

Total No. of Questions : 7]

SEAT No. :

P7477

[Total No. of Pages : 3

[6173]-1001

First Year M.Sc. (Computer Science)

CS - 501 - MJ : ADVANCED OPERATING SYSTEM

(2023 Credit Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Solve any five questions from 2 to 7.*
- 3) *Questions 2 to 7 carry equal marks.*

Q1) Solve any 5 of the following:

[5×2=10]

- a) True or False Justify: “The kernel is a separate set of process that run in parallel to user processes.”
- b) What are the 4 different conditions for the pid argument of kill system call?
- c) What is the difference between ‘wait’ and ‘waitpid’?
- d) If we execute `iseek(fd, 0, 2)` then what will be the new file byte offset?
- e) What is broken link?
- f) How to obtain process ID and parent Process ID?
- g) What is the output of following code?

```
#include<stdio.h>
```

```
#include<unistd.h>
```

```
int main( )
```

```
{
```

```
    if (fork( ) & & (!fork())) {
```

```
        if (fork( ) || fork( )) {
```

```
            fork( ); }
```

```
    }
```

```
    printf(“2”);
```

```
    return 0;
```

```
}
```

P.T.O.

Q2) Attempt the following: [12]

- a) i) What is a process? Draw and Explain state transition diagram of a process. [4]
- ii) Explain any three data structure for Demand Paging. [3]
- b) Explain syntax of following system call. [5]
 - i) alarm()
 - ii) kill()
 - iii) sbrk()
 - iv) execl()
 - v) fchmod()

Q3) Attempt the following: [12]

- a) i) Explain fourth scenario for buffer allocation. [4]
- ii) Explain the behaviour of the following C program: [3]

```
#include<fcntl.h>
main(int argc, char *argv[ ])
{
    int fd, skval;
    char c;
    if(argc != 2)
        exit( );
    while(skval = read(fd, & c, 1))
    {
        printf("char%c\n", c);
        skval=lseek(fd, 1023L, 1);
        printf("new seek val%d\n", skval);
    }
}
```

- b) Write a C program to prints the type of file for each command line argument. [5]

Q4) Attempt the following: [12]

- a) i) What are pipes? Explain named pipes and unnamed pipes? [4]
- ii) Which operation are performed by the kernel during execution of `fork()`? [3]
- b) Write a C program to demonstrate race condition in catching signals. [5]

Q5) Attempt the following: [12]

- a) i) Under which circumstances the process is swapped out? [4]
- ii) Explain the structure of regular file with suitable diagram? [3]
- b) C program that creates a child process to read commands from the standard input and execute them. You can assume that no arguments will be passed to the commands to be executed. [5]

Q6) Attempt the following: [12]

- a) i) Under which circumstances the process is swapped out? [4]
- ii) Draw and explain the structure of buffer pool? [3]
- b) Draw and explain Unix System architecture. [5]

Q7) Attempt the following: [12]

- a) i) Write a short note on process context. [4]
- ii) Write a C program that illustrate the suspending and resuming process using signal. [3]
- b) What is anonymous memory mapping? What are the advantages of allocating memory via anonymous memory mapping? [5]



Total No. of Questions : 6]

SEAT No. :

P7478

[Total No. of Pages : 2

[6173]-1002

**First Year M.Sc. (Computer Science)
CS - 502 - MJ : ARTIFICIAL INTELLIGENCE
(CBCS 2023 Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All Questions are Compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) Solve any Six of the following:

[6×2=12]

- a) What is knowledge and data?
- b) Explain AI benefits.
- c) Define Backward chaining.
- d) List AI applications.
- e) Describe any two characteristics of problem.
- f) What is Classical Planning in AI?
- g) What is Intelligent Agent?

