समानो मन्त्रः समितिः समानी

UNIVERSITY OF NORTH BENGAL

BCA Major 2nd Semester Examination, 2025

BCAPMAJ203-BACHELOR OF COMPUTER APPLICATION

DIGITAL ELECTRONICS

Time Allotted: 2 Hours 30 Minutes | Full Marks: 60

The figures in the margin indicate full marks.

GROUP-A

Answer any *four* of the following 3×4 = 12

1. State the De-Morgan's law and prove it.
2. Implement the given function using NAND gates only:

$$F(x, y, z) = \sum m(0, 6)$$

3. How does a 2 bit comparator work?
4. Differentiate between combinational and sequential circuit.
5. Why D Flip-flop is known as Delay Flip-flop? Define forbidden state in S-R-Flip-flop.
6. Define toggle. What is race condition?

GROUP-B

Answer any *four* of the following 6×4 = 24

7. (a) Determine the value of base x if $(211)_x = (152)_8$
   (b) Represent $(3452)_{10}$ in Excess-3 code.
   (c) Perform (–50) – (–10) in binary using the signed -2's complement.
8. Simplify the Boolean expression using K-map

$$F(A, B, C, D) = \sum m(0, 2, 3, 8, 10, 11, 14) + d(7, 15)$$

9. Design and explain about Full adder.
10. Draw and explain the circuit diagram of 1×4 demultiplexer.
11. Draw the circuit diagram of ring counter.
12. (a) Analyze the differences between Latch and flip-flop.
    (b) Distinguish between synchronous and asynchronous counters.

GROUP-C

Answer any *two* of the following $12 \times 2 = 24$

13.(a) Which gates are called as the universal gates and why? Implement the basic gates using Universal gates.

(b) Design a binary to Gray code converter circuit.

14.(a) Draw and explain the circuit diagram of Decimal to BCD Encoder.

(b) Draw and explain the circuit diagram of 4 bit parallel adder cum subtractor circuit.

15. Discuss different types of shift registers.

16. Write a short note on the following:

(a) ASCII

(b) CMOS

(c) SOP and POS.

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BCA Major 2nd Semester Examination, 2025

BCAPMAJ204-BACHELOR OF COMPUTER APPLICATION

JAVA PROGRAMMING

Time Allotted: 2 Hours 30 Minutes | Full Marks: 60

The figures in the margin indicate full marks.

GROUP-A

Answer any *four* questions 3×4 = 12

1. What is overriding?
2. Define Autoboxing.
3. What are wrapper classes?
4. What is the use of this keyword?
5. What are constructors?
6. What is garbage collection?

GROUP-B

Answer any *four* questions 6×4 = 24

7. Explain operator overloading with the help of an example.
8. Explain the features of JAVA Language.
9. Describe access control specifiers with example.
10. Explain different exception types in JAVA with the help of examples.
11. Write down different string handling methods.
12. What is an interface? Write the differences between an interface and a class.

GROUP-C

Answer any *two* questions 12×2 = 24

13. With an appropriate transition diagram discuss the complete life cycle of an applet.
14. Illustrate the iteration statements with suitable example.
15. What is inheritance? Write a java program to demonstrate the multilevel inheritance.
16. What is a package? How will you create and import package? Explain with the help of a program.

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