance of Results

• The practice encouraged deeper engagement with DCN topics such as routing algorithms, error control methods, network models, and security protocols.

• Students demonstrated improved ability to analyze and interpret technical content.

• Academic performance showed enhancement, as students became more confident in tackling varied exam questions.

• The compiled question bank supported self-paced learning and preparation for internal tests and competitive exams like GATE.

Effective Practice

• The activity covered each DCN unit logically, ensuring comprehensive question coverage from basics (network types, transmission media) to advanced topics (IPv6, SNMP, security protocols).

• The use of Bloom's taxonomy ensured diversity in cognitive challenge across the question sets.

• Group work and peer review fostered teamwork and constructive feedback culture.

• Question banks were structured clearly, categorized by topic and cognitive level for ease of use.

• The practice developed critical thinking, valuable for both academics and industry readiness.

POs Mapped

PO1, PO2, PO3, PO5, PO9, PO10

Reflective Critique

• Faculty observed that the question-making exercise led to improved participation during discussions and problem-solving activities.

• Some students initially struggled to design higher-order questions (analysis, evaluation), but improved with guidance.

• Feedback indicated that students appreciated the deeper insight gained through the activity but suggested inclusion of mock tests using the designed questions to reinforce learning.

Critique Review Form Link**:** **https://forms.gle/818yDURzS8iDqGb89**

Evidences of Success

• Enhanced classroom engagement during DCN lectures and discussions.

• Positive feedback: Students found question creation helpful for understanding and revising complex concepts.

• Frequent reference to the shared question bank for self-study and exam preparation.

Challenges Faced During Implementation

• Time constraints in covering question-making for all units alongside the regular syllabus.

• Initial difficulty in framing high-order questions by students unfamiliar with Bloom's taxonomy.

• Need for faculty effort to validate and refine student-generated questions for accuracy and relevance.

Peer Review Critique

- Peer reviewers appreciated the structured approach and variety in question types.
- Suggested further scaffolding for students to build high-order (evaluate/create) questions.
- Recommended integrating mock exam sessions using these question sets for better practice.

Sample Question Excerpts (Unit-wise)

Unit I: Introduction
• Remember: Define data communication and list its components.

• Understand: Explain the difference between circuit switching and packet switching with examples.

• Apply: Draw and explain the layered architecture of the TCP/IP model.

• Analyze: Compare the advantages and disadvantages of guided and unguided transmission media.

• Evaluate: Justify the choice of packet switching for internet communication.

• Create: Design a simple network topology for a small office, specifying media and switching type.

Unit II: Application Layer
• Remember: List the services provided by the application layer.

• Understand: Describe the working of HTTP protocol.

• Apply: Illustrate how DNS resolves a domain name to IP address.

• Analyze: Compare client-server and peer-to-peer paradigms.

• Evaluate: Assess the efficiency of FTP in transferring large files.

• Create: Propose an API design for a basic web service.

Unit III: Transport Layer
• Remember: What is the function of the transport layer?

• Understand: Explain TCP’s congestion control mechanism.

• Apply: Given a scenario, determine whether UDP or TCP is more appropriate.

• Analyze: Analyze the impact of flow control on network performance.

• Evaluate: Evaluate the reliability of TCP over unreliable networks.

• Create: Design a simple transport layer protocol for a gaming application.

Unit IV: Network Layer

• Remember: State the purpose of DHCP.

• Understand: Describe the structure of an IPv4 datagram.

• Apply: Explain how NAT enables private IP addressing.

• Analyze: Compare distance vector and link state routing algorithms.

• Evaluate: Critique the transition mechanisms from IPv4 to IPv6.

• Create: Design a subnetting plan for an organization with 4 departments.

Unit V: Link Layer

• Remember: List types of error detection techniques.

• Understand: Explain the working of CRC with an example.

• Apply: Demonstrate how ARP maps IP addresses to MAC addresses.

• Analyze: Analyze the performance of CSMA/CD in high traffic scenarios.

• Evaluate: Evaluate the effectiveness of HDLC in point-to-point communication.

• Create: Develop a simple frame format for a data link layer protocol.

Unit VI: Network Management & Security

• Remember: What is SNMP?

• Understand: Explain the concept of digital signatures.

• Apply: Show how SSL secures e-commerce transactions.

• Analyze: Compare SNMP managers and agents.

• Evaluate: Assess the strengths and weaknesses of SET in online payments.

• Create: Propose a basic cryptographic protocol for securing email communication.

Innovative Practice-Content Based Questions-DCN- Document Link:
https://docs.google.com/document/d/1-a6snXe38KSZqkrmZMVzFqaLHGgXYOpL/edit