Q2) Attempt any Four of the following:

[4×3=12]

- a) Explain Water Jug Problem in detail.
- b) Describe the A* algorithm.
- c) Discuss in brief the various issues in Knowledge Representation.
- d) Explain the MINIMAX procedure.
- e) Consider the following statement and Convert to FOPL and prove that,
 - i) John likes all kind of food
 - ii) Apple and vegetable are food.
 - iii) Anil eats peanuts and still alive

Q3) Attempt any Three of the following:

[3×4=12]

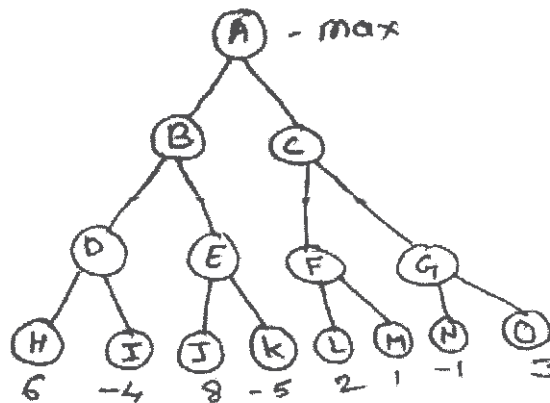
- a) Explain Hill Climbing Algorithm in detail.
- b) Explain Monte Carlo Tree Search technique.
- c) Define Constraint Satisfaction problem. Solve SEND+MORE=MONEY using Constraint Satisfaction.
- d) Construct the truth table for each compound position.
 - i) $p^{\wedge}(\sim q \vee q)$
 - ii) $\sim(p \vee q) \vee (\sim p^{\wedge} \sim q)$

P.T.O.

Q4) Attempt any Three of the following:

[3×4=12]

- a) Explain Mean Ends Analysis algorithm in detail.
- b) Apply Alpha-Beta Pruning algorithm for following Search.



- c) Describe any two approaches of representing knowledge.
- d) Explain Mental and Modal Object logics.

Q5) Attempt the following:

- a) Attempt any TWO of the following.

[2×5=10]

- i) What is Hierarchical Planning? Explain in detail.
- ii) Explain First-Order-Logic with example.
- iii) State components using which Problem can be formatted?

- b) Attempt any ONE of the following.

[1×2=2]

- i) Define Search Strategy terminology.
- ii) Explain Language Model in AI.

Q6) Write a short note. Any Two.

[2×5=10]

- a) Automated Planning.
- b) AO* Algorithm.
- c) Information Extraction.



Total No. of Questions : 5]

SEAT No. :

P7479

[Total No. of Pages : 2

[6173]-1003

First Year M.Sc. (Computer Science)

**CS - 503 - MJ : PRINCIPLES OF PROGRAMMING LANGUAGES
(2023 Credit Pattern) (Semester - I) (Paper - I)**

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No. 1 is compulsory.*
- 2) *Solve any Three questions from Q.2 to Q.5.*

Q1) Attempt any Five of the following:

[5×1=5]

- a) What is l-value and r-value?
- b) What is an array slice? name any two languages supporting it.
- c) Show IEEE floating point standard for single and double precision.
- d) What are the Keyword and positional parameters?
- e) What is formal parameter? Give example.
- f) Which function is used to join two strings. Give Syntax.
- g) Explain malloc() and calloc() functions with example.

Q2) Attempt the following:

[4+4+2=10]

- a) Explain the concept of tail recursion with suitable example.
- b) What are the issues related to initialization and finalization? Explain in detail how to choose a constructor with respect to various programming languages.
- c) What will be output of following code. Justify.

```
main()  
{  
    auto int i = 10;  
    {  
        auto int i = 20;  
        printf ("%d\n", i);  
    }  
    printf ("%d\n", i);  
}
```

P.T.O.

Q3) Attempt the following:

[4+4+2=10]

- a) What is multiple inheritance? Explain in detail the implementation of multiple inheritance.
- b) What are the ways to implement parameter passing method? Explain in detail the use of parameter passing methods in various programming languages.
- c) Define the following terms(any2):
 - i) Precedence
 - ii) Associativity
 - iii) Orthogonality

Q4) Attempt the following:

[4+4+2=10]

- a) What is enumeration type? Give design issues for enumeration type.
- b) What is polymorphism? Explain in detail object closure
- c) Give difference between structure & union.

