[5976]-101

F.Y. B.Sc. (Cyber & Digital Science)
CDS-111 : INTRODUCTION TO COMPUTER AND PROBLEM SOLVING
(2020 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.*
3) *Draw diagrams wherever necessary.*

Q1) Attempt any Ten of the following: **[10×1=10]**

a) What is Machine Language?

b) What is problem solving?

c) Define Bridge.

d) What is WAN?

e) Define Client-server network.

f) What is Ethernet?

g) What is Output device?

h) Convert decimal number 51 to binary number.

i) What is Electronic commerce?

j) What is Internet protocol address?

k) Enlist the Network component.

l) What is Workstation in networking?

Q2) Attempt any five of the following: **[5×2=10]**

a) Divide 11010 by101.

b) What is Domain name?

P.T.O.

c) Define Interoperability.

d) What is Batch file?

e) State the advantages of Distributed OS.

f) What is SRAM?

Q3) Answer any four of the following: **[4×5=20]**

a) Explain types of bridges in detail.

b) Write the difference between LAN and WAN.

c) Explain peer-to-peer network in detail.

d) ExplainTree topology in detail.

e) Write algorithm and draw flowchart to check number is palindrome or not.

Q4) Answer any Four of the following: **[4×5=20]**

a) What is an Automated Teller Machine (ATM)? Explain in detail.

b) Explain any 2 types of E-commerce.

c) Explain features of Super-computer in detail.

d) What is brainstorming? Explain benefits in detail.

e) Explain Characteristics of an algorithm in detail.

Q5) Answer any One of the following: **[1×10=10]**

a) Explain advantage and disadvantage of E-commerce.   **[5]**

b) Explain MS-DOS Internal commands.   **[3]**

c) What is Directories?   **[2]**

OR

a) Explain Mobile OS in detail. State its advantages and disadvantages.**[5]**

b) Differentiate between PROM and EPROM.   **[3]**

c) Explain following commands RMDIR and CHDIR.   **[2]**

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[5976]-102

F.Y.B.Sc. (Cyber & Digital Science)
CDS-112 : PYTHON PROGRAMMING
(2020 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.***
    3)   ***Draw diagrams wherever necessry.***

Q1) Attempt any TEN of the following (Out of Twelve)   **[10×1=10]**
    a)   List features of Python.
    b)   What is a break statement?
    c)   Write the basic data types in Python.
    d)   List the any two builtin modules in Python.
    e)   Define dictionary methods.
    f)   Which function is used for creating the file?
    g)   What is the extention of Python program?
    h)   What are the different file modes?
    i)   If Str = 'india' find Str **2?
    j)   What is the use of dir() function?
    k)   What do you mean by indentation in Python?
    l)   Define Anonymous function.

Q2) Attempt any FIVE of the following (Out of Six)   **[5×2=10]**
    a)   Compare for and while loop in python. (any two points)
    b)   If s = 'abcde' then find s[1:3]? State the length of the 's'.
    c)   Mention the use of * and + operators in string with example.
    d)   State the two differences between tuple and list.
    e)   Define Recursion with an example.
    f)   Write the syntax of function in python?

P.T.O.

Q3) Attempt any FOUR of the following (Out of Five) :   **[4×5=20]**

    a)   List various types of operators in Python and write any 4 types of operators.

    b)   Write a python program to find the area of circle.

    c)   Define the following with example.

        i)   Tuple

        ii)   List

        iii)   Set

        iv)   Dictionary

    d)   Explin built-in string methods with an example.

    e)   With the help of example describe the following loops:

        i)   While

        ii)   For

Q4) Attempt any FOUR of the following (Out of Five) :   **[4×5=20]**

    a)   Discuss about keyword arguments and default arguments in python with example.

    b)   Write a python program to swap two variables.

    c)   Write a note on operations on file.

    d)   Explain the use of NumPy module with example.

    e)   What is package? How to create it? Explain with an example.

Q5) Attempt any ONE of the following (Out of Two) :   **[1×10=10]**

    a)   i)   Write a program in python to display Fibonacci series using recursion. Give appropriate comments.   **[5]**

        ii)   List any two operations on dictionary with an examples.   **[3]**

        iii) What is the output of the following code?   **[2]**

```
tuple 1 = (2, 4, 3)
tuple 2 = tuple 1 * 2
print(tuple2)
```

<div align="center">OR</div>

    b)   i)   Write the functions in Python to -   **[5]**

          1)   Function to concatenate two strings.

