

# उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय,इलाहाबाद

Bachelor of Computer Application

कार्यक्रम अधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-1.1</b>	कोर्स शीर्षक:— (Course Title) <b>Computer Fundamental &amp; PC Software</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतमअंक : 18

Section-A

Maximum Marks: 18

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्नसंख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Explain the differences between followings:
  - (i) Compiler and interpreter
  - (ii) Spooling and buffering
  - (iii) Message switching and Circuit switching.
2. Explain the different classification of Computers? Differentiate between microcomputers mini-computers and main-frames.
3. Explain the terms:
  - (i) Serial Processing
  - (ii) Batch Processing
  - (iii) Multiprogramming.

खण्ड ब

अधिकतमअंक : 12

Section –B

Maximum Mark : 12

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्नसंख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

4. What is Computer virus? Briefly explain different types of computer virus?
5. Explain various elements of programming language.
6. Briefly explain the key features of various transmission media?
7. What do you mean by normal view and page layout view of a document?

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Bachelor of Computer Application

कार्यक्रम अधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-1.2</b>	कोर्स शीर्षक:— (Course Title) <b>C Programming</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

Section-A

**Maximum Marks: 18**

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

- (a) What is a static variable? When should it be used?  
(b) What is a library function? What are its uses in C programming?
- (a) What is heap? Explain heap sort with an example.  
(b) How to represent binary tree using arrays and linked list?
- (a) Explain arithmetic, logical and bitwise operators with examples.  
(b) Write a C program to check whether the given matrix is symmetric or not

खण्ड ब

अधिकतम अंक : 12

Section –B

**Maximum Mark : 12**

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्नसंख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

- Write any five advantages of Pointers over Arrays.
- What is a stack? Explain various applications of stack?
- Write a program in C language to generate the given series upto terms less than 200.  
1 - 4 + 9 - 16 + 25 .....
- Write the output/error of the following code with explanation.

```
Main ()
{
    static int var = 5;
    printf ("%d", var .... );
    if (var)
    main ();
}
```

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Bachelor of Computer Application

कार्यक्रम अधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-1.3</b>	कोर्स शीर्षक:— (Course Title) <b>Basic Mathematics</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

Section-A

**Maximum Marks: 18**

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. State and prove Lagrange's mean value theorem
2. Show that every differentiable function is continuous but converse is not true.
3. Prove that inverse of a bijective function is bijective.

खण्ड ब

अधिकतम अंक : 12

Section -B

**Maximum Mark : 12**

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्नसंख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

4. Evaluate  $\lim_{x \rightarrow 0} \sqrt{(1+x)} - 1$
5. Integrate  $\int \frac{dx}{1+\sin x}$
6. If  $\alpha$  and  $\beta$  are roots of  $ax^2 + bx + c = 0$  then find  $\alpha^3 + \beta^3$ .
7. Find the Value of x:  $(x^2 + 2x + 3)^{1/2} = (2x + 5)$

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Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र 2018–19

कोर्स कोड :	कोर्स शीर्षक:- (Course Title)	अधिकतम अंक : 30
Course Code:BCA-E1	Design and Analysis Of Algorithms	Maximum Marks : 30

खण्ड अ

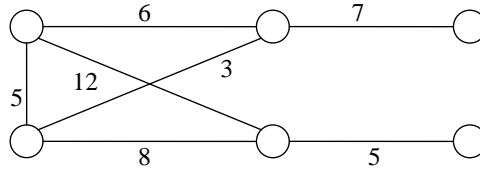
Section-A

अधिकतम अंक : 18

Maximum Marks: 18

नोट-(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.

1. Show the results of inserting the keys: F, S, Q, K, C, L, H, T, V, W, M, R and N in order to an empty B-Tree with minimum degree 2.
2. Solve the recurrence relation by iteration  
 $T(n) = T(n-1) + n^4$
3. Find the minimum spanning tree using Prims algorithm for the following graph.



खण्ड ब

Section -B

अधिकतम अंक : 12

Maximum Mark : 12

नोट-(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.

