

# उत्तर प्रदेश राजर्षि टण्डन मुक्त विश्वविद्यालय, इलाहाबाद

कार्यक्रम अधिन्यास सत्र 2018–19

Under Graduate Computer Science

कोर्स कोड : Course Code: UGCS-01	कोर्स शीर्षक:— (Course Title) <b>Computer Fundamental</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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## नोट— (Instructions):

1. **Answer all Questions.** सभी प्रश्नों के उत्तर दें।
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words.** खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है।
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words.** खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है।

## खण्ड अ Section-A

अधिकतमअंक : 18  
**Maximum Marks: 18**

1. Briefly describe what are Special purpose registers and General purpose registers in CPU. Why registers are present in the CPU.
2. Explain the following addressing modes with an example and suggest use for those addressing modes:
  - i. Register Indirect
  - ii. Auto increment
  - iii. Indirect address
  - iv. Base address
  - v. Indexed address
3. What is input-output interface? Draw and explain block diagram of input-output interface.

## खण्ड ब Section –B

अधिकतम अंक : 12  
**Maximum Mark : 12**

4. What is the difference between isolated I/O and memory mapped I/O?
5. Discuss and Differentiate Hardware and Micro-programmed control unit.
6. What is the race around condition? How can it be overcome?
7. Write an assembly language program to print the difference of the squares of 15 and 8 with only one multiplication.

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Under Graduate Computer Science

कोर्स कोड : Course Code: <b>UGCS-03</b>	कोर्स शीर्षक:— (Course Title) <b>Introduction to System Software</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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## नोट— (Instructions):

1. **Answer all Questions.** सभी प्रश्नों के उत्तर दें।
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words.** खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है।
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words.** खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है।

## खण्ड अ Section-A

अधिकतम अंक : 18  
Maximum Marks : 18

1. What are necessary conditions to hold a deadlock in a system? Explain the resource allocation Graph algorithm to deal with deadlock problem. What are the limitations of this approach?
2. What do you mean by operating system? What are the major functions of operating system?
3. Define the following terms :
  - a. Dispatchers
  - b. Scheduling
  - c. Swapping
  - d. Context switching

## खण्ड ब Section –B

अधिकतम अंक : 12  
Maximum Mark : 12

4. Discuss the paging system for memory management; also give its advantages and disadvantages.
5. Differentiate between :
  - (a) System software and application software
  - (b) General purpose OS and real time OS
6. What do you understand by page replacement? Name the algorithm available for page replacement.
7. Write the merits and demerits of Assembly language and High level language.

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Under Graduate Computer Science

कोर्स कोड : Course Code: <b>UGCS-04</b>	कोर्स शीर्षक:— (Course Title) <b>'C' Programming</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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## नोट— (Instructions):

1. **Answer all Questions.** सभी प्रश्नों के उत्तर दें।
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words.** खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है।
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words.** खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है।

खण्ड अ

अधिकतम अंक : 18

Section-A

Maximum Marks : 18

1. What is an operator? Explain the arithmetic, relational, logical and assignment operators in C.
2. Write a C program to calculate the factorial of a given number.
3. Write a C program to take a year as input and find out whether it is leap year or not.

खण्ड ब

अधिकतम अंक : 12

Section –B

Maximum Mark : 12

4. Write any two differences between compilers and interpreters.
5. Explain with example the difference between switch case and do-while loop in C.
6. With the help of an example explain how dynamic memory allocation can be done in C.
7. Define array and its types.

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Under Graduate Computer Science

कोर्स कोड : Course Code: UGCS-06	कोर्स शीर्षक:- (Course Title) <b>Database Management System</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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**नोट— (Instructions):**

1. **Answer all Questions.** सभी प्रश्नों के उत्तर दें।
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words.**  
खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है।
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words.**  
खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है।

**खण्ड अ**

अधिकतम अंक : 18

**Section-A**

**Maximum Marks: 18**

1. 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.
2. Explain the following with their advantages and disadvantages.
  - a. Distributed database
  - b. Client-server database
  - c. Relational database
3. What is index file? What are the differences between primary index and secondary index? Discuss in detail on B+ tree and B tree index file.

**खण्ड ब**

अधिकतम अंक : 12

**Section –B**

**Maximum Mark : 12**

4. Given the following set F of functional dependencies for relation schema  $R = \{A, B, C, D, E\}$ .  $\{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$  List the candidate keys for R.
5. Write relational algebra queries for the following relation:  
Student(ssn, name, address, major)  
Course(code, title) Registered(ssn,code)
  - a) Names of students and the titles of courses they registered to.
  - b) The titles of courses for which no student is registered.
6. Discuss on the various ways in which we can arrive at a good database design.
7. Explain 1NF, 2NF and 3NF with an example.

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Under Graduate Computer Science

कोर्स कोड : Course Code: UGCS-07	कोर्स शीर्षक:– (Course Title) System Analysis and Design	अधिकतम अंक : 30 Maximum Marks : 30
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## नोट– (Instructions):

1. Answer all Questions. सभी प्रश्नों के उत्तर दें।
2. Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है।
3. Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है।

खण्ड अ

अधिकतम अंक : 18

Section-A

Maximum Marks: 18

1. What is Risk Management and what will risk management do for any business? How does software risk management related to software process improvement?
2. Define Software Development Life Cycle (SDLC). What is spiral model? List the advantage and disadvantage of waterfall model.
3. What is software testing? What are the various characteristics of good testable software?

