Total No. of Questions : 5]

SEAT No. :

P5121

[Total No. of Pages : 3

[5823]-101

F.Y. B.Sc. (Computer Science)

CS-111 : Problems Solving Using Computer and 'C' Programming

(2019 Pattern) (CBCS) (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) ***Assume suitable data if necessary.***

Q1) Attempt any Eight of the following : **[8 × 1 = 8]**

a) What is a compiler?

b) What is linker?

c) Define pseudocode.

d) List the various data types in 'C' language.

e) What is the use of break & continue statement.

f) Write the syntax for nested if - else loop.

g) State the use of rewind ( ) function.

h) List the different storage classes.

i) List the types of arrays.

j) State the applications of arrays.

Q2) Attempt any Four of the following : **[4 × 2 = 8]**

a) Define algorithm. Explain its characteristics.

b) Evaluate the following expressions assuming a is integer type variable.

i) a = 3/2 * 4 + 3/8

ii) a = 2 * 3/4 + 4/4 + 8 – 2 + 5/8

P.T.O.

c) Explain for loop with example.

d) Explain the following function with example.

i) isupper( )

ii) isalpha( )

e) Explain how can be declare and initialize 2D arrays.

Q3) Attempt any Two of the following : **[2 × 4 = 8]**

a) Write an algorithm and flowchart for swap of two numbers.

b) Write a 'C' program to check whether a number is palindrome or not.

c) Explain recursive functions with example.

Q4) Attempt any Two of the following : **[2 × 4 = 8]**

a) Trace the output for the following :

i)
```
#include <stdio.h>
int main( )
{
    int arr[ ] = {2, 3, 4, 1, 6};
    printf("%u, %u, %u\n", arr, & arr[0], & arri);
    return 0;
}
```

ii)
```
# include <stdio.h>
main ( )
{
    int i :
    for(i = 0; i < 5, i ++)
       printf("%d", i);
    return 0;
}
```

b) Explain the working of switch - case with syntax and example.

c) Explain arithmetic, relational and conditional operators.

Q5) Attempt any one of the following : **[1 × 3 = 3]**

a) Write a program in 'C' to find whether the number is even or odd using functions.

b) Write a 'C' program to accept m×n matrix and print sum of all elements of a matrix.

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Total No. of Questions : 5]

SEAT No. :

P5122

[Total No. of Pages : 3

[5823]-102

F.Y. B.Sc. (Computer science)

CS - 112 : DATABASE MANAGEMENT SYSTEMS

(2019 Pattern) (Semseter - I) (CBCS)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any EIGHT of the following : **[8 × 1 = 8]**

a) Enlist users of DBMS.

b) Define decomposition.

c) Define second normal form.

d) What do you mean by domain of an attribute?

e) Define an entity.

f) What is a foreign key?

g) What is DDL?

h) What is view?

i) List any two aggregate functions in SQL.

j) What is Right Outer Join?

Q2) Attempt any FOUR of the following : **[4 × 2 = 8]**

a) Differentiate between 3NF and BCNF.

b) What is use of check constraint? Give the syntax of check constraint in a column definition.

c) Define strong and weak entity sets.

d) What is DML? Write any one example of DML.

e) Describe the term nested subquery with example.

P.T.O.

Q3) Attempt any TWO of the following : **[2 × 4 = 8]**

a) What is data abstraction? What are different levels of data abstraction?

b) Differentiate between Generalization and Specialization.

c) What is attribute? Explain different types of attributes.

Q4) Attempt any TWO of the following : **[2 × 4 = 8]**

a) Consider R = (A, B, C, D, E) and set of FDs defined on R as

F={A→B, A→C, CD→E, B→D, E→A}, Compute closure of F i.e. F+.

b) Consider the following relational database :

Sailors (sid, sname, rate, age)

Boats (bid, bname, colour)

Reserves (sid, bid, day)

Write SQL statement for each of the following queries.

i) Find name and ages of all Sailors.

ii) Find all the Sailors with a rating above 6.

iii) Find the sids of Sailors who have reserved a red boat.

iv) Find colours of boats reserved by Amol.

c) Consider the following entities and relationships :

Game (g_no, gname, no_of_players, coach_name_captain)

Player (p_no, p_name)

Game and Players are related with many-to-many relationships.

Create Relational Database for the above and solve the following queries in SQL.

i) List the name of players playing 'basketball' and 'handball'.

ii) List the name of players playing game'cricket'.

iii) Count the total numbers of players whose coach name is 'mr.sharma'

Q5) Attempt any ONE of the following : **[1 × 3 = 3]**

a) What are Armstrong's Axioms?

b) Construct an E-R diagram for a car insurance company that has a set of customers. Each customer owns one or more cars. Each are associated with more cars. Each can be associated with zero to any number of recorded accidents.

□□□

Total No. of Questions : 5]

SEAT No. :

P5123

[Total No. of Pages : 3

[5823]-103

F.Y. B.Sc. (Computer Science)

MATHEMATICS

MTC - 111 : Matrix Algebra

(2019 Pattern) (Semester - I) (Paper-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) ***Use of single memory, non-programmable scientific calculator is allowed.***

Q1) Attempt any five out of seven. **[10]**

a) Describe the nature of solution for the following system of linear equations.

$x + y = 6$

$3x + 3y = 18$

b) If $u = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$, $v = \begin{bmatrix} 1 \\ 3 \end{bmatrix}$, then compute, $u + v$, $u + 5v$.

c) Is the following matrix in reduced row echelon form? Justify $\begin{bmatrix} 1 & 2 & 0 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$.

d) If $A = \begin{bmatrix} 3 & -2 \\ 5 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 4 \\ 6 & -7 \end{bmatrix}$. Find, $A - 4B + 7I_2$.

e) Determine whether the following matrix is invertible or not. If yes find its inverse $A = \begin{bmatrix} 8 & 1 \\ 5 & 2 \end{bmatrix}$.

P.T.O.

f) Write the standard matrix for the transformation that gives reflection through the x_1–axis.

g) If A is 3×7 matrix and nullity(A) = 4, then find the rank (A).

Q2) Attempt any three out of five. **[15]**

a) Compute the solution of the following system by using Cramer's rule.

$5x_1 + 7x_2 = 3$

$2x_1 + 4x_2 = 1$

b) Solve the following system of linear equations.

$x_2 + 4x_3 = -5$

$x_1 + 3x_2 + 5x_3 = -2$

$3x_1 + 7x_2 + 7x_3 = 6$

c) If A is an m×n matrix, $u, v, \in R^n$ and C is a scalar, then prove that,

a) A (u+v) = Au + Av

b) A (Cu) = C (Au)

d) Let, $V_1 = \begin{bmatrix} 1 \\ 0 \\ -1 \\ 0 \end{bmatrix}, V_2 = \begin{bmatrix} 0 \\ -1 \\ 0 \\ 1 \end{bmatrix}, V_3 = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 1 \end{bmatrix}.$

Does $\{V_1, V_2, V_3,\}$ Span R^4? Justify.

e) Let, T : $R^2 \rightarrow R^3$ be a linear transformation, such that $T(x_1, x_2) = (x_1 - 2x_2, -x_1 + 3x_2, 3x_1 - 2x_2)$. Find X such that, T(X) = (–1, 4, 9).

Q3) Attempt any one out of two questions. **[10]**

a) Find basis for col A and Nul A of the following matrix A.

$$A = \begin{bmatrix} 3 & 3 & 1 & -5 \\ -9 & -4 & 1 & 7 \\ 9 & 2 & -5 & 1 \end{bmatrix}$$

Also find rank and nullity of A.

b) i) Find the volume of the following parallelepiped with one vertex at the origin and adjacent vertices are (1, 0, –3), (1, 2, 4) and (5, 1, 0).

ii) Solve the following system of linear equations.

$$x_1 + x_3 = 2$$

$$-2x_1 + x_2 - 6x_3 = -1$$

$$x_2 + 8x_3 = 6$$

Total No. of Questions : 5]

SEAT No. :

P5124

[Total No. of Pages : 3

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F.Y. B.Sc. (Computer Science)

MATHEMATICS

MT - C 112 : Discrete Mathematics

(2019 Pattern) (Semester - I) (Paper - II)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn whenever necessary.***
5) ***Use of single memory, non-programmable scientific calculator is allowed.***

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

a) Let p and q be the propositions having truth values 'True' and 'False' respectively. Find the truth value of the compound statement

$(p \rightarrow q) \wedge (\sim q)$.

b) Is D_{18} with the 'divides' relation a Boolean algebra? Justify.

c) Give an example of a relation on the set A = {1, 2, 3} which is reflexive and symmetric but not transitive.

d) Show that in a group of 13 people, there must be at least two having birthday in the same month.

e) Find the number of three digit numbers divisible by 5 which can be formed by using the digits 1, 2, 3, 4 and 5, if repetition of digits is allowed.

f) Find a_4, if the sequence $\{a_n\}$ is defined by the recurrence relation

$a_n = a_{n-1} + a_{n-2}$; $a_0 = 1, a_1 = 1$

Q2) a) Find the number of integers from 1 to 500 (both inclusive) which are **[6]**

i) divisible by 2 or 3 or 5.

ii) neither divisible by 2 nor by 3, nor by 5.

OR

P.T.O.