4. Solve the following recurrence. :  
 $T(1) = 1$   
 $T(n) = 4T(n/3) + n^2$  for  $x \leq 2$
5. Show the trace of heapsort algorithm for following input data :  
30, 50, -100, 200, 50, 30, 60, 80, 200 in order.
6. Give an algorithm for Strassens's multiplication. Explain how a divide and conquer strategy is applicable to it? Also analyze your algorithm.
7. Find the optimal solution using greedy criterion for a knapsack having capacity 50 kg. The list of items having values and weight as are shown in the table:

Item	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>
Profit	10	20	24	9	8
weight	8	14	34	5	4

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Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र 2018–19

कोर्स कोड : Course Code: <b>BCA-E2</b>	कोर्स शीर्षक:– (Course Title) <b>Theory of Computation</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

**Section-A**

अधिकतम अंक : 18

**Maximum Marks: 18**

**नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. Construct a NFA for language  $L = (a + b)b(a + bb)$ .
2. Write short notes on: (i) Chomsky classification of Languages (ii) Pushdown Automata. (iii) Turing Machine.
3. Show that the given grammar is ambiguous.  
 $S \rightarrow a / abSb / aAb$   
 $A \rightarrow bs / aAAb$

खण्ड ब

**Section –B**

अधिकतम अंक : 12

**Maximum Mark : 12**

**नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. What do you understand by pumping lemma for regular grammar?
5. What do you understand by undecidable problems? State the Halting problem and prove that halting problem is undecidable.
6. Draw finite automat recognizing following language.  $1(1 + 10)^* + 10(0+01)^* 14$ .
7. What is the difference between DFA and NFA?

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Bachelor of Computer Application

कार्यक्रमअधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-1.5</b>	कोर्स शीर्षक:- (Course Title) <b>DBMS</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

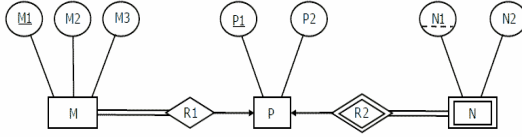
Section-A

Maximum Marks: 18

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Consider a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents.
  - (i) Draw an E-R diagram
  - (ii) Transform the E-R diagram to a Relational Schema.
2. Consider the following ER diagram.



Explain how many tables are needed to represent M, N, P, R1, R2?

3. Consider the relation  $R(A,B,C,D,E,G)$  with functional dependencies given by  $\{AB \rightarrow C, AC \rightarrow B, AD \rightarrow E, B \rightarrow D, BC \rightarrow A, E \rightarrow G\}$ . Consider the decomposition of R into  $\{AB, BC, ABDE, EG\}$ .
  - a) Is this decomposition lossy or lossless? Explain why?
  - b) Is this decomposition is dependency preserving or not? Explain why?

खण्ड ब

अधिकतम अंक : 12

Section –B

Maximum Mark : 12

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. Identify the Normal Forms of the relation R(ABCDEF) Functional dependencies given by  $\{AB \rightarrow C, C \rightarrow D, B \rightarrow E, B \rightarrow F\}$
5. Let R (ABCDEF) is a relational schema having FDs  $\{A \rightarrow BCDEF, BC \rightarrow ADEF, B \rightarrow C, D \rightarrow E\}$  Find out the Candidate Key ?
6. What is derived attribute? Explain the differences between single-valued attributes and multi-valued attributes.
7. The employee information in a company is stored in the relation.

Employee:(name,sex,salary,deptName)

Assume name is primary key and consider the following SQL query:

```
SELECT deptName FROM Employee WHERE sex='M' GROUP BY deptName  
HAVING AVG (salary)> (SELECT AVG(salary) FROM Employee);
```

Explain the output of above SQL query?

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Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र 2021–22

कोर्स कोड : Course Code: <b>BCA-1.6</b>	कोर्स शीर्षक:— (Course Title) <b>RDBMS</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

**Section-A**

अधिकतम अंक : 18

**Maximum Marks: 18**

**नोट—(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. Describe the main characteristics and advantages of the database management system in contrast with the earlier file oriented approach.
2. Briefly explain the following term:
  - i. Functional dependency
  - ii. Structured Query Language (SQL)
  - iii. Multi valued Attribute
  - iv. Composite Attribute
3. Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted.
  - (i) Draw an E-R diagram
  - (ii) Transform the E-R diagram to a Relational Schema.

