TRIBHUVAN UNIVERSITY

2082 (New Course)

Bachelor / Education /5th Semester — Full Marks: 60

Math.Ed.456 Discrete Mathematics — Time: 3 hrs.

Candidates are required to give answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all questions

Group "B" — 6 X 5 marks =30

1. Define Pigeonhole Principle and expand $(2x-y)^5$ by using binomial theorem.
2. Show that the sum of the first n odd numbers is n^2.

OR

How many 10-digit mobile numbers can be formed using digits 0–9 without repeating any digit, and such that the number starts with an odd digit?

3. Construct circuits that produce the outputs of $(x+y)\bar{x}$.
4. By using Boolean function show that $x(y+z)=xy+xz$.

OR

Define RSA Cryptosystem with example. Explain the technique of generating RSA keys.

5. For all real number x, if $f(x)=3x-5$ and $g(x)=x+7$, find the value of $(fog)(x)$ and $(gof)(x)$.
6. Define Concatenation. Find the value of AB and BA, if A={0, 11} and B= {1, 10, 110}.

Group "C" — 2 X 10 marks =20

7. Solve the recurrence relation $a_n=a_{n-1}+3$ subject to the initial condition $a_1=2$.

8. Define Classical cryptography. Decrypt the ciphertext message "I LIKE NEPALI CULTURAL PROGRAM" that was encrypted with the shift cipher with shift k=5.

OR

Define Modern cryptography with example. Also define digital signature and explore detail process of digital signature.

TRIBHUVAN UNIVERSITY

2082 (New/Old Course)

Bachelor / Education /5th Semester — Full Marks: 40

ICT.Ed.457 Software Engineering and Project Management — Time: 3 hrs.

Candidates are required to give answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all questions

Group "B"

6 X 5 marks =30

1. Compare the Waterfall model with the Spiral model.

OR

Which software development model would be most suitable for a startup company which is building a mobile app? Give reasons.

2. Describe the process of requirement elicitation with examples.
3. Explain the steps involved in software project planning.

OR

How can a Gantt chart be used to manage a software project with multiple phases?

4. Define software design. Compare structural models with interaction models with illustrative diagrams.
5. Explain the types of software maintenance with examples.
6. Why is it important to use both unit testing and system testing during software development?

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TRIBHUVAN UNIVERSITY

2082 (New Course)

Bachelor / Education /5th Semester — Full Marks: 40

ICT.Ed.456 Data Communication and Networks — Time: 3 hrs.

Candidates are required to give answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all questions

Group "B" — 6 X 5 marks =30

1. Differentiate between TCP and UDP with example.
2. What is DNS? How CDN works? Explain.

OR

Explain the architecture of peer-to-peer (P2P) networks. What are the differences in file distribution between P2P and client-server models?

3. Assume that you are network administrator of XYZ company. Your task is to create subnets for 4 departments of XYZ company with provided network address 192.168.1.0/24 and answer following questions:
   i. How many usable hosts are available in each subnet?
   ii. Determine the subnet mask of each network.
4. Explain the services provided by the link layer.

OR

What are the different error correction and detection techniques available in link layer? Explain any one method in detail.

5. Describe the distance vector algorithm. In what ways does it differ from the algorithm used in links states?
6. What is personal area network? Compare Wi-Fi with cellular networks.

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TRIBHUVAN UNIVERSITY

2082 (New/Old Course)

Bachelor / Education /5th Semester — Full Marks: 40

ICT.Ed.455 Java Programming Language — Time: 3 hrs.

Candidates are required to give answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all questions

Group "B" — 6 X 5 marks =30

1. Define inheritance. Identify the different types of inheritance with their example.
2. Create a GUI window to collect name, address, phone, gender, hobbies and button to submit those data.

   OR

   Write java program to make use of Grid layout and Flow layout managers.
3. Differentiate between method overloading and method overriding. Write program to show the method overriding.
4. What is exception handling? Write program to show the array index out of bound exception.
5. Define interface. Why interface is used in programs? Write example program to illustrate use of interface.
6. What is the difference between listener and adapter classes? Write program to show handling of any one type of event.

   OR

   Write JDBC program to create database in mysql database named mydb_2025.

TRIBHUVAN UNIVERSITY

2082 (New Course)

Bachelor / Education /5th Semester — Full Marks: 60

Ed.452 Assessment and Evaluation in Education — Time: 3 hrs.

Candidates are required to give answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all questions

Group "B" — 6 X 5 marks =30

1. Explain how formative evaluation, as a type of evaluation, can be effectively implemented in a typical Nepalese classroom to improve student learning.
2. Differentiate between "concurrent validity" and "predictive validity," providing a hypothetical example of how each might be established for an educational test in Nepal.
3. Explain the concept of a "teacher-made test" and outline two distinct purposes these tests serve in the Nepalese school system.

OR

Outline the essential steps involved in "planning the test" when constructing a teacher-made test, emphasizing the importance of instructional objectives and the specification chart.

4. Explain the concept of 'standard deviation' and how it helps a teacher in Nepal understand the spread or variability of test scores within a class.
5. Describe the key features of the "existing student assessment system at the school level" in Nepal.

OR

Explain the "concept" and "process" of the Continuous Assessment System (CAS) as practiced in Nepalese schools.

6. Compute standard deviation from the given data set.

Score	13	15	17	19	21	25
Frequency	5	7	9	8	6	5

Group "C" 2 X 10 marks =20

7. Define reliability and validity as essential qualities of a test. Explain why both are important for a credible assessment instrument in the Nepalese educational context, providing examples of how a test might be reliable but not valid, and vice versa.

OR

Describe at least three methods of estimating reliability (e.g., test-retest, parallel form, split-halves, Kuder-Richardson). Discuss the practical feasibility and challenges of applying these methods to teacher-made tests in Nepalese schools.

8. Compare and contrast subjective and objective test items, discussing their respective types, construction principles, and uses. Analyze the advantages and disadvantages of using each type of item in the Nepalese context, considering factors like class size and teacher workload.