Q5) Attempt the following:

[5+5=10]

- a) What is a dangling pointer? Explain two solutions to the dangling pointer problem?
- b) What are the characteristics of subprogram? Explain in detail the various types of parameters and their uses in different languages.



Total No. of Questions : 5]

SEAT No. :

P7480

[Total No. of Pages : 2

[6173]-1004

M.Sc. - I (Computer Science)

CS - 510 MJ : ADVANCED DATABASES AND WEB TECHNOLOGIES

(2023 Credit Pattern) (Semester - I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question No. 1 is compulsory.*
- 2) *Solve any three questions from Q.2 to Q.5.*
- 3) *Question 2 to 5 carry equal marks.*

Q1) Solve any five of the following : **[5]**

- a) Write any two features of NOSAL
- b) What is polyglot programming?
- c) What are the semantic elements in HTML5?
- d) State the purpose of <transition - delay> tag in CSS3.
- e) What is Bootstrap?
- f) Write the container classes used in Bootstrap.

Q2) Attempt the following : **[10]**

- a)
 - i) What is Sharding? **[2]**
 - ii) Give the syntax and purpose of the following form attributes. **[4]**
 - 1) autocomplete
 - 2) auto focus
 - 3) formaction
 - 4) formtarget
- b) What are the features of column family databases? **[4]**

P.T.O.

Q3) Attempt the following : [10]

- a) i) List some of the popular key value databases. [2]
- ii) Consider an “Movie” databases of film, with two collections (Entities) film, Actor. Assume appropriate attributes as per query requirements and Answer the following queries. [4]
 - 1) Arrange the film names in ascending order and release year should be in descending order.
 - 2) Find the titles of all the film acted by “Ajay Devgan” and “Fuveena Tandon”
- b) Describe aggregate data model with example. [4]

Q4) Attempt the following : [10]

- a) i) Explain data and color form input types in HTMLS. [2]
- ii) Write a note on Bootstrap colors utility with example. [4]
- b) Explain bootstrap Navbar with suitable example. [4]

Q5) Attempt any two of the following : [10]

- a) Mr. Zende purchased a laptop online from Amazon shopping site at the cost of 45,000t. This laptop was also recommended by Mr. Pande on 19 December 2023. Amazon also sells other branded laptops of different companies such as Dell, Lenovo, Apple.
The laptop purchased by Mr.Pande is Dell with warranty of 1 year.
 - i) Identify different nodes, labels, relationships and respective properties.
 - ii) Draw a graph model using the same.
- b) Write an HTML5 program for students registration for college admission and also apply CSS3.
- c) Explain the following Bootstrap components.
 - i) Jumbotron.
 - ii) Button.
 - iii) Table
 - iv) Grid
 - v) Pager.

x x x

Total No. of Questions : 5]

SEAT No. :

P7481

[Total No. of Pages :2

[6173] - 1005

First Year M.Sc. (Computer Science)

CS-512MJ : CLOUD COMPUTING

(2023 Credit Pattern) (Semester-I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) *Question 1 is compulsory.*
- 2) *Solve any three questions from question No.2 to Question No.5.*
- 3) *Question No.2 to 5. carry equal marks.*

Q1) Solve any Five of the following. **[5]**

- a) What are cloud enabling technologies.
- b) What is multitenancy.
- c) What is Paas.
- d) List the benefits of cloud computing.
- e) List the platforms which are used for large-scale cloud computing.
- f) List out different Amazon cloud storage services.

Q2) Attempt the following. **[10]**

- a)
 - i) What is data center? **[2]**
 - ii) What is Load Balancing? Explain any one type with detail. **[4]**
- b) Explain detail cloud computing Architecture. **[4]**

Q3) Attempt the following. **[10]**

- a)
 - i) What is MFA? **[2]**
 - ii) What is benefits and challenges of cloud security monitoring. **[4]**
- b) Describe the Amazon cloud services in detail. **[4]**

P.T.O.