खण्ड ब

**Section –B**

अधिकतम अंक : 12

**Maximum Mark : 12**

**नोट—(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

3. Let  $R(ABCDEF)$  is a relational schema having FDs  $\{A \rightarrow BCDEF, BC \rightarrow ADEF, B \rightarrow C, D \rightarrow E\}$  Find out the Candidate Key ?
4. What is normalization and why do we use it?
5. What is dependency preserving and lossless join decomposition?



6. Write a query in sql for the following database:

Employee(empno,ename,deptno,job,hiredate)

a) Create a table employee and make the empno as primary key of the table.

b) Give list of employee name & their job spec who are working in deptno 20?

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Master of Computer Application कार्यक्रम अधिन्यास सत्र 2021–22

कोर्स कोड :	कोर्स शीर्षक:– (Course Title)	अधिकतम अंक : 30
Course Code: <b>BCA-1.7</b>	<b>Basic Electronics</b>	<b>Maximum Marks : 30</b>

खण्ड अ

Section-A

अधिकतम अंक : 18

Maximum Marks: 18

**नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. What is Modulation? Why is modulation necessary in communication system?
2. Draw the circuit of Bridge rectifier and explain the working of it. Give its merits and demerits.
3. Draw the basic circuit for obtaining the static V-I characteristics of thyristor.

खण्ड ब

Section –B

अधिकतम अंक : 12

Maximum Mark : 12

**नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

प्रश्न संख्या 10से 21 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. Explain the difference between Zener and avalanche breakdown.
5. Explain universal logic gates? How they can be converted into each other?
6. Explain CB, CE and CC configuration in detail.
7. Draw and explain the working of emitter follower.

उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

**Bachelor of Computer Application** कार्यक्रम अधिन्यास सत्र **2021–22**

कोर्स कोड : Course Code: <b>BCA-E3</b>	कोर्स शीर्षक:– (Course Title) <b>Data Mining</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

**Section-A**

अधिकतम अंक : 18

**Maximum Marks: 18**

**नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. Explain structure of the data warehouse? Discuss in detail all the steps involve in making a data ware house.
2. Explain the different partitioning hierarchical clustering methods in details.
3. Differentiate between following:  
a) Database b) Data Warehouse c) Data Mining d) KDD

खण्ड ब

**Section –B**

अधिकतम अंक : 12

**Maximum Mark : 12**

**नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. Explain various data reduction techniques.
5. What are the various types of metadata? Explain in detail?
6. What is Classification? What do you mean by data cleaning?
7. How does data warehouse handle multidimensional data?

# उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

**Bachelor of Computer Application** कार्यक्रम अधिन्यास सत्र 2021–22

कोर्स कोड : Course Code: <b>BCA-E4</b>	कोर्स शीर्षक:– (Course Title) <b>E-Commerce</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

**Section-A**

अधिकतम अंक : 18

**Maximum Marks: 18**

**नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. What do we mean by Electronic Data Interchange? Explain the architecture of EDI with the help of a diagram.
2. Explain the benefits of e-commerce to organizations, customers and society at large.
3. Explain how smart cards and credit cards have roles in e commerce applications.

खण्ड ब

**Section –B**

अधिकतम अंक : 12

**Maximum Mark : 12**

**नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

इस खंड से किसी भी चार प्रश्नों के उत्तर दें।

4. Briefly describe the following:
  - a. Firewalls
  - b. Domain Name System
5. What do we mean by Electronic Fund Transfer? What are the different ways in which fund transfer can be done electronically?
6. What is a Cyber Crime?
7. How risk is handled in e-Payment system?