Draw Hasse diagram for D_{45} with the partial order relation 'divides'.
Find glb (3, 15) and lub (9, 5).
Is it a complemented lattice? Justify. **[6]**

b) Test the validity of the following argument. **[4]**

$(p \rightarrow r) \rightarrow \sim s,\ q \rightarrow r,\ p \rightarrow q,\ s \vee t \vdash t$

Q3) a) Find conjunctive normal form of the function **[6]**

$f(x,y,z) = \overline{x} \vee (y \wedge (\overline{z} \vee x))$.

OR

Solve the following recurrence relation. **[6]**

$a_r - 7a_{r-1} + 10a_{r-2} = 3^r$, $a_0 = 0, a_1 = 1$.

b) Let $Q(x, y)$ be the statement "x has sent email message to y", where the universe of discourse for both x and y consists of all students in your class. Express each of the following quantification in English. **[4]**

i) $\exists x \exists y\ Q(x,y)$

ii) $\exists x \forall y\ Q(x,y)$

iii) $\forall x \exists y\ Q(x,y)$

iv) $\exists y\ \forall x\ Q(x,y)$

Q4) a) Using Warshall's algorithm, obtain transitive closure of the relation **[6]**
R = {(1, 2), (2, 2), (2, 4), (3, 2), (3, 4), (4, 1)}
on the set A = {1, 2, 3, 4}.

OR

Prove that if there are n_1 indistinguishable objects of type 1, n_2 indistinguishable objects of type 2, ----- n_k indistinguishable objects of type k, where $n_1 + n_2 + \text{---} + n_k = n$, then the number of permutations of these n objects is $\dfrac{n!}{n_1!n_2!....n_k!}$. **[6]**

Hence find number of arrangements of the letters in the word 'MATHEMATICA'

b) Let R be the relation on the set {1, 2, 3, 4} defined by
'x R y if and only if $|x - y| = 1$'. Draw the digraph of R. Also write matrix of R. **[4]**

Q5) Attempt any two of the following :

a) Let $[B, \bar{}, \vee, \wedge]$ be *a* Boolean algebra. For elements $a, b \in B$, Prove that $\overline{a \wedge b} = \bar{a} \vee \bar{b}$. **[5]**

b) Solve : $a_r - a_{r-1} - 12\, a_{r-2} = 0, \quad a_0 = 0, a_1 = 1.$ **[5]**

c) Show that if any 11 numbers are chosen from the set {1, 2, ..., 20}, then one of them will be a multiple of the other. **[5]**

Total No. of Questions : 5]

SEAT No. :

P5125

[Total No. of Pages : 2

[5823]-105

F.Y. B.Sc. (Computer science)

ELECTRONIC SCIENCE

ELC - 111 : Semiconductor Devices and Basic Electronic Systems (Backlog)

(CBCS) (2019 Pattern) (Semester - I) (Paper - I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Draw neat labeled diagrams wherever necessary.***

Q1) Solve any five of the following : **[5 × 1 = 5]**

a) Draw symbols for :
   i) LED
   ii) Zener diode

b) What is piezoelectric effect?

c) State types of MOSFET.

d) Define knee voltage.

e) "IC 555 astable multivibrator is used as a clock" _ state true or false.

f) What is output voltage of IC 7805?

Q2) Answer the following :

a) Explain construction and working of opto coupler. **[4]**

b) Explain working of transistor as a switch. **[3]**

c) Draw block diagram of SMPS and explain its operation in brief. **[3]**

Q3) Answer the following :

a) Define the terms α,β an γ with reference to transistor. State the relationship between α and β. **[4]**

P.T.O.

b) Draw diagram of full wave rectifier using two diodes with filter capacitor. Define ripple factor. **[3]**

c) Draw diagram of IC 555 timer. For R_A = 8kΩ, R_B = 4kΩ and C = 0.1μF; calculate the output frequency. **[3]**

Q4) Answer the following :

a) Explain working of zener diode as a voltage regulator. **[4]**

b) State Barkhausen Criteria for sustained oscillations. Find output frequency of wien bridge oscillator **[3]**

if R_1 = 1kΩ, C = 0.22μf ;

c) Draw diagram of 2 bit flash ADC and explain its working. **[3]**

Q5) Attempt any four of the following : **[4 × 2.5 = 10]**

a) Explain need of Digital to Analog converter.

Draw diagram of R-2R ladder network.

b) Write a short note on crystal oscillator.

c) Explain how MOSFET works as a switch.

d) Draw block diagram of successive approximation ADC.

e) Write a short note on potential divider bias of transistor.

f) Draw block diagram of off - line UPS.

Total No. of Questions : 5]

SEAT No. :

P5126

[Total No. of Pages : 2

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F.Y. B.Sc. (Computer Science)

ELECTRONICS SCIENCE

ELC 112 : Principles of Digital Electronics

(2019 Pattern) (CBCS) (New) (Paper - II) (Semester - I)

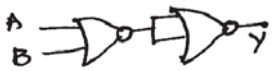
Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any Three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any Five of the following : **[5 × 1 = 5]**

a) $(1)_2 - (1)_2 - (1)_2 = (?)_2$

b)  · This gate is (i) OR (ii) NOR (iii) AND

c) For a multiplexer with 60 inputs, find out the number of control lines.

d) Full form of ASCII is _____.

e) $\overline{A} + \overline{B}$ = _____.

f) State the function of IC 7447.

Q2) a) i) Give rules for binary addition of two bits. Perform $(1100.010)_2$ + $(10.1110) + (1010)_2$ **[3]**

ii) Using rules of Boolean algebra simplify **[3]**

$$M = \overline{X}\overline{Y}\overline{Z} + \overline{X}Y\overline{Z} + X\overline{Y}Z + XY\overline{Z}$$

b) With neat logic diagram explain the working of 4 bit universal adder subtractor. **[4]**

P.T.O.

Q3) a) i) Convert the following expression into standard POS form. **[3]**

$Y=(\overline{A}+\overline{B})\,(\overline{B}+C)\,(\overline{A}+C)$

ii) Draw the logic diagram for 3 bit adder and write its truth table. **[3]**

b) Perform the following : **[4]**

i) $(1011101)_2$ = (?) Gray

ii) $(110101)_2$ = (?) BCD

Q4) a) i) Simplify the following expression using K map. **[3]**

$A = \overline{X}\overline{Y}Z + \overline{X}\overline{Y}\overline{Z} + XY\overline{Z} + \overline{X}Y\overline{Z} + \overline{X}YZ$

ii) Draw the logic circuit diagram for BCD to seven segment conversion. Give the logic levels to display digit '3' on common anode display. **[3]**

b) Draw the logic diagram for the given Boolean expression and write the truth table for it **[4]**

$$Y = \overline{\overline{A}BC\overline{D} + (A+\overline{C}) + BD}$$

Q5) Attempt any Four of the following : **[4 × 2½ = 10]**

a) Write a short note on Hexadecimal number system.

b) Write a short note on universal gates.

c) Write a short note on IC 74138.

d) What is a Gray code? Where is it used?

e) Explain how EX-OR gates can be used as controlled inverter.

f) Explain the concept of parity bits. Where are parity bits used?

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Total No. of Questions : 5]

SEAT No. :

P5127

[Total No. of Pages : 3

[5823]-107

F.Y. B.Sc. (Computer Science)

STATISTICS

CSST-111 : Descriptive Statistics - I

(2019 Pattern) (Semester - I) (Paper - 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) ***Use of calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meaning.***

Q1) Choose the most appropriate alternative for each of the following : **[4]**

i) If the classes are 0 - 2, 2 - 4, 4 - 6, 6 - 8, 8 - 10. Then the class width is

a) 4 b) 10

c) 2 d) 5

ii) The number of quartiles are

a) 4 b) 10

c) 100 d) 3

iii) Mode can be obtained graphically by using

a) histogram

b) less than type cumulative frequency curve

c) more than type cumulative frequency curve

d) ogive curves

iv) If (Q3 - Q2) > (Q2 - Q1), then the distribution is

a) symmetric b) positively skewed

c) negatively skewed d) leptokurtic

P.T.O.

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

i) Define the terms :

a) Attribute b) Variable

ii) Construct stem and leaf plot for the following data :

15, 22, 12, 34, 28, 45. 31, 22. 26, 21

iii) Define less than type cumulative frequency.

iv) The mean monthly salary of 100 male employees is Rs. 20,000/-. The mean monthly salary of 50 female employees is Rs. 22,000/-. Find mean monthly salary of all the employees taken together.

v) Examine whether the following data is consistent or not?

N = 200, (A) = 150, (B) = 80, (AB) = 25

vi) Express the second and third central moment in terms of raw moments.

vii) State the relation between mean, median and mode for

a) symmetric distribution

b) positively skewed distribution

viii) What is dispersion. State different measures of dispersion?

Q3) Attempt any TWO of the following : **[2 × 4 = 8]**

i) Explain inclusive and exclusive methods of classification.

ii) Write a note on Box plot.

iii) Define Arithmetic Mean. State its merits.

Q4) Attempt any TWO of the following : **[2 × 4 = 8]**

i) Define the following terms :

a) Dichotomous classification

b) Order of a class

c) Positive class

d) Ultimate class frequency

ii) Write a note on kurtosis.

iii) Compute Yule's coefficient of association for the following data :

N = 20, (A) = 12, (B) = 10, (AB) = 8

Q5) Attempt any one of the following : **[1 × 5 = 5]**

i) The following data is related with the two workers doing same job in company.