          2)   Function that merge the two python dictionary.

        ii)   What is modules in Python? List the built-in modules.   **[3]**

        iii) What is the output of the following code?   **[2]**

```
t1 = ('a', 'b','c')
t2 = (1, 2, 3)
Print (list(t1 + t2)
```

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[5976] - 103

F.Y. B.Sc.

CYBER AND DIGITAL SCIENCE

CDS-113 : Basic Mathematical Techniques

(2020 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.

3)   Draw diagrams wherever necessary.

Q1) **Attempt any Five of the following :**   **[10]**

a)   Find eigen value of Matrix $\begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$.

b)   Find *gcd* of 12, 21 and 6.

c)   If $n(A)=70, n(B)=30$ and $n(A \cap B)=25$ then find $n(A \cup B)$.

d)   Draw Hasse diagram for the poset D_{24}, where D_{24} is set of all positive divisors of 24.

e)   Let p : I am hungry, q : I will eat be two statement. Then write the following statement into English sentences :

$p \rightarrow q, \sim p \rightarrow \sim q, \sim q$

f)   Define tree and connected graph.

g)   State true or false :

i)   If a simple undirected graph has Hamiltonian cycle, then it has an Euler tour.

ii)   If a graph with n vertices has atleast n–1 edges, then it must connected.

Q2) **Attempt any Four of the following :** [20]

    a)   Solve the following system

$$6x+3y+2z=6$$
$$6x+4y+3z=0$$
$$20x+15y+12z=0$$

    b)   If $a \equiv b$ mod n then prove that $(a,n)=(b,n)$.

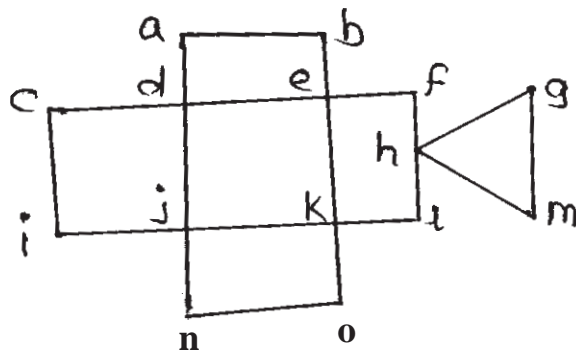   c)   Show that a tree with n-vertices has $n-1$ edges.

    d)   Construct truth table of the statement

         $(p \vee q) \leftrightarrow (q \vee p)$.

    e)   How many arrangements of five letters from the word 'APPLE'.

    f)   Build an Euler cycle for the graph

Q3) **Attempt any Four of the following :** [20]

   a)   Let L be a Lattice. Then show that for every a and b in L

         $a \vee b = b$ if and only if $a \leq b$.

    b)   Find 4^{99} Mod 35.

    c)   Prove that $p \rightarrow q \equiv \sim q \rightarrow \sim p$.

    d)   Two dice are rolled, one green and one red. Each die has faces numbered 1 through 6. What is the probability that same value on both dice?

e) Let $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ be matrix. Find characteristics polynomial of Matrix

A and check whether the Matrix A satisfy its characteristics polynomial.

f) Determine whether following graphs are isomorphic or not.
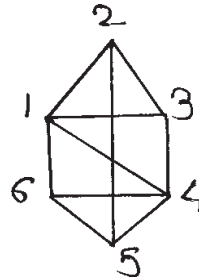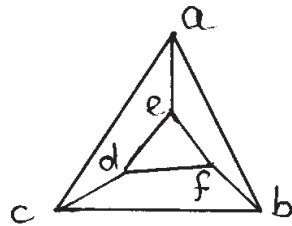
Q4) **Attempt any Two of the following :** [20]

a) Show that 4999 and 1109 are relatively prime. Also find m and n such that $1 = 4999\, m + 1109\, n$.

b) i) Find the all spanning trees of K_4.

ii) Consider the Boolean Polynomial $P(x, y, z) = x \wedge (y \vee z')$, If $B = [0, 1]$, Compute truth table of the function $f : B_3 \to B$ defined by P.

c) i) Find LU decomposition of Matrix $A = \begin{bmatrix} 2 & 5 \\ 1 & 2 \end{bmatrix}$.

ii) Find the value of $\binom{20}{0} - \binom{20}{1} + .. + (-1)^k \binom{20}{k} .... + (-1)^{20} \binom{20}{20}$.