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Bachelor of Computer Application

कार्यक्रम अधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-1.9</b>	कोर्स शीर्षक:— (Course Title) <b>C++ and Object Oriented Programming</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

Section-A

अधिकतम अंक : 18

Maximum Marks: 18

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Declare an abstract class “*Shape*” with methods ‘*area*’ & ‘*volume*’. Refine this super class to subclasses like “*cone*”, “*cylinder*” & “*Rectangular Box*”. Then, Calculate area and volume for the subclasses.
2. Explain why do we need constructors? Explain a copy constructor with an example.
3. What is operator overloading? Illustrate Operator overloading concept to concatenate strings.

खण्ड ब

Section –B

अधिकतम अंक : 12

Maximum Mark : 12

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. Explain input and output streams.
5. What do you mean by “this” function? What are the applications of “this” pointer?
6. What is reusability? Which things can be reused in Object Oriented Programming?
7. Write a program using a try block to detect and throw an exception if the condition “divide by zero” occurs.

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Bachelor of Computer Application

कार्यक्रम अधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-1.10</b>	कोर्स शीर्षक:— (Course Title) <b>Multimedia Technology</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

Section-A

**Maximum Marks: 18**

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. List the hardware and software components essential for professional multimedia development. Also, justify purpose and need of each of the hardware components.
2. How image is stored in vector format? Explain its advantages.
3. What are the authoring tools? List out some silent features of a good authoring tool.

खण्ड ब

अधिकतम अंक : 12

Section –B

**Maximum Mark : 12**

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. What are the differences between the GIF and JPEG?
5. What do you mean by Animation? List the all Animation Tools.
6. What are the various component of hypertext? Discuss the application of hypertext in multimedia.
7. Explain the process involved in planning of Multimedia Application.

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Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र 2021–22

कोर्स कोड : Course Code: <b>BCA-1.11</b>	कोर्स शीर्षक:– (Course Title) <b>System Analysis and Design</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

**Section-A**

अधिकतम अंक : 18

**Maximum Marks: 18**

**नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. Explain prototype model of software development. Is prototype model a suitable Model for courier company management system? Justify your answer.
2. Explain the following:  
a) Project b) Project scheduling c) Critical Path d) Milestones e) Checkpoints f) Project review.
3. With respect to purchasing and inventory control systems explain any three of the following:  
a) Why do retail outlets carry inventory b) Inventory carrying cost. c) Procurement lead time d) Bill of material.

खण्ड ब

**Section –B**

अधिकतम अंक : 12

**Maximum Mark : 12**

**नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. What are the differences between Black Box Testing” and “White Box Testing”?
5. Discuss the role of PERT Chart in software development.
6. What is coupling and Cohesion? What are the different type of Cohesion?
7. What is spiral model?

# उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

## Bachelor of Computer Application कार्यक्रम अधिन्यास

कोर्स कोड : Course Code: <b>BCA-E5</b>	कोर्स शीर्षक:— (Course Title) <b>Object Oriented Analysis and Design</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

**Section-A**

अधिकतम अंक : 18

**Maximum Marks: 18**

**नोट—(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. What is the relationship between cohesion and coupling? Identify the type of coupling in the following. How can it overcome?
2. Explain Aggregation & Generalization in detail with suitable example.
3. Describe how class diagram, object diagram and generalization are represented with UML Diagram.

खण्ड ब

**Section –B**

अधिकतम अंक : 12

**Maximum Mark : 12**

**नोट—(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. Describe the activities involved in an ATM transaction.
5. What are the shortcomings in structured approach? Why generally, does an object granted system use a relational DBMS?
6. Explain the steps for converting state diagram to code.
7. Differentiate between Class diagram & Instance diagram



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कार्यक्रम अधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-E6</b>	कोर्स शीर्षक:— (Course Title) <b>Java Programming</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

**Section-A**

**Maximum Marks: 18**

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. What is overloading of methods? Explain with an example how overloading of methods is different from overriding of methods.
2. What is a constructor? Write a Java program to explain how super class constructors are called in their subclasses.
3. How Access Control Mechanism is implemented in Java? What Method does subclass inherit from superclass.

खण्ड ब

अधिकतम अंक : 12

**Section –B**

**Maximum Mark : 12**

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. Explain the use of 'this' keyword with an example.
5. Write down a java program to display number in word format, for Example: 123 will be shown as "One Two Three".
6. Differentiate between components and containers in AWT
7. What is the difference between Overloading and Overriding? Is it possible to override a inner classes.