	Worker A	Worker B
Mean time of completing the job (in minutes)	40	42
Standard deviation (minutes)	8	6

Which worker is more consistent?

ii) Define skewness. Explain types of skewness with the help of sketch.

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Total No. of Questions : 4]

SEAT No. :

P5128

[Total No. of Pages : 3

[5823]-108

F.Y. B.Sc. (Computer Science)

STATISTICS

CSST - 112 : Mathematical Statistics (Paper - II)

(2019 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) ***Use of non-programmable scientific calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meaning.***

Q1) **Attempt each of the following :** **[1 each]**

A) Fill in the blanks :

i) Suppose A and B are two independent events defined on sample space then $P(A \cap B) =$ _____.

ii) The variance of geometric distribution with parameter 'p' is _____.

B) Choose the most appropriate alternative for each of the following :**[1 each]**

i) The probability that there are 53 Sundays in randomly chosen leap year is

a) $\frac{2}{7}$ b) $\frac{1}{14}$

c) $\frac{1}{28}$ d) $\frac{1}{7}$

ii) If x is a continuous random variable with distribution function F(x) then which of the following is NOT true?

a) F(x) is non-negative function of x

b) F(x) is non-decreasing function of x

c) F(x) is right continuous function of x

d) F(x) is step function of x

iii) If x is a discrete random variable with E(x) = 3 then E(2x + 5) =____

a) 3 b) 6

c) 11 d) 12

P.T.O.

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

A) Explain the terms :

i) Non-deterministic experiments

ii) Addition principle of counting

B) Define each of the following :

i) Sure event

ii) Mutually exclusive events

iii) Conditional probability

iv) Sample space

v) Mathematical expectation of discrete random variable (r.v.) X

C) The software gives 4 digit numbers by using digits 0-9 at random. Assuming that no digit is repeated, find the probability that,

i) The number is greater than 5000.

ii) The number is divisible by 5.

Q3) Attempt any Two of the following : **[2 × 5 = 10]**

A) Explain the term independent events. Also show that, if A and B are independent events then

i) A^C and B are also independent.

ii) A^C and B^C are also independent.

B) Following is the probability mass function of a discrete r.v. X :

X	0	1	2	3	4
P(x)	0.2	0.15	0.3	0.25	0.1

Find :

i) P[X is even]

ii) distribution function of X.

iii) mode of X.

C) Define discrete uniform distribution. State its mean and variance. Also give two real life situations where the distribution is applicable.

Q4) Attempt any One of the following :

A) i) State each of the following : **[6]**

1) Poisson approximation to binomial distribution

2) Additive property of Poisson distribution

3) Bayes' theorem

ii) The probability density function of a continuous r.v. X is : **[4]**

$f(x) = k(4x - 2x^2)$, $0 \le x \le 2$

$= 0$, otherwise

Find :

1) the value of k.

2) E(X).

B) i) Define binomial distribution. State its mean and variance. Also state Bernoulli distribution as particular case of binomial distribution. **[5]**

ii) A shooter is hitting at a target. The probability of hitting a target at any shoot is 0.6. What is the probability that he will hit the target on 5^{th} attempt for the first time? Also obtain expected number of shoots required to hit the target for the first time. **[5]**

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Total No. of Questions : 5]

SEAT No. :

P5129

[Total No. of Pages : 2

[5823] - 201
First Year B.Sc. (Computer Science)
CS 121 : ADVANCED 'C' PROGRAMMING
(CBCS 2019 Pattern) (Semester - II)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Figures to the right indicate full marks.***
2) ***All questions are compulsory.***

Q1) Attempt any EIGHT of the following. **[8×1=8]**

a) What is the use of strcpy() function in C?

b) Demonstrate puts () function.

c) What is file opening mode.

d) What is pointer variable? Give example.

e) What is macro?

f) What is the use of strncat () function.

g) What is command line argument.

h) Demonstrate type def keyword with example.

i) What is string? Give example.

j) Demonstrate "structure within structure" with example.

Q2) Attempt any FOUR of the following (Out of FIVE) **[4×2=8]**

a) Differentiate between static & dynamic memory allocation.

b) Explain the file opening modes for text file.

c) What is the use of # include directive.

d) Explain the use of fgets() and fputs() with suitable example.

e) Explain in brief concept of macros.

P.T.O.

Q3) Attempt any TWO of the following (Out of THREE) **[2×4=8]**

a) Write a 'C' program to calculate area, & perimeter and diameter of circle using one function for all & use pointers.

b) Write a 'C' program to accept a string & convert in uppercase without using built - in function.

c) Write a 'C' program to accept a time from user as hh:mm:ss & check the validity of it. If it is invalid, validate it. Use pointer to structure.

Q4) Attempt any TWO of the following (Out of THREE) **[2×4=8]**

a) Write a program in 'C' to accept details 'n' employees & print the details of highest salaried employee. Use structure to store the employee data.

b) Differentiate macros and functions.

c) Explain following functions with syntax and example.

fgetc(), fputc(), fscanf (), fprintf ().

Q5) Attempt any ONE of the following (Out of TWO) **[1×3=3]**

a) What is the output of following code?

```
# include <stdio.h>
int main ()
{
    char str[100];
    char *ptr;
    strcpy(str, "India is GREAT");
    ptr = str + strlen (str)
    printf ("The string is:");
    while (*ptr ! = str)
    printf ("%c", *ptr --);
    return 0;
}
```

b) Differentiate structure and union.

Total No. of Questions : 5]

SEAT No. :

P5130

[Total No. of Pages : 2

[5823]-202
First Year B.Sc. (Computer Science)
CS-122: Relational Database Management Systems
(2019 Pattern)(Semester II)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Total number of questions are 5.***
2) ***Total marks assigned 35.***
3) ***Time assigned 2 hours.***

Q1) Attempt any Eight of the Following: **[8×1=8]**

a) What do you mean by trigger?

b) State the different ways to call a PL/SQL function.

c) What is the concurrent schedule?

d) Define deadlock.

e) What is audit trail?

f) What do you mean by referential Integrity?

g) What is the use of commit command?

h) what is log?

i) Define distributed database.

j) Which are the types of NOSQL database?

Q2) Attempt any four of the following **[4×2=8]**

a) Explain types of cursor.

b) Draw the state diagram of the transaction.

c) Write down use and syntax of GRANT command.

d) Which are the schemes of the recovery from concurrent transactions?

e) Which are the characterstics of big data?

P.T.O.

Q3) Attempt any two of the following: **[2×4=8]**

a) Explain variations of two phase locking.

b) Define transaction. Explain ACID properties of transaction.

c) Explain mandatory access control method.

Q4) Attempt any two of the following: **[2×4=8]**

a) Write a plpgsql function that accepts student credit out of 10 marks and returns grade based on eligibility as -

If credit is less than 5 $\rightarrow$ C grade

If credit is less than 7 $\rightarrow$ B grade

If credit is above 7 $\rightarrow$ A grade

b) Consider the following transaction. Give two non-serial Schedules that the serializable.

T1	T2
Read(X)	Read(Y)
X=X+5000	Y=Y+2000
Write(X)	Write(Y)
Read(Y)	Read(Z)
Y=Y-1500	Z=Z-3100
Write(Y)	Write(Z)

C) Explain encryption techniques used for database security.

Q5) Attempt any ONE of the following : **[1×3=3]**

a) Explain time stamp based protocal with read write conflicting conditions.

b) Explain failure Classification

Total No. of Questions : 3]

SEAT No. :

P5131

[Total No. of Pages : 2

[5823] - 203
F.Y.B.Sc.
COMPUTER SCIENCE
Mathematics
MTC-121 : Linear Algebra
(2019 Pattern) (Semester -II)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Use of single memory, non-programmable scientific calculator is allowed.***

Q1) Attempt any five of the following. **[10]**

a) Define subspace of a vector space. Give one example of subspace of a vector space $\mathbb{R}^2$.

b) If $\bar{u} = (1,2,-1)$ and $\bar{v} = (2,0,2)$ then find angle between $\bar{u}$ and $\bar{v}$.

c) Write the standard basis for $P_2(\mathbb{R})$. Also write it's dimension.

d) Is the transformation $T : \mathbb{R}^2 \to \mathbb{R}^2$ defined by T(x,y) = (2x, 1) is linear? Justify.

e) Define the following terms:

i) Affine set

ii) Convex combination of Vectors

f) Find the matrix of quadratic form given below:

$$Q(x) = 3x_1^2 + 2x_2^2 - 5x_3^2 - 6x_1x_2 + 3x_1x_3 - 4x_2x_3.$$

g) Find the distance between vectors.

$$X = \begin{bmatrix} 10 \\ -3 \end{bmatrix} \text{and } Y = \begin{bmatrix} -1 \\ -5 \end{bmatrix}.$$

P.T.O.