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[5976]-103   3

[5976]-104

F.Y. B.Sc.

(CYBER & DIGITAL SCIENCE)

CDS-114: Basic Statistical Techniques for Computer Science

(2020 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.

　3)　Draw diagrams wherever necessary.

Q1)　Attempt any Ten of the following (Out of Twelve) :　　[10 × 1 = 10]

　a)　Define Mean.

　b)　Give one real-life example of positively skewed data.

　c)　Define regression model.

　d)　What is the range of value of Spearman's rank correlation coefficient?

　e)　Define random experiment.

　f)　What is the probability that a ball drawn from a bag containing 6 red, 4 white and 10 yellow balls is white?

　g)　Illustrate the concept of a random variable with one real-life example.

　h)　Find the value of mode for the given data: 1, 2, 3, 1, 4, 5, 7, 8, 9, 5, 1.

　i)　State any two properties of the cumulative distribution function.

　j)　State the lack of memory property.

　k)　Illustrate the concept of a type-1 error with one real-life example.

　l)　Define p-value.

P.T.O.

Q2) **Attempt any Five of the following (Out of Six) :** [5 × 2 = 10]

  a) What do you mean by the central tendency of data?

  b) Explain the leptokurtic and platykurtic terms with suitable examples.

  c) Find the value of Karl Pearson's coefficient of correlation (*r*) for the following data.

X	−2	−1	0	1	2
Y	4	1	0	1	4

  d) Discuss the limitations of the classical definition of probability.

  e) Define the Bernoulli distribution and state the additive property.

  f) Calculate the mean for the Normal distribution.

Q3) **Attempt any Four of the following (Out of Five) :** [4 × 5 = 20]

  a) Explain SRSWR and SRSWOR with one illustration each.

  b) Define Range and Standard deviation. State the formula for each in case of ungrouped data and frequency distribution.

  c) Define Binomial distribution with parameters *n* and *p*. State its mean and variance. Give any two real-life situations where binomial distribution can be used.

  d) Define regression coefficients and state three properties of it.

  e) Explain the procedure of the proportions test for two samples.

Q4) **Attempt any Four of the following (Out of Five) :** [4 × 5 = 20]

  a) Write a short note on skewness. Explain the procedure of drawing a histogram.

  b) Define exponential distribution and obtain its mean and variance.

  c) Explain the term correlation. What are its different types? Explain them with one illustration of each.

  d) Define poisson distribution and obtain its mean and variance.

  e) Define terms: Sample Space, Event, independence of two events, probability model, conditional probability.

[5976]-104   2

Q5) **Attempt any One of the following (Out of Two) :** [1 × 10 = 10]

a) i) Suppose X and Y are two continuous random variables. Find Karl Pearson's coefficient of correlation between X and Y using the following information and interpret the result.

$n = 10, \sum_{i=1}^{n} X_i = 666, \sum_{i=1}^{n} Y_i = 663,$

$\sum_{i=1}^{n} X_i^2 = 44490, \sum_{i=1}^{n} Y_i^2 = 44061, \sum_{i=1}^{n} X_i Y_i = 44224$ [5]

ii) Two fair dice are rolled. Let A be the event that the sum of points on the uppermost faces is odd and B be the event that there is at least a 3 shown. Evaluate probabilities of the events: A∪B, A∩B and A∩B. [3]

iii) Find the variance of first ten natural numbers. [2]

b) i) The iron contents of fruits before and after applying farmyard manure were observed as follows.

Fruit No.	1	2	3	4	5	6	7	8	9	10
Before Applying	7.7	8.5	7.2	6.3	8.1	5.2	6.5	9.4	8.3	7.5
After Applying	8.1	8.9	7.0	6.1	8.2	8.0	5.8	8.9	8.7	8.0

Is there any significant difference between the mean iron contents in the fruits before & after applying farmyard manure at a 5% level of significance? [5]

ii) It has been found that on average the number of mistakes per typed page of a typist is 1.5. Find the probability that there are 3 or less mistakes. [3]

iii) For a certain type of computer, the time required to full charge the battery is normally distributed with a mean of 50 hours and a standard deviation of 15 hours. John owns one of these computers and wants to know the probability that the length of time will be between 50 and 70 hours. [2]

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[5976]-104 3