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कार्यक्रम अधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-1.13</b>	कोर्स शीर्षक:— (Course Title) <b>Computer Network</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

Section-A

Maximum Marks: 18

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Describe the differences between the following:  
(i) Half Duplex and Full Duplex (ii) multicast addressing and Unicast addressing. (iii) packet switching and Circuit Switching.
2. Explain the OSI reference model with the help of a diagram. List the important functions of each layer of the model.
3. Assume message M: 1010101010 bits and generator G: 10001 bits. Explain how CRC is used for error detection using above message bits and generator bits.

खण्ड ब

अधिकतम अंक : 12

Section –B

Maximum Mark : 12

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. How classful addressing is different from class-less addressing? Give the range of IP addresses used in different classes in class addressing mode.
5. Write the similarities between TCP/IP and OSI model.
6. Explain the format of TCP header through illustration.
7. Explain the working of Link State Routing Algorithm using an example.

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कार्यक्रम अधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-1.14</b>	कोर्स शीर्षक:— (Course Title) <b>Operating System</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

Section-A

**Maximum Marks: 18**

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Consider the following page reference string: 1,2,3,4,2,1,5,6,1,2,3,7,6,3,2,1,2,3,6. How many page faults would occur for the LRU, FIFO, LFU and optimal page replacement algorithms assuming three and five frames?
2. Consider the following table of arrival time and burst time for three processes P0, P1 and P2.

Process	Arrival time	Burst Time
P0	0 ms	9 ms
P1	1 ms	4 ms
P2	2 ms	9 ms

The pre-emptive shortest job first scheduling algorithm is used. Scheduling is carried out only at arrival or completion of processes. What is the average waiting time for the three processes?

3. Assuming the current disk cylinder to be 50 and the sequence for the cylinders to be 1,36,49,65,53,12,3,20,55,16,65 and 78 find the sequence of servicing using
  - (a) Shortest seek time first (SSTF)
  - (b) SCAN disk scheduling policies.

खण्ड ब

अधिकतम अंक : 12

Section –B

**Maximum Mark : 12**

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. How does thrashing occurs? Explain with an example.
5. How does a deadlock happens in a system?
6. What are the minimum requirements that should be satisfied by a solution to critical section problem?
7. What is purpose of Process Control Block?

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कार्यक्रम अधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-1.15</b>	कोर्स शीर्षक:— (Course Title) <b>Windows Programming</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

**Section-A**

**Maximum Marks: 18**

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. What are the advantages and disadvantages of Visual Basic over any other object-oriented language? Explain with suitable examples.
2. Write a program in VB for adding List Box, List Items, Check Box, Radio Button and Menus to your Window.
3. What are the important features of Visual Basic? Explain various control structures in Visual Basic?

खण्ड ब

अधिकतम अंक : 12

**Section –B**

**Maximum Mark : 12**

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. What is event? Discuss any four events supported by visual basic.
5. What are the basic differences between checkbox and radio buttons?
6. Write a Visual Basic program to design a digital clock.
7. Explain the concept of database connectivity.

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**Bachelor of Computer Application** कार्यक्रम अधिन्यास सत्र 2021–22

कोर्स कोड : Course Code: <b>BCA-E7</b>	कोर्स शीर्षक:– (Course Title) <b>Network Programming</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

**Section-A**

**Maximum Marks: 18**

**नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. Define process identifier. Explain the operation of ‘fork’ function. List the similarities and differences between parent and child process.
2. Explain the following with syntax
  - a. kill() and raise() functions
  - b. alarm() and pause() functions
  - c. Pipes in UNIX
3. Explain the following with necessary diagram
  - i. I/O Multiplexing
  - ii. Signal driven I/O
  - iii. Asynchronous I/O

खण्ड ब

अधिकतम अंक : 12

**Section –B**

**Maximum Mark : 12**

**नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. State the difference between fork( ) and exec( ) functions
5. How is a system call different from Library function?
6. What is a socket in TCP communication? Give the IPv4 internet socket address structure.
7. List out the entities that are shared by all threads within a process.