Q2) Attempt any three of the following. **[15]**

a) If W_1 and W_2 are subspaces of a vector space Y, then prove that $W_1 \cap W_2$ is a subspace of V. Is $W_1 \cup W_2$ is a subspace of V? Justify.

b) Find rank of following matrix A and hence write it's nullity.

$$A = \begin{bmatrix} 1 & 1 & 0 & -1 \\ 1 & 2 & 3 & 0 \\ 2 & 3 & 3 & -1 \end{bmatrix}.$$

c) Find all eignvalues of the following matrix A & hence state whether it is diagonalizable.

$$A = \begin{bmatrix} -1 & 4 & -2 \\ -3 & 4 & 0 \\ -3 & 1 & 3 \end{bmatrix}.$$

d) Determine whether $S = \{\bar{u}_1, \bar{u}_2, \bar{u}_3\}$ is a basis for $\mathbb{R}^3$ where $\bar{u}_1 = (2,-1,3)$, $\bar{u}_2 = (4,1,3)$ $\bar{u}_3 = (8,-1,8)$.

e) Classify the quadratic form given below $Q(x) = 4x_1^2 - 4x_1x_2 + 4x_2^2$.

Q3) Attempt any one of the following. **[10]**

a) Check whether the following matrix is diagonalizable. If yes find the matrix P that diagonalizes A.

$$A = \begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}.$$

b) i) Express $P = 1 + 2x - x^2$ as a linear combination of $P_1 = 1+x$, $P_2 = 1-x$ and $P_3 = x^2$.

ii) Define orthonormal set. Determine whether the given set $S = \{\bar{u}_1, \bar{u}_2, \bar{u}_3\}$ is orthonormal or not, where.

$$\bar{u}_1 = \begin{bmatrix} 1\sqrt{10} \\ 3/\sqrt{20} \\ 3/\sqrt{20} \end{bmatrix} \quad \bar{u}_2 = \begin{bmatrix} 3/\sqrt{10} \\ -1/\sqrt{20} \\ -1/\sqrt{20} \end{bmatrix} \quad \bar{u}_3 = \begin{bmatrix} 0 \\ -1/\sqrt{2} \\ 1/\sqrt{2} \end{bmatrix}$$

Total No. of Questions : 3]

SEAT No. :

P5132

[Total No. of Pages : 3

[5823]-204
F.Y.B.Sc. (Computer Science)
MATHEMATICS
MTC-122 : Graph Theory
(2019 Pattern) (Semester-II) (Paper-II)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

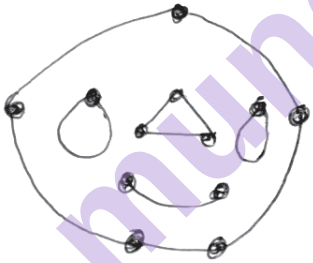
1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt any five of the following **[10]**

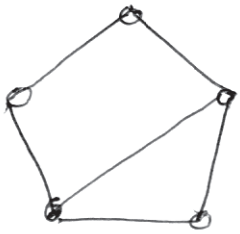
a) Draw K_6, the complete graph on 6 vertices.

b) Define regular graph. Also draw one example of a 2-regular graph.

c) What is the number of connected components in the following graph?

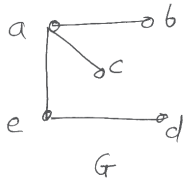


d) Determine whether the following graph is a bipartite graph. Justify.



P.T.O.

e) Draw the complementary graph $\overline{G}$ of the following graph G.

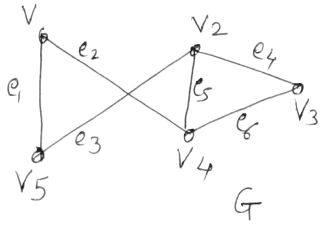


f) How many edges are there in a regular graph of degree 3 with 6 vertices?

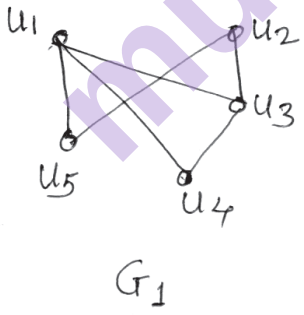
g) Define : Tree. Draw an example of a tree.

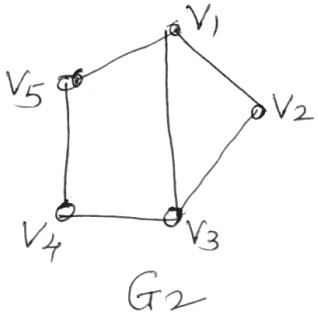
Q2) Attempt any three of the following. **[15]**

a) Write the adjacency matrix and incidence matrix for the following graph G.



b) Show that the following graphs G_1 and G_2 are isomorphic.





c) Draw 10 nonisomorphic simple graphs with 4 vertices.

d) Give an example of a graph which has-

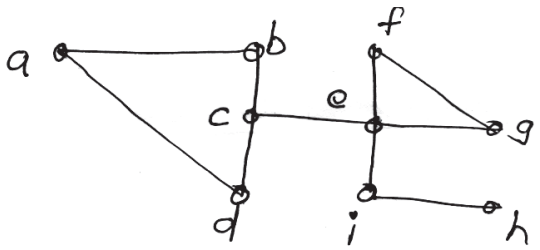
i) Euler circuit but not Hamilton circuit.

ii) Euler circuit as well as Hamilton circuit.

e) Construct a complete binary tree of height 4. How many leafs it has?

Q3) Attempt any one of the following. **[10]**

a) For the given graph G answer the following questions



G

ii) List all cutvertices in G.

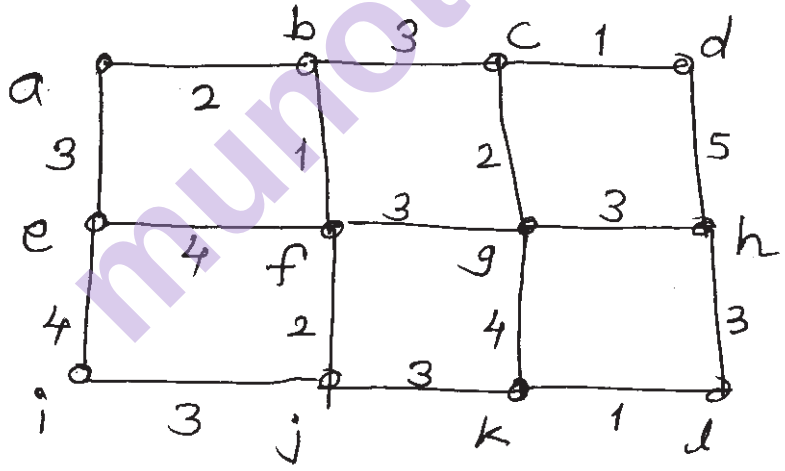
iii) List all cycles in G.

iv) List any two distinct paths from the vertex *a* to vertex *h* in G.

v) Verify Handshaking lemma for this graph.

b) i) Explain the " seven bridges problem of Konigsberg".

ii) Use Kruskal's algorithm to find a minimum spanning tree in the following weighted graph given below.



Total No. of Questions : 5]

SEAT No. :

P5133

[Total No. of Pages : 2

[5823]-205

F.Y.B.Sc. (Computer Science)
ELECTRONIC SCIENCE
ELC - 121 : Instrumentation Systems
(Semester - II) (New CBCS 2019 Pattern) (Paper - I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat diagrams wherever necessary.***
5) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5×1=5]**

a) Define actuator with one example.
b) State any two applications of PIR sensor.
c) Draw the circuit diagram for unity gain amplifier using opamp.
d) Calculate the output voltage of LM35 for 45ºC temperature.
e) Which are two types of film sensors?
f) Draw the symbol of OPAMP and lebel it.

Q2) a) Attempt any two of the following. **[2×3=6]**

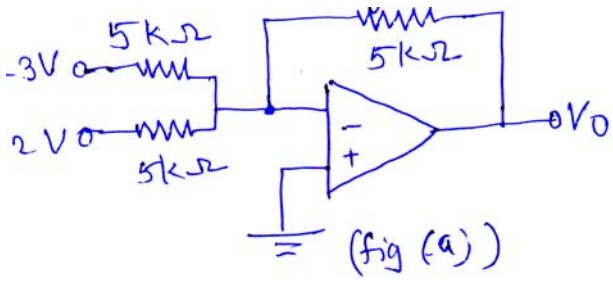
i) Describe block diagram of instrumentation system.
ii) Describe working of CCD image sensor.
iii) Draw smart instrumentation system. Give two advantages.

b) Draw circuit diagram of op-amp based voltage to current converter and explain its working. **[1×4=4]**

Q3) a) Attempt any two of the following. **[2×3=6]**

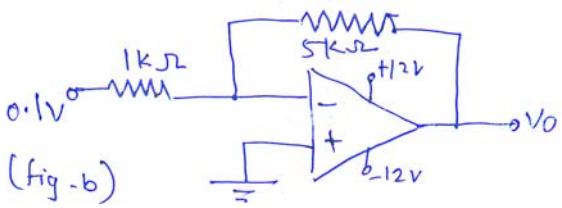
i) Explain working principle of ultrasonic sensor and state any two applications.
ii) Explain the concept of nano sensor.
iii) Explain the working of PIR sensor.

b) Identify the following configurations and find their output voltage. **[1×4=4]**



(fig (a))

P.T.O.



Q4) a) Attempt any two of the following. **[2×3=6]**

i) Discuss the concept of active and passive sensors with example.

ii) Draw the circuit diagram of non-inverting amplifier for op-amp. Derive the expression for its output voltage.

iii) Explain op-amp as comparator.

b) Explain construction and working of DC motor. **[1×4=4]**

Q5) Attempt any four of the following. **[4×2.5=10]**

a) Define the following term for sensor.

i) Resolution.

ii) Linearity.

b) Explain working principle of tilt sensor.

c) List any five features of LM35 temperature sensor.

d) Draw the block diagram of op-amp. State ideal value of input offset voltage.

e) State any five advantages of smart sensor.

f) Explain the concept of virtual ground with neat diagram.