खण्ड ब

अधिकतम अंक : 12

Section –B

Maximum Mark : 12

4. What are the differences between “Black Box Testing” and “White Box Testing”?
5. What do you mean by Software Configuration Management?
6. Discuss the role of PERT Chart in software development.
7. What is system analysis? Describe the importance of system analysis in software system development.

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Under Graduate Computer Science

कोर्स कोड : Course Code: <b>UGCS-08</b>	कोर्स शीर्षक:— (Course Title) <b>Discrete Mathematics</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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नोट— (Instructions):

1. Answer all Questions. सभी प्रश्नों के उत्तर दें।
2. Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है।
3. Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है।

खण्ड अ  
Section-A

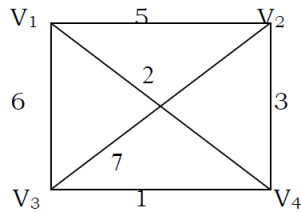
अधिकतम अंक : 18  
Maximum Marks : 18

1. What do you mean by the rank and nullity of a group? Discuss the rank and nullity of a complete graph of  $n$  vertices.
2. In a Boolean algebra  $[B, +, \cdot, /]$  prove that :  
(a)  $(a+b)' + (a+b')' = a'$   
(b)  $(a+b) \cdot (a'+c) = a' \cdot b + a \cdot c$
3. prove that  $nCr = n-1Cr + n-1Cr-1$

खण्ड ब  
Section –B

अधिकतम अंक : 12  
Maximum Mark : 12

4. Find three distinct Hamiltonian cycle in the following graph. Also find their weights.



5. Simplify Boolean function  $f$  given by:  
 $F(A,B,C,D) = \sum (0,2,7,8,10,15)$  using Karnaugh map.
6. Solve the recurrence relation  $Y_{n+1} - Y_n = n^2$
7. Eight coins are thrown simultaneously. Find the chance of obtaining at least six heads.

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## Under Graduate Computer Science

कोर्स कोड : Course Code: UGCS-09	कोर्स शीर्षक:— (Course Title) Computer Network	अधिकतम अंक : 30 Maximum Marks : 30
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### नोट— (Instructions):

1. Answer all Questions. सभी प्रश्नों के उत्तर दें।
2. Section A consists of long answer questions. Answer should be in 800 to 1000 words. खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है।
3. Section B consists of short answer questions. Answer should be in 200 to 300 words. खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है।

### खण्ड अ Section-A

अधिकतम अंक : 18  
Maximum Marks : 18

1. What do you understand by the term computer network? List the key component of a network.
2. Differentiate between OSI and TCP reference model in terms of layers. Functionality of each layer and important protocols at each layer.
3. Describe the following transmission techniques with examples:  
(i) Simplex    (ii) Half Duplex    (iii) Full Duplex

### खण्ड ब Section –B

अधिकतम अंक : 12  
Maximum Mark : 12

4. Explain the format of TCP header through illustration.
5. Explain the advantage of ISDN.
6. What is the need of multiplexing channels?
7. What are the various transmission media available?

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**Under Graduate Computer Science**

कोर्स कोड : Course Code: <b>UGCS-11</b>	कोर्स शीर्षक:– (Course Title) <b>C++ and Object oriented programming</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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## नोट– (Instructions):

1. **Answer all Questions.** सभी प्रश्नों के उत्तर दें।
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words.**  
खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है।
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words.**  
खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है।

खण्ड अ

**Section-A**

अधिकतम अंक : 18

**Maximum Marks : 18**

1. What is operator overloading? Illustrate Operator overloading concept to concatenate strings.
2. Explain why do we need to use constructors? Explain a copy constructor with an example.
3. What are the different forms of inheritance supported by C++? Explain with examples.

खण्ड ब

**Section –B**

अधिकतम अंक : 12

**Maximum Mark : 12**

4. What do you mean by “this” function? What are the applications of “this” pointer?
5. What are pure virtual functions?
6. What do you mean by container classes?
7. What is a Use case? Also explain with example.



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## Under Graduate Computer Science

कोर्स कोड : Course Code: <b>UGCS-17</b>	कोर्स शीर्षक:– (Course Title) <b>Operational Research</b>	अधिकतम अंक : 30 <b>Maximum Marks : 30</b>
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### नोट– (Instructions):

1. **Answer all Questions.** सभी प्रश्नों के उत्तर दें।
2. **Section A consists of long answer questions. Answer should be in 800 to 1000 words.** खंड अ में दीर्घ उत्तरीय प्रश्न हैं जिनका उत्तर 800 से 1000 शब्दों में लिखना है।
3. **Section B consists of short answer questions. Answer should be in 200 to 300 words.** खंड ब में लघु उत्तरीय प्रश्न हैं जिनका उत्तर 200 से 300 शब्दों में लिखना है।

### खण्ड अ Section-A

अधिकतम अंक : 18  
**Maximum Marks : 18**

1. Solve graphically:  
Maximize  $Z = 2x_1 + 3x_2$   
Subject to constraints:  
 $x_1 + x_2 \leq 30$   
 $x_2 \geq 3$   
 $0 \leq x_2 \leq 12$   
 $x_1 - x_2 \geq 0$   
 $0 \leq x_1 \leq 20$
2. Describe Monte Carlo method of simulation.
3. Write Short notes on:  
a. Genetic Algorithm      b. Simulated Annealing Problem

### खण्ड ब Section –B

अधिकतम अंक : 12  
**Maximum Mark : 12**

4. What are the advantages and disadvantages of simulation?
5. Write down the steps of the graphical method to obtain an optimal solution to a linear programming problem.
6. Briefly describe the steps for solving a transportation problem.
7. Explain the steps involved in critical path method.