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कोर्स कोड : Course Code: <b>BCA-E8</b>	कोर्स शीर्षक:— (Course Title) <b>Mobile Computing</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

Section-A

अधिकतम अंक : 18

Maximum Marks: 18

**नोट—(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. a) What are the main differences between ad-hoc network and other network? What advantages do the ad-hoc network offers? Explain in detail by giving a suitable example.  
b) Explain mobile IP in detail. Discuss the routing mechanism in detail.
2. Explain the following with respect to mobile IP:  
a. Tunneling b. Mobile TCP c. Digital Video Broadcasting d. WAP e. Bluetooth
3. a) What is mobile computing? Explain with a suitable example and its applications. What are the limitations of mobile devices?  
b) Explain the operating systems available for mobile devices.

खण्ड ब

Section –B

अधिकतम अंक : 12

Maximum Mark : 12

**नोट—(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. What are the different types of synchronizations? Mentions the applications of each.
5. Explain how space, time, frequency, and code division methods control the simultaneous access to the medium by multiple source or channels of mobile terminals and base base transceivers.
6. Compare WAP 1.1 and 2.0 architecture. Describe WSP.
7. Differentiate between the functions of labels, tags and cards. How do smart cards, smart labels, smart tokens and RFID tags work if they have no internal battery?

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Bachelor of Computer Application

कार्यक्रम अधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-1.17</b>	कोर्स शीर्षक:— (Course Title) <b>Software Engineering</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

Section-A

**Maximum Marks: 18**

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. What is Risk Management? How does software risk management related to software process improvement?
2. Define Software Development life cycle (SDLC). List the advantage and disadvantage of spiral model.
3. What is Software Testing? What are the various characteristics of a good testable software?

खण्ड ब

अधिकतम अंक : 12

Section –B

**Maximum Mark : 12**

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. Explain differences between prototype model and spiral model.
5. Discuss the role of PERT Chart in software development.
6. What is Cohesion? How it is different from of coupling?
7. What do you understand by Software Configuration Management?



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Master of Computer Science

कार्यक्रम अधिन्यास सत्र 2021–2022

कोर्स कोड : Course Code: <b>BCA-1.18</b>	कोर्स शीर्षक:– (Course Title) <b>System Software</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

Section-A

Maximum Marks: 18

**नोट–(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. What are the differences between Search Data Structures and Allocation Data Structures in Language Processors?
2. What is a general purpose macro processor? State and explain the algorithm for an one pass macro processor.
3. What is the role of parser in compiler design? Differentiate between top-down parsing and bottom-up parsing.

खण्ड ब

अधिकतम अंक : 12

Section –B

Maximum Mark : 12

**नोट–(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. What do you understand by Machine Dependency of System Software?
5. What is a loader? How loader is different from linker?
6. What is the regular expressions that denotes a language comprising all possible strings of even length over the alphabet ( 0 , 1 )?
7. What are different code optimization techniques?

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कोर्स कोड : Course Code: <b>BCA-1.19</b>	कोर्स शीर्षक:– (Course Title) <b>Computer Graphics</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

**Section-A**

अधिकतम अंक : 18

**Maximum Marks: 18**

**नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. List the hardware and software components essential for professional multimedia development. Also, justify the need of each of the hardware components.
2. Describe the matrix formulation of 2D Translation, Scaling and Rotation.
3. Define following terms:
  - a) Refresh buffer/frame buffer.
  - b) Pixel?
  - c) Aspect ratio.

खण्ड ब

**Section –B**

अधिकतम अंक : 12

**Maximum Mark : 12**

**नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. Explain the various digital movie tools.
5. Write short note on:
  - (a) MPEG
  - (b) MP3
6. What are the differences between the GIF and JPEG?
7. Explain Bresenham's circle generating algorithm.

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कोर्स कोड : Course Code: <b>BCA-E9</b>	कोर्स शीर्षक:- (Course Title) <b>Web Technology</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

**Section-A**

अधिकतम अंक : 18

**Maximum Marks: 18**

**नोट-(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. Explain the servlet API life cycle methods in brief.
2. Discuss the basic differences between Servlet and JSP.
3. Explain in detail the creation, instantiation and usage of java beans objects.