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Total No. of Questions : 5]

SEAT No. :

P5134

[Total No. of Pages : 2

[5823] - 206
F.Y.B.Sc. (Computer Science)
ELECTRONIC SCIENCE
ELC-122 : Basics of Computer Organization
(New 2019 Pattern) (CBCS) (Semester -II) (Paper-II)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q2 to Q5.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat diagrams wherever necessary.***
5) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of following. **[5×1=5]**

a) _____ number of address lines are required for the memory of 2 MB capacity.

b) Write the full forms with respect to Computer Organization.

CPU - _____

PC-_____

c) What is the role of stack pointer in Computer Organization?

d) Write any two applications of counter.

e) Draw the logic symbol of J-K flip-flop

f) What is significance of data bus in Computer Organization?

Q2) a) Answer any two of the following. **[2×3=6]**

i) Draw the neat logic diagram of R-S flip flop using NAND gates. Also write down its truth table.

ii) Explain the need of Input output interface in Computer Organization.

iii) Write three point difference between Synchronous Counter and Asynchronous counter.

b) With neat block diagram explain four level memory hierarchy. **[4]**

P.T.O.

Q3) a) Answer any two of the following ; **[2×3=6]**

i) Design a memory of (1K×16) using available memory chip of size (1K×4). The memory is of RAM type.

ii) Explain T Flip-Flop using J-K Flip-Flop with neat logic diagram. Draw the wave forms of clock and output.

iii) Draw logic diagram of 3 bit SISO shift register in right shift mode and explain its working.

b) Draw neat block diagram of CPU and Explain working of each block.**[4]**

Q4) a) Answer any Two of the following. **[2×3=6]**

i) Explain the operation of ring counter with neat logic diagram.

ii) Explain the concept of memory stack organization with diagram.

iii) Discuss various types of memories used in computer system in short.

b) Explain working of 3-bit Asynchronous up counter with logic diagram, Truth table and timing diagram. **[4]**

Q5) Answer any four of the following. **[10]**

a) Explain in short Race around condition in J-K Flip Flop

b) Draw logic diagram of PISO shift register.

c) What is role of Cache memory in computer organization.

d) Write a short note on Virtual memory.

e) Explain basic Computer Organization with block diagram.

f) Calculate average Access time of memory if hit ratio is 95%, Cache memory access time is 400 nsec and main memory access time is 900 nsec.

Total No. of Questions : 5]

SEAT No. : ____

P5135

[Total No. of Pages : 2

[5823]-207

First Year B.Sc. (Computer Science)

STATISTICS

CSST-121 : METHODS OF APPLIED STATISTICS

(2019 Pattern) (Semester -II) (Paper-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) ***Use of calculator and statistical tables is allowed.***
4) ***Symbols and abbreviations have their usual meaning.***

Q1) Choose the most approprate alternative for each of the following: **[1 each]**

i) The diagram which visualizes the correlation between two variables is.

a) Scatter diagram b) Histogram

c) Bar diagram d) Pie diagram

ii) The number of normal equations required to fit the curve $Y=ab^X$ are

a) Four b) Two

c) One d) Three

iii) Partial correlation coefficient $r_{12.3}$ is the simple correlation between

a) X_1 and X_2

b) X_1 and X_2 when linear effect of X_3 is eliminated from each of them.

c) X_1 and X_3

d) X_1 and X_3 when linear effect of X_2 is eliminated from each of them.

iv) In time series the data are arranged in

a) Chronological order b) Geographical order

c) Alphabetical order d) Numerical order

Q2) Attempt any five of the following; **[2 each]**

a) Define bivariate data with one example.

b) State the types of correlation giving one illustration each.

c) Define Karl Pearson's coefficient of correlation.

d) Explain the term regression.

P.T.O.

e) If $b_{XY}=0.4$, $b_{YX}=1.6$, then find r(X,Y).

f) Define coefficient of determination. And state its interpretation.

g) Define multiple correlation coefficient for a trivariate data.

h) State the additive and multiplicative models of time series.

Q3) Attempt any two of the following: **[4 each]**

a) Six entries at a song competition were rated by two judges X and Y as follows.

Ranks by X	5	6	4	3	2	1
Ranks by Y	6	2	1	3	4	5

Compute Spearman's rank correlation coefficient between X and Y.

b) For a trivariate data: $r_{12}=0.6$, $r_{13}=0.4$, if $R_{1.23}=1$, find the value of r_{23}.

c) What is time series? Explain 'Trend' as a component of time series.

Q4) Attempt any Two of the following **[4 each]**

a) In the regression analysis the equation of two lines of regression are $2X+3Y=8$ and $X+2Y=5$, find mean values of X and Y.

also, define the following terms: Covariance, regression coefficient of Y on X.

b) Explain the concept of multiple regression, Also, state the equation of multiple regression plane of X_1 and X_2 and X_3.

c) Describe the stepwise procedure of fitting the curve of the type $Y=a+bX+cX^2$ to the bivariate data using the method of least squares.

Q5) Attempt any one of the following: **[5each]**

a) Describe the stepwise procedure of fitting a line of regression of Y on X to the bivariate data using method of least squares.

b) Fit a straight line trend by the method of least squares to the following data:

Year	2015	2016	2017	2018	2019
Production (in tonnes)	14	11	13	15	16

Total No. of Questions : 4]

SEAT No. : ____

P5136

[Total No. of Pages : 2

[5823]-208

First Year B.Sc. (Computer Science)

STATISTICS

CSST - 122 : Continuous Probability Distributions and Testing of Hypothesis

(2019 Pattern) (Semester - II) (Paper- II)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of non-programmable scientific calculator is allowed.***
4) ***Use of statistical tables is allowed.***
5) ***Symbols have their usual meaning unless otherwise stated.***

Q1) Answer EACH of the following by selecting most appropriate option.

[1 mark each]

a) IF X ~U(3, 8) then F (5) is

i) 1/5 ii) 3/5

iii) 2/5 iv) 1

b) A random variable X has an exponential distribution with mean 5. Then variance of X is

i) 2.5 ii) 5

iii) 25 iv) 0

c) A random variable X has Pareto distribution with $\alpha = 3$, then mean of X is

i) 3 ii) 9

iii) 1.5 iv) 0.75

d) The probability of rejecting H_0 when it is true is called as

i) type I error ii) Type II error

iii) level of significance iv) standard error

e) In a test of hypothesis problem, the sample size is 57, then this test is called as

i) small sample test ii) small population test

iii) large sample test iv) large population test

P.T.O.

Q2) Answer any TWO of the following: **[5]**

a) Define exponential distribution with mean = 0. State its lack of memory property and give one example of this property.

b) Describe procedure of testing mean of a population when sample size is large.

c) Let X follows normal distribution with mean 2 and variance 16. If Y= (3X + 2), find

i) P(Y>8) and

ii) P(6<Y<9).

Q3) Answer any TWO of the following: **[5]**

a) Describe procedure of drawing a sample of size n from $N(\mu, \sigma^2)$ using Box-Muller transformation.

b) Define normal distribution. State any three properties of normal distribution.

c) In a sample of 7 observations, the sum of squared deviations from the mean is 94.5. In another sample of 10 observations, the sum of squared deviations from the mean is 101.7. Test whether the two variances are significantly different at 10% level of significance.

Q4) Answer any ONE of the following.

a) i) Define each of the following. **[5]**

Parameter
Statistic
Null hypothesis
Alternate hypothesis
Type II error

ii) Theory predicts that the proportion of beans in 3 groups A, B and C should be in the ratio 1 : 2 :3. In an experiment on 300 beans, the frequencies in the 3 groups were 45, 105 and 150 respectively. Does the experiment support the theory at 5% level of significance? Justify your answer. **[5]**

b) i) Describe procedure of paired - t test. **[5]**

ii) A certain factory runs in two shifts. A sample of 100 articles selected from production of day shift gave 52 defective afticles whereas a sample of 700 articles selected from prodcution of night shift gave 45 defective articles. Can we conclude that proportion of defective articles in the day shift is significantly less than that of night shift at 5% level significance? **[5]**

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Total No. of Questions : 5]

SEAT No. : ____

P5137

[Total No. of Pages : 2

[5823]-301

S.Y. B.Sc. (Computer Science)

CS-231 : DATA STRUCTURES AND ALGORITHMS-I

(2019 Pattern) (Semester - III) (Paper-I)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

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

Q1) Attempt any 8 of the following. **[8×1=8]**

a) Define Data object.

b) Define In-place sorting.

c) What is circular linked list?

d) State the principle used in 4-queen problem.

e) Define Queue.

f) What is time complexity?

g) What is best case & worst case time complexity of merge sort algorithm?

h) "Linked list can be accessed randomly" state true/false. Justify.

i) Round-robin algorithm is example of which type of queue?

j) List any two applications of stack.

Q2) Attempt any 4 of the following. **[4×2=8]**

a) Define Big Oh (O) and Big Omega (Ω) Notations.

b) Define Array. List of an array.

c) Differentiate between singly linked list and doubly linked list.

d) Convert following expression to equivalent postfix and prefix notation.

(A+B)∗C–(D–E) ∧ (F+G)

e) What are operations performed on dequeue?