Q4) Attempt the following. [10]

- a) i) What is Hypervisor in cloud computing? [2]
ii) Write a short note on virtualization. [4]
- b) Explain various components of Azure cloud platform. [4]

Q5) Attempt any two of the following. [10]

- a) Write difference between physical clusters and virtual clusters. [5]
- b) Explain virtual machine provisioning & manageability. [5]
- c) Write short note on. [5]
 - i) Security architecture design
 - ii) Identity and Access management



Total No. of Questions : 6]

SEAT No. :

P7482

[6173]-1006

[Total No. of Pages :2

First Year M.Sc. (Computer Science)
CS-514MJ : C# NET PROGRAMMING
(2023 Credit Pattern) (Semester-I)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right indicate full marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Solve any six of the following.

[6]

- a) State the access specifiers in C#.
- b) What is serialization?
- c) What is an interface?
- d) State any two features of .Net assemblies.
- e) State the properties of PictureBox.
- f) What are partial methods.
- g) State use of DataGridView.

Q2) Attempt any three.

[6]

- a) Write a note on explicit interface.
- b) How does C# use virtual and override method?
- c) List two properties and two methods of control class.
- d) What is managed code and unmanaged code in DOTNET?

Q3) Attempt any two.

[6]

- a) Explain CLR and its components.
- b) What is polymorphism? Explain with suitable example.
- c) Which objects are mainly used in ADO.NET to work with data? Also explain their roles.

P.T.O.

Q4) Attempt any two. [6]

- a) What is 'pass' by reference. Explain ref and out parameters with example.
- b) How does Visual Studio .NET work as Integrated Development Environment.
- c) Write short note on DataView.

Q5) Attempt any following. [6]

- a) Solve any one. [4]
 - i) Explain disconnected architecture of the ADO.NET. Write the steps to implement disconnected architecture.
 - ii) What are delegates? Explain multicast delegates with suitable example.
- b) What is the role of assembly loader? [2]

Q6) Attempt any one. [5]

- a) Write a C# code to copy content of one file into another file.
(Use stream Reader and stream Writer)
- b) Write a C# program to find minimum & maximum from array?



Total No. of Questions : 6]

SEAT No. :

P7483

[6173]-1007

[Total No. of Pages :2

First Year M.Sc. (Computer Science)
CS-531-RM : RESEARCH METHODOLOGY
(2023 Credit Pattern) (Semester-I)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) All questions are compulsory.*
- 2) Figures to the right side indicate full marks.*
- 3) Neat diagrams must be drawn wherever necessary.*

Q1) Solve any six of the following.

[12]

- a) Define Plagiarism.
- b) What is Literature Review?
- c) List any four research design or methods.
- d) Write the type of hypothesis.
- e) What is secondary data sources?
- f) What is the significance of report writing?
- g) List out different e-resources for research.

Q2) Attempt any four of the following.

[12]

- a) State the objectives of research.
- b) State merits and demerits of sampling.
- c) What are the features of good research design?
- d) What are the different methods of data collection?
- e) Write the importance of ethics in publication.

Q3) Attempt any three of the following.

[12]

- a) Explain the characteristics of Researcher in detail.
- b) Explain the types of plagiarism in detail.
- c) Write a note on Research Process.
- d) Write a short note on measures of central tendency.

P.T.O.

Q4) Attempt any three of the following. [12]

- a) Explain probability sampling methods in detail.
- b) Write a note on Pure and Applied Research.
- c) State the difference between Questionnaires and schedules.
- d) What are the different techniques in interpretation?

Q5) Attempt the following.

- a) Solve any two of the following. [10]
 - i) Differentiate between Research Methods and Research Methodology.
 - ii) What is Research Problem? What are the techniques involved in defining a research problem?
 - iii) Explain experimental research with example.
- b) What is violation of publication ethics? [2]

Q6) Write note on the following. (Any two) [10]

- a) Report writing
- b) Data Analysis
- c) Sampling