खण्ड ब

**Section –B**

अधिकतम अंक : 12

**Maximum Mark : 12**

**नोट-(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. Explain the way in which a DNS server resolves addresses.
5. Give some advantages of using cascading style sheets.
6. Compare DOM and SAX in XML processing.
7. Write a CSS which adds background images and indentation?

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कोर्स कोड : Course Code: <b>BCA-E10</b>	कोर्स शीर्षक:– (Course Title) <b>Client Server Technology</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

**Section-A**

अधिकतम अंक : 18

**Maximum Marks: 18**

**नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. Draw the block diagram of client/server architecture and explain the advantages of client/server computing with the help of suitable example.
2. Explain about network management and remote system management. How can security be provided to network?
3. Explain Connectivity and Communication Interface Technology in client/server application. How does transmission protocol work in client/server application?

खण्ड ब

**Section –B**

अधिकतम अंक : 12

**Maximum Mark : 12**

**नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. Why OLE is needed? Explain its importance.
5. Why Network Management is needed? Explain.
6. Differentiate between stateful and stateless servers.
7. Explain asynchronous Transfer mode (ATM) in detail.

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Bachelor of Computer Application

कार्यक्रम अधिन्यास सत्र 2021-22

कोर्सकोड : Course Code: <b>BCA-1.21</b>	कोर्स शीर्षक:— (Course Title) <b>Principle of Programming Languages</b>	अधिकतमअंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

**Section-A**

**Maximum Marks: 18**

**नोट—(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.**

प्रश्न संख्या 1से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Describe the various attributes of a good programming language. Write any four important uses of programming languages.
2. Explain variable, constant and data types with suitable example. Explain various types of conditional and looping statements in a programming language.
3. What is High level programming language? Briefly explain various advantages of high level programming languages over assembly and machine level languages.

खण्ड ब

अधिकतम अंक : 12

**Section –B**

**Maximum Mark : 12**

**नोट—(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.**

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. What is exception in programming language? How does the exception is handled?
5. What is static and stack based storage management?
6. Describe call by value and call by reference with suitable example.
7. Describe Language Translators? Explain different types of language translators.

## उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र 2021–22

कोर्स कोड : Course Code: BCA-1.22	कोर्स शीर्षक:– (Course Title) <b>Computer Organization</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

अधिकतम अंक : 18

Section-A

Maximum Marks: 18

नोट–(Instructions): Section A consists of long answer questions. Answer should be in 800 to 1000 words. Attempt all three questions from this section.

प्रश्न संख्या 1 से 3 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. (a) Implement the following Boolean Expression with NOR GATE only.  
 $F(A, B, C) = \Pi(0, 2, 4, 6, 7)$   
(b) Why NAND and NOR gates are called as Universal gate.
2. What do you mean by Flip-Flop? Discuss the functions and circuits diagram of different type of flip flop?
3. What is the difference between combinational and sequential circuit? Explain with appropriate example.

खण्ड ब

अधिकतम अंक : 12

Section –B

Maximum Mark : 12

नोट–(Instructions): Section B consists of short answer questions. Answer should be in 200 to 300 words. Attempt all four questions from this section.

प्रश्न संख्या 4 से 7 तक लघु उत्तरीय प्रश्न है जिनका उत्तर 200 से 300 शब्दों में लिखना है।

4. Differentiate Hardware and Micro-programmed control unit with their advantages and disadvantages.
5. What is instruction cycle? When will be any interrupt processed during the instruction cycle?
6. What is DMA? Explain DMA transfer modes in detail.
7. What do you mean by memory hierarchy? Why registers are present in CPU?