P.T.O.

Q3) Attempt any two of the following: **[2×4=8]**

a) Define Data structure and explain types of Data structure.

b) Sort the following data using bubble sort method:
30, 40, 10, 50, 25, 35, 15

c) Write a 'C' function to create doubly linked list.

Q4) Attempt any two of the following: **[2×4=8]**

a) Show the stack contents and output while converting following infix expression to postfix expression. A/B∧C+D∗E–A∗C

b) What is linear queue? How to implement it? Explain in detail.

c) List the variants of sequential search. Explain any one with an example.

Q5) Attempt any one of the following: **[1×3=3]**

a) List advantageous & disadvantageous of circular queue.

b) Write a short note on generalized linked list.

Total No. of Questions : 5]

SEAT No. : ____

P5138

[Total No. of Pages : 2

[5823]-302

S.Y. B.Sc. (Computer Science)
CS -232 : SOFTWARE ENGINEERING
(New CBCS 2019 Pattern) (Semester-III) (Paper-II)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Assume suitable data if necessary.***

Q1) Attempt any Eight of the following. **[8×1=8]**

a) Define process Flow.

b) List any two agile principles.

c) What are the different building blocks of UML?

d) Write any two purposes served by SRS.

e) Define abstraction.

f) List the advantages of waterfall model.

g) What is requirement validation?

h) Write the purpose of activity diagram.

i) List any two umbrella activities of software process.

j) Define Artifacts.

Q2) Attempt any Four of the following. **[4×2=8]**

a) What is Functional independance? Which qualitative criteria is applied to assessed independance.

b) Define diagrams. Write classification of UML diagrams.

c) List the elements of Andysis model.

d) Write the role of scrum.

e) Write advantages of RAD model.

Q3) Attempt any two of the following. **[2×4=8]**

a) Explain spiral model in detail.

b) Explain different approaches for requirements elicitation.

c) Draw UML use case diagram for online shopping. (credit card processing)

P.T.O.

Q4) Attempt any Two of the following. **[2×4=8]**

a) Explain phases of xp process with suitable diagram.

b) Draw UML class diagram for railway reservation system.

c) Define unified process. Explain phases of unified process.

Q5) Attempt any One of the following. **[1×3=3]**

a) Explain types of design patterns.

b) Explain the human factors considered during agile software development.

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Total No. of Questions : 3]

SEAT No. :

P5139

[Total No. of Pages : 2

[5823]-303
S.Y. B.Sc. (Computer Science)
MATHEMATICS
MTC - 231 : Groups and Coding Theory
(2019 Pattern) (Semester - III) (23221)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Non-programmable scientific calculator is allowed.***

Q1) Attempt any five of the following. **[5×2=10]**

a) If $a|b$ and $a|c$, then show that $a|(b+c)$.

b) Find all generators of the group $(\mathbb{Z}_6,+_6)$.

c) Check whether the permutation $\sigma=(1\ 2\ 5\ 4\ 6\ 3)(7\ 8)$ is even or odd. Justify?

d) Let $G=(\mathbb{Z}_4,+_4)$ be a group and $H=\{\overline{0},\overline{2}\}$ be a subgroup of G. Find all right cosets of H in G.

e) Find the hamming distance between x and y, where $x=1100010$, $y=1010001$.

f) Prepare composition table of addition for $(\mathbb{Z}_5,+_5)$.

g) State whether the following statement is True or False:

"Union of two subgroups is a subgroup." Justify your answer with proper example.

Q2) Attempt any three of the following. **[3×5=15]**

a) Let G be a group such that $a^2=e,\forall a\in G$. Then prove that G is abelian.

P.T.O.

b) Let $\sigma = (1\ 5\ 2)(4\ 3)$, $\tau = (6\ 1\ 9\ 7)$ be two permutations. Compute $\sigma\tau\sigma^{-1}$.

c) Let $H = \begin{bmatrix} 0 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ be a parity check matrix. Determine (2, 5) group code $e_H : B^2 \to B^5$.

d) Let R be a relation on $\mathbb{Z}$ defined by xRy if and only if $5x + 6y$ is divisible by 11, for $x, y \in \mathbb{Z}$. Show that R is an equivalence relation on $\mathbb{Z}$.

e) Let $a, b, x, y \in \mathbb{Z}$. If $a \equiv b \pmod{n}$, then prove that :

i) $ax \equiv bx \pmod{n}$

ii) $(a + x) \equiv (b + x) \pmod{n}$

Q3) Attempt any one of the following. **[1×10=10]**

a) Find gcd of 4999 and 1109 and also find integers m, n such that $(4999, 1109) = m(4999) + n(1109)$.

b) i) For the set $\phi^+ = \phi - \{0\}$, of non-zero rationals, the binary operation $*$ is defined as $a * b = \frac{ab}{3}$. Show that $(\phi^+, *)$ is an abelian group.

ii) Encrypt the message "URD" using $f(x) = (3x + 7) \pmod{26}$.

Total No. of Questions : 3]

SEAT No. :

P5140

[Total No. of Pages : 2

[5823]-304
S.Y. B.Sc. (Computer Science)
MATHEMATICS
MTC - 232 : NUMERICAL TECHNIQUES
(2019 Pattern) (Semester - III) (23222)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Non-programmable scientific calculator is allowed.***

Q1) Attempt any five of the following. **[5×2=10]**

a) State the trapezoidal rule for numerical integration.

b) Given that, $y' = x^2 + y^2$ with $y(0) = 1$. Find $y(0.1)$ by Euler's Method.

c) Prove that, $(1+\Delta)(1-\nabla) = 1$ by usual notation.

d) Find relative error of the number 5/7 whose approximate value is 0.714.

e) Write the Newton-Raphson formula for square root of any real number.

f) Given that, $y(10) = 130, y(20) = 180, y(30) = 200, y(40) = 275, y(50) = 450$. Prepare Newton's Backward difference table.

g) Write Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule for numerical integration.

Q2) Attempt any three of the following. **[3×5=15]**

a) Derive divided difference interpolation formula.

b) Evaluate $\int_1^7 (1+\log x)\, dx$ by using Simpson's $\left(\frac{3}{8}\right)^{th}$ rule (Take $h = 1$).

P.T.O.

c) Given that, $y(1)=2,\ y(2)=4,\ y(3)=8,\ y(4)=16,\ y(5)=32$. Obtain $y(1.5)$ by using Newton Forward interpolation formula.

d) Find real root of equation $x^3-4x-9=0$ in the interval [2, 3] correct upto 2 decimal places by using Regula - Falsi method.

e) Given that $y(1)=0,\ y(3)=1,\ y(4)=48,\ y(6)=180,\ y(10)=900$. Obtain $f(5)$ by using Lagrange's interpolation formula.

Q3) Attempt any one of the following. **[1×10=10]**

a) Given that, $\frac{dy}{dx}=1+xy^2, y(0)=1, h=0.1$. Find $y(0.1), y(0.2)$ by using Runge - Kutta method of fourth order.

b) i) Find the real root of the equation $x\cdot\sin x+\cos x=0$ correct to three decimal places using Newton - Raphson method (Take $x_0=2.5$)

ii) Given that, $y'=x^2+y, y(0)=1$. Obtain $y(0.1)$ by using Euler's Modified Method.

Total No. of Questions : 5]

SEAT No. :

P5141

[Total No. of Pages : 2

[5823] - 305
S.Y. B.Sc. (Computer Science)
ELECTRONICS
ELC 231 : Microcontroller Architecture and Programming
(2019 Pattern) (Semester - III)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question No.1 is compulsory.***
2) ***Solve any three Questions from Q.No. 02 to Q.No. 05.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator is allowed.***

Q1) Attempt any five of the following. **[5×1=5]**

a) Which port of 8051 requires external pull up resistors?

b) Which registers are used as data pointer in indirect addressing mode.

c) What extension is used to save 'C' Language program.

d) Name the timer register of 8051 microcontroller used as bit addressable.

e) Define step angle of stepper motor.

f) In half duplex, data is transmitted in only one direction at a time-comment.

Q2) Answer the following. **[2×5=10]**

a) Draw and explain interfacing of external 16 kb RAM with 8051 microcontroller?

b) Explain function of following instructions.

i) CLR A

ii) NOP

iii) RR A

iv) SUBB A, # 05 H

v) SWAP A

P.T.O.

Q3) Answer the following. **[2×5=10]**

a) Explain internal RAM organisation of 8051 microcontroller.

b) Write 8051 C program to generate square wave with 2500 Hz frequency on pin 2.7. Use Timer 1 in mode 2. Assume XTAL frequency = 12 MHz.

Q4) Answer the following. **[2×5=10]**

a) Explain in brief classification of 8051 instructions. (any 5)

b) Write C program for LCD interface to 8051 for displaying 'ELECTRONICS'.

Q5) Write short notes (any four) **[4×2½=10]**

a) Difference between LCALL and ACALL (any 2).

b) Timer mode 2 of 8051.

c) Immediate addressing mode.

d) Interrupts in 8051.

e) Difference between simplex and full duplex.

f) Input output (I/O) ports of 8051.

Total No. of Questions : 5]

SEAT No. : ____

P5142

[Total No. of Pages : 2

[5823]-306

S.Y. B.Sc. (Computer Science)
ELECTRONICS
ELC -232 : Digital Communication and Networking
(2019 Pattern) (Semester-III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagram must be drawn wherever necessary.***
5) ***Use of calculator is allowed.***

Q1) Attempt any five **[5×1=5]**

a) Define bit rate.

b) What is modulation?

c) What is TDMA?

d) How many voice channels are multiplexed together in the basic group of FDM.

e) What is MAN?

f) In which topology networking devices connected together at center point.

Q2) Answer the following. **[2×5=10]**

a) Explain with block diagram electronic communication system.

b) Differentiate between Asynchronous and synchronous transmission.

Q3) Answer the following. **[2×5=10]**

a) Explain QPSK modulator.

b) Give any five features of FDMA.

Q4) Answer the following. **[2×5=10]**

a) Explain FDM technique used in communication system.

b) What is networking devices? Explain router end hub.

P.T.O.

Q5) Write short notes on <u>any four</u> of the following. **[4×2½=10]**

a) Modulation Index

b) DSSS (Direct Sequence Spread Spectrum)

c) Ring topology

d) CSMA protocol

e) Types of noise

f) Networking device switch

❖ ❖ ❖

Total No. of Questions : 3]

SEAT No. :

P4649

[Total No. of Pages : 1

[5823]-307

S.Y. B.C.A./S.Y. BSc. (Computer Science/Biotechnology)

English Ability Enhancement Course

AECC- II : LANGUAGE COMMUNICATION - I

(2019 Pattern) (CBCS) (Semester - III) (LA - 231)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any one of the following in about 150-200 words : **[15]**

a) Compare and contrast Sambu and his Mother's reactions and memories to various scenes in the film.

b) What qualities does Rabindranath Tagore wish his country to have and why?

Q2) Attempt any two of the following in about 50-80 words : **[10]**

a) Anushree and her mother meet her college professor Dr. Priya Mahate in the mall while they are in line for the same movie. Anushree introduces them to each other. Write a dialogue for this situation.

b) Sejal, Suvarna and Ramesh Share their thoughts on how best to make time for exercise whilst attending college classes and participating in extracurricular activities.

c) Shirish apologises to his boss for reaching office late. Write a dialogue for this situation.

Q3) Attempt any two of the following in about 50-80 words : **[10]**

a) Discuss various techniques for effective participation in Group discussion.

b) Explain the significance of Audio of Visual Aids in presentation.

c) Explain five tips to prepare for an Interview.

♣ ♣ ♣

Total No. of Questions : 5]

SEAT No. : ____

P5143

[Total No. of Pages : 3

[5823]-401

S.Y.B.Sc.

COMPUTER SCIENCE

CS 241 : Data Structure and Algorithms - II

(2019 CBCS Pattern) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Figures to the write indicate full marks.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Your answers will be values as a whole.***

Q1) Attempt any EIGHT of the following. **[8 × 1 = 8]**

a) Define Heap.

b) List tree traversal methods.

c) Define node of tree.

d) What is height balance tree?

e) Define balance factor.

f) Define Spanning tree.

g) Define in-degree & out-degree of vertex.

h) What is weighted graph.

i) Define Bucket

j) What do you mean by rehashing.

Q2) Attempt any Four of the following. **[4 × 2 = 8]**

a) Write any two properties of hash function.

b) Define i) Degree of vertex

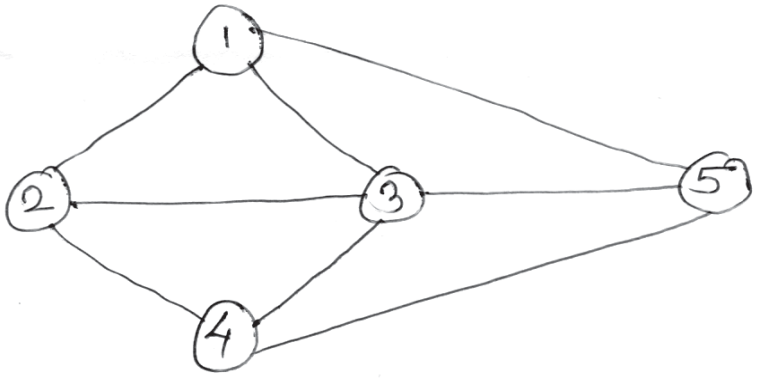
ii) Subgraph

c) List any two applications of tree data structure.

d) What is skewed binary tree.

P.T.O.

e) Convert the following undirected graph into adjacency matrix.



Q3) Attempt any Two of the following. **[2 × 4 = 8]**

a) Write a program to sort 'n' randomly generated elements using heapsort method.

b) Write a program that accepts the vertices and edges of graph and store it as an adjacency matrix. Display adjacency matrix.

c) Write a function to search an element in binary search tree.

Q4) Attempt any Two of the following. **[2 × 4 = 8]**

a) Construct an AVL tree for the following data.

70, 50, 30, 90, 80, 130, 120

b) Consider the following adjacency matrix.

	1	2	3	4
1	0	1	1	0
2	1	0	1	0
3	0	0	0	1
4	1	0	0	0

i) Draw the graph

ii) Draw Adjacency list.

c) Write a C function to traverse a graph using BFS.

Q5) Attempt any ONE of the following. **[1 × 3 = 3]**

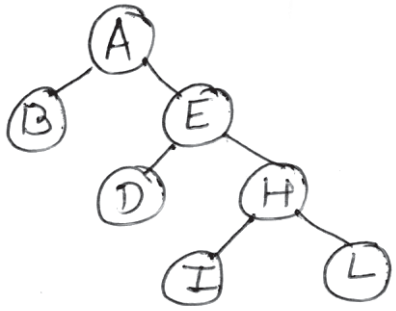
a) Define the following terms.

i) Height of tree

ii) Forest

iii) Siblings of tree

b) Traverse the following tree using preorder, inorder and postorder traversal techniques.



Total No. of Questions : 5]

SEAT No. :

P5144

[Total No. of Pages : 2

[5823]-402

S.Y. B.Sc.

COMPUTER SCIENCE

CS - 242 : Computer Networks - I

(2019 Pattern) (Semester - IV)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Neat diagram must be drawn if necessary.***

Q1) **Attempt any EIGHT of the following (Out of TEN).** **[8 × 1 = 8]**

a) What is Port address?

b) What is the size of IPv4 & IPv6 Address?

c) List application Layer Protocol.

d) "UDP is Connection Oriented Protocol." State the statement is true / false.

e) What is the function of Presentation layer?

f) What is Protocol?

g) Which devices operates at physical layer.

h) What is Bandwidth?

i) What is CSMA/CD?

j) Define Masking.

Q2) **Attempt any FOUR of the following (Out of FIVE).** **[4 × 2 = 8]**

a) Define Terms :

i) Jitter

ii) Latency

b) Write Nyquist & Shannon's formula for calculating data rate of a channel.

c) Define routing.

P.T.O.

d) Define following Data communication standards:

i) De Facto

ii) De Jure

e) Apply bit stuffing on Pattern 01101111111111110010

Q3) **Attempt any TWO of the following (Out of THREE). [2 × 4 = 8]**

a) Explain Multiplexing & De_multiplexing in transport Layer.

b) What is Taxonomy for Media Access Protocol?

c) Which are the methods of framing.

Q4) **Attempt any TWO of the following (Out of THREE). [2 × 4 = 8]**

a) Write note on Circuit Switching.

b) For the given IP address 205.16.37.39/28 in some block of address, Calculate :

i) Address Mask

ii) First Address of block

iii) Last address of block

iv) Number of addresses in the block

c) Write note on UDP

Q5) **Attempt any ONE of the following (Out of TWO). [1 × 3 = 3]**

a) What is BSS & ESS? Explain in detail.

b) Explain TCP/IP Model in detail.

Total No. of Questions : 3]

SEAT No. :

P5145

[Total No. of Pages : 2

[5823]-403

S.Y. B.Sc. (Computer Science)

MATHEMATICS

MTC-241 : Computational Geometry

(2019 Pattern) (Semester - IV)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All Questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Non-programmable scientific calculator is allowed.***

Q1) Attempt any five of the following. **[5 × 2 = 10]**

a) Write transformation matrix of rotation about origin through an angle 45° in clockwise direction.

b) Find the slope of line which is perpendicular to the line $2x + y = 3$.

c) Find point in three dimensional space whose homogenous co-ordinate is $\left[1 \quad 2 \quad 3 \quad \frac{1}{2}\right]$.

d) Write matrix of overall scaling by factor 3 in three dimensional space.

e) Define foreshortning factors in projection.

f) If foreshortning factor along z-direction is $F_z = \frac{1}{2}$. What is the angle ϕ required to rotate about Y-axis to construct a dimetric projection.

g) Write any two properties of Be′zier curve.

Q2) Attempt any three of the following : **[3 × 5 = 15]**

a) Obtain concatenated transformation matrix [T] for Axonometric projection.

b) If the line segment AB is scaled uniformly by factor 3 then find mid-point of transformed line segment A'B'. Where A = [4 9] and B = [3 2].

P.T.O.

c) Obtain combined transformation matrix for the following sequence of transformation. First Reflection through x-axis, followed by Rotation about origin through an angle 270°, followed by scaling in x and y direction by factors 2 and –1 units respectively.

d) Obtain transformation matrix to Reflect the object through plane $x = -2$.

e) Obtain transformation matrix to rotate the line which is parallel to y-axis and passing through point (0, 4, 0), by an angle $\theta = 45°$.

Q3) Attempt any one of the following : **[1 × 10 = 10]**

a) Generate equispaced 4 point on the curve of circle $(x-1)^2 + (y+1)^2 = 9$.

b) i) Find parametric equation of curve determine by control points $B_0[3, 4]$, $B_1[0, 1]$ and $B_2[2, -1]$. Also find position vector of the point on the curve corresponding to parametric value t = 0.3.

ii) Write the transformation matrix for dimetric projection with $F_z = \frac{3}{8}\ (\theta > 0, \phi > 0)$.

Total No. of Questions : 3]

SEAT No. :

P5146

[Total No. of Pages : 4

[5823]-404

S.Y. B.Sc. (Computer Science)

MATHEMATICS

MTC-242 : Operations Research

(2019 Pattern) (Semester - IV) (Paper - II) (24222)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All Questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Non-programmable scientific calculator is allowed.***

Q1) Attempt any Five of the following. **[5 × 2 = 10]**

a) Write two applications of Linear programming problem.

b) How an assignment problem with certain restrictions can be solved?

c) Write dual form of the following Linear programming problem :

Maximize $Z = x_1 + 3x_2$

Subject to

$3x_1 + 2x_2 \leq 6$

$3x_1 + x_2 = 4$

$x_1, x_2 \geq 0$

d) Obtain Initial Basic Feasible solution of the Transportation Problem using Matrix Minima Method.

Destination → Origin ↓	D_1	D_2	D_3	Supply
O_1	10	13	6	10
O_2	16	7	13	12
O_3	8	22	2	8
Demand	6	11	13	30

P.T.O.

e) Solve the following Assignment Problem for minimization :

Jobs → Persons ↓	I	II	III
A	7	3	5
B	2	7	4
C	6	5	3
D	3	4	7

f) Write the standard form of the following linear programming problem :

Minimize $Z = x_1 + x_2 + x_3$

Subject to :

$$x_1 - 3x_2 + 4x_3 = 5$$
$$x_1 - 2x_2 \leq 3$$
$$2x_1 - x_3 \geq 4$$
$$x_1, x_2, x_3 \geq 0$$

g) Draw the Feasible region for the following constraints :

Max $Z = 3x - 2y$

Subject to

$$x + y \leq 1$$
$$2x + 2y \geq 4$$
$$x, y \geq 0$$

Q2) Attempt any three of the following : **[3 × 5 = 15]**

a) Solve the following assignment problem to minimize the cost such that Machine. M_2 cannot be assigned Job - C and Machine M_3 cannot be assigned Job - A.

	A	B	C	D	E
M_1	9	11	15	10	11
M_2	12	9	-	10	9
M_3	-	11	14	11	7
M_4	14	8	12	7	8

b) Solve the following Linear Programming Problem by Big-M method :

Maximize $Z = 3x_1 - x_2$

Subject to :

$$2x_1 + x_2 \geq 2$$

$$x_1 + 3x_2 \leq 3$$

$$x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

c) Solve the following assignment problem For minimum cost :

	A	B	C	D	E
M_1	7	5	9	8	11
M_2	9	12	7	11	10
M_3	8	5	4	6	9
M_4	7	3	6	9	5
M_5	4	6	7	5	11

d) Solve the Linear Programming Problem by graphically.

Max. $Z = 9x + 13y$

Subject to :

$$2x + 3y \leq 18$$

$$2x + y \leq 10$$

$$x, y \geq 0$$

e) Solve Transportation Problem by north - west corner rule.

	I	II	III	IV	V	VI	Capacity
A	9	12	9	8	4	3	5
B	7	3	6	8	9	4	8
C	4	5	6	8	10	14	6
D	7	3	5	7	10	9	7
E	2	3	8	10	2	4	3
Requirement	3	4	5	7	6	4	

Q3) Attempt any one of the following : **[1 × 10 = 10]**

a) Find Initial Basic Feasible solution by vogel's Approximation method. Obtain the optimal solution by Modified Distribution method of the following transportation problem.

Ware houses → Factory ↓	w_1	w_2	w_3	w_4	Supply
F_1	19	30	50	10	7
F_2	70	30	40	60	9
F_3	40	8	70	20	18
Requirement	5	8	7	14	34

b) i) Solve the following Linear Programming problem by simplex method.

Max. $Z = 6x + 3y$

Subject to :

$2x + y \leq 8$

$3x + 3y \leq 18$

$y \leq 3$

$x, y \geq 0$

ii) Write an algorithm to solve assignment problem

Total No. of Questions : 5]

SEAT No. :

P5147

[Total No. of Pages : 2

[5823]-405

S.Y. B.Sc. (Computer Science)

ELECTRONICS

ELC-241 : Embedded System Design

(2019 Pattern) (Semester - IV) (Paper - I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any Three questions from Q.2 to Q.5.***
3) ***Figures to the right indicates full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Use of calculator is allowed.***

Q1) Attempt any five. **[5 × 1 = 5]**

a) Define an Embedded system.

b) Which processor is used in Raspberry pi.

c) What is the difference between Lists and Tuples?

d) What is the use of 'time' function?

e) How physical numbering scheme is selected on Raspberry pi?

f) Write the use of GSM module.

Q2) Answer the following : **[2 × 5 = 10]**

a) i) Explain following functions of Python **[3]**

I) eval (str)

II) GPIO.input (channel)

III) GPIO-setup (channel, GPIO.OUT)

ii) Write Python program for LED interfacing to Raspberry pi **[2]**

b) Explain any two types of SBC in detail. List the advantages and disadvantages of SBC. **[5]**

P.T.O.

Q3) Answer the following : **[2 × 5 = 10]**

a) i) Write the functions of following blocks of Raspberry pi **[5]**

I) HDMI

II) Micro SD Card

III) USB ports

IV) Ethernet

V) Processor

b) List different types of operators used in Python. Explain any three operators in detail. **[5]**

Q4) Answer the following : **[2 × 5 = 10]**

a) Draw the neat diagram of architecture of SOC. Explain any three blocks of it. **[5]**

b) Explain different types of Network Access devices used for SBC along with their features. **[5]**

Q5) Write a short note on <u>any four</u> of the following : **[4 × 2.5 = 10]**

a) Raspberry pi and Beagle Bone SBC.

b) ARM 1176JZF-S.

c) GPIO functions.

d) Standard data types used in Python.

e) 'elif' statement.

f) Python Dictionary.

Total No. of Questions : 5] **SEAT No. :**

P5148 **[Total No. of Pages : 2**

[5823]-406

S.Y. B.Sc. (Computer Science)

ELECTRONICS

ELC 242 - Wireless Communication and Internet of Things

(2019 Pattern) (Semester - IV) (Paper-II)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q. is compulsory.***
2) ***Solve any three questions from Q2 to Q5.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator is allowed.***

Q1) Answer the following in one or two sentence each.(Any Five). **[5×1=5]**

a) Define femtocell.

b) Give any two example of public cloud.

c) What is full form of MQTT?

d) Define scalabity of IOT system.

e) What is the use of the RFID module?

f) Which modulation technique is used in bluetooth?

Q2) Answer the following. **[2×5=10]**

a) Explain following topologies used in ZigBee

i) Star ii) Tree

iii) Cluster tree iv) Mesh

What is ZigBee coordinator?

b) Draw and explain smart irrigation system for agricultural field.

P.T.O.

Q3) Answer the following. **[2×5=10]**

a) What is GSM? Give function of following blocks of NSS of GSM.

i) Visitor location Register (VLR)

ii) Home location Register (HLR)

iii) Equipment Indentify Register (EIR)

iv) Authentication Centre (AUC)

b) Write in detail transport layer of Z-wave.

Q4) Answer the following. **[2×5=10]**

a) Compare LoRaWAN & Sig fox technologies.

b) Draw and explain GPRS architecture.

Q5) Write a short notes (Any Four). **[4×2.5=10]**

a) Private cloud

b) Home Automation using IoT.

c) Scatternet of Bluetooth.

d) Draw block diagram of mobile handset.

e) Limitation of RFID system.

f) Frequency reuse

Total No. of Questions : 3]

SEAT No. : ____

P4650

[Total No. of Pages : 1

[5823]-407

S.Y. B.Sc. Com. Sci./Biotechnology/S.Y.B.C.A.

AECC - II : ENGLISH ABILITY ENHANCEMENT COURSE

Language Communication - II

(2019 Pattern) (CBCS) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any one of the following in about 150-200 words. **[15]**

a) Why did the speaker fear that there was little prospect of him getting back the dollar in the story 'My Lost Dollar'.

b) Summarize the central idea of the poem 'Stopping by Woods on a Snowy Evening'.

Q2) Attempt any two of the following in 50-80 words. **[10]**

a) Write a note on content writing.

b) What is an agenda.

c) Write a notice to all the students of your college to participate in annual sports and cultural activities.

Q3) Attempt any two of the following in 50-80 words. **[10]**

a) Write the importance of soft skills and hard skills in professional life. **[6]**

b) Discuss the importance of setting long term and short term goals in your life.

c) Do a SWOT analysis of your college.

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Total No. of Questions : 4]

SEAT No. :

P5149

[Total No. of Pages : 2

[5823]-501

T.Y. B.Sc.

COMPUTER SCIENCE

CS - 351 : Operating Systems - I

(2019 Pattern) (CBCS) (New) (Semester - V) (Paper - 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) ***