

This question paper contains 3 printed pages.

B.C.A. (Sem. - II)

003995

Roll No. 5802338

UG0801

BCA-52T-111

B.C.A. Three/Four Year (Semester - II)

EXAMINATION SESSION 2024-25 (Held in Jul. 2025)

(Faculty of Science)

BACHELOR OF COMPUTER APPLICATIONS

(Computer Organization and Architecture)

Time Allowed: Three Hours

Maximum Marks: 120

No supplementary answer book will be given to any candidate. The candidates should write the answers precisely in the main answer book only.

किसी भी परीक्षार्थी को पूरक उत्तर-पुस्तिका नहीं दी जाएगी। परीक्षार्थियों को समस्त प्रश्नों के उत्तर मुख्य उत्तर पुस्तिका में ही लिखने चाहिए।

Answers to short answer-type questions must be given in sequential order. Similarly, all the parts of one question of descriptive part should be answered in one place in the answer-book.

लघुत्तरात्मक प्रश्नों के उत्तर प्रश्नों के क्रमानुसार ही दें। इसी प्रकार किसी भी एक वर्णनात्मक प्रश्न के अन्तर्गत पूछे गए विभिन्न प्रश्नों के उत्तर, उत्तर-पुस्तिका में एक ही स्थान पर क्रमानुसार हल करने चाहिए।

Write your roll number on question paper before start writing answers of questions.

प्रश्नों के उत्तर लिखने से पूर्व प्रश्न-पत्र पर रोल नम्बर अवश्य लिखिए।

Question paper consists of two parts A and B and C.

प्रश्न पत्र में दो भाग अ और ब और स होंगे।

PART A: 20 marks भाग - अ : 20 अंक

Part A is compulsory having 10 very short answer-type questions (with a limit of 20 words) of two marks each. This first question is based on knowledge, understanding and applications of the topics/texts covered in the syllabus.

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P.T.O.

भाग अ में दो अंक के 10 अति लघु उत्तरीय प्रश्न (20 शब्दों की सीमा के साथ) अनिवार्य हैं। पहला प्रश्न पाठ्यक्रम में शामिल विषयों/पाठ के ज्ञान, समझ और अनुप्रयोगों पर आधारित है।

PART - B : 20 marks भाग – ब : 20 अंक

Part B has 4 questions (with a limit of 150 words) of 10 marks from each unit. The candidate is required to attempt any 2 questions.

प्रश्न पत्र के भाग ब में 10 अंक के 4 प्रश्न (150 शब्दों की सीमा के साथ) हैं। परीक्षार्थी को कोई भी 2 प्रश्न हल करने हैं।

PART - B : 80 marks भाग – स : 80 अंक

Part C of the question paper is divided into four units comprising question numbers 6 to 9. There is one descriptive question from each unit with internal choice. Each question will carry 20 marks.

प्रश्न पत्र के भाग स को प्रश्न संख्या 6 से 9 सहित चार इकाइयों में विभाजित हैं। प्रत्येक इकाई से आंतरिक विकल्प के साथ एक वर्णनात्मक प्रश्न हैं। प्रत्येक प्रश्न 20 अंक का है।

PART - A

1. (a) Explain Cache Memory. 2X10=20
- (b) Define De Morgan's Theorems with an example.
- (c) Differentiate between AND, OR and NOT gates with their symbols.
- (d) What is a Multiplexer? Write its function.
- (e) What is a JK flip-flop?
- (f) Define Register Transfer Language (RTL). Give an example.
- (g) What is a CPU?
- (h) List any two addressing modes with examples.
- (i) Differentiate between Programmed I/O and Interrupt I/O.
- (j) What is DMA (Direct Memory Access)?

PART - B

Attempt any two questions:

2. Explain Cache Memory. Why is it important? Explain the basic laws of Boolean Algebra with suitable examples. 10
3. What is a Multiplexer? Explain the working of a 4-to-1 multiplexer with a logic diagram and truth table. 10
4. Explain the Instruction Cycle with a flowchart. 10
5. Explain different modes of data transfer in I/O Organization. 10

PART - C

6. Explain different types of logic gates (AND, OR, NOT, NAND, NOR, XOR) with their truth tables and circuit symbols. 20

OR

Simplify the following Boolean expression using Boolean laws:

$$F = A \cdot (B + C) + A \cdot B' + A' \cdot C.$$

Also, example the basic laws of Boolean algebra used in simplification. 20

7. Design and explain a 4-bit Parallel Binary Adder. Include logic diagram and explain how carry is generated. 20

OR

Explain the working of SR, JK, and D Flip-Flops with truth tables and circuit diagrams. 20

8. Explain the common bus system used in computers. How are registers connected using this bus? 20

OR

Describe the steps of the instruction cycle with the help of a flowchart. Also explain instruction formats and addressing modes. 20

9. Differentiate between Programmed I/O, Interrupt-drive I/O, and DMA. Explain the working of Direct Memory Access (DMA). 20

OR

Explain memory hierarchy with diagram. Also describe the characteristics and roles of main memory, cache memory and associative memory. 20