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Bachelor of Computer Application कार्यक्रम अधिन्यास सत्र 2021–22

कोर्स कोड : Course Code: <b>BCA-1.23</b>	कोर्स शीर्षक:– (Course Title) <b>Computer Oriented Numerical Techniques</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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खण्ड अ

**Section-A**

अधिकतम अंक : 18

**Maximum Marks: 18**

**नोट–(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

1. Find the roots of the equation  $x^2 - 5x + 2 = 0$  correct to five decimal places by Newton Raphson method.
2. What do you mean by Simpson's 1/3 rd and 3/8 th rule. Find the value of  $\int \sqrt{1-x^2} dx$  by Simpson's 1/3 rd rule.
3. For what value k, the following system of equations will have an infinite number of solutions

$$x+y+z=12$$

$$x+3y-z=5$$

$$x+2y-kz=4$$

खण्ड ब

**Section –B**

अधिकतम अंक : 12

**Maximum Mark : 12**

**नोट–(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. Estimate the eigen Values of matrix

$$\begin{vmatrix} 5 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 5 \end{vmatrix}$$

5. Find the value of Y for x = 0.1 by Euler's method of the initial value

$$\frac{dy}{dx} = \frac{(y-x)}{(y+x)}, y = 1 \text{ for } x = 0.$$

6. By Newton Raphson method find the positive root of  $f(x) = x - 2\sin x$ . Choose suitable initial guess and perform three iterations.
7. Find the inverse of the matrix

$$A = \begin{vmatrix} 5 & -2 & 4 \\ -2 & 1 & 1 \\ 4 & 1 & 0 \end{vmatrix}$$

## उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

Master of Computer Application कार्यक्रम अधिन्यास सत्र 2021–22

कोर्स कोड :	कोर्स शीर्षक:— (Course Title)	अधिकतम अंक : 30
Course Code: BCA-E11	Computer Architecture	Maximum Marks : 30

खण्ड अ

Section-A

अधिकतम अंक : 18

Maximum Marks: 18

**नोट—(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

प्रश्न संख्या 1 से 10 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है। इस खंड से किसी भी तीन प्रश्नों का उत्तर दें।

1. What are the similarities and differences between multiprocessor and multicomputer system? Explain the classification of multiprocessor system.
2. Explain the Pipeline scheduling in detail.
3. Identify the dependences in the following code snippet:

ADD R1, R2, R3

DIV R4, R1, R5

ADD R5, R7, R4

AND R5, R4, R2



खण्ड ब

अधिकतम अंक : 12

Section –B

Maximum Mark : 12

**नोट—(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. What is cache coherency and how is it eliminated?
5. What are different pipelining hazards and how are they eliminated?
6. Suppose a cache is 10 times faster than main memory & suppose the cache can be used 70% of the time. How much speedup do we gain by using cache?
7. Assume that for a certain processor, a read request takes 50 nanoseconds on a cache miss and 5 nanoseconds on a cache hit. Suppose while running a program, it was observed that 80% of the processor's read requests result in a cache hit. Find the average read access time in nanoseconds.

## उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

**Bachelor of Computer Application** कार्यक्रम अधिन्यास सत्र 2021–22

कोर्स कोड :	कोर्स शीर्षक:— (Course Title)	अधिकतम अंक : 30
Course Code:BCA-E12	<i>Microprocessor and its Applications</i>	<b>Maximum Marks : 30</b>

खण्ड अ

अधिकतम अंक : 18

Section-A

**Maximum Marks: 18**

**नोट—(Instructions): Section A consists of long answer questions from 1 to 3. Answer should be in 800 to 1000 words.**

प्रश्न संख्या 1से 9 तक दीर्घ उत्तरीय प्रश्न है जिनका उत्तर 800 से 1000 शब्दों में लिखना है।

1. Explain the following.  
(i) Data Bus. (ii) Address Bus. (iii) Control Bus.
2. Explain I/O addressing scheme used in 8086 with neat block diagram.

3. With block diagram describe the working of a DMA controller.

खण्ड ब

अधिकतम अंक : 12

**Section –B**

**Maximum Mark : 12**

**नोट—(Instructions): Section B consists of short answer questions from 4 to 7. Answer should be in 200 to 300 words.**

4. What do you mean by Conditional Flag?
5. What are the advantages of segmented memory scheme?
6. What are the flags in machine status word?
7. What is the difference between a microprocessor and a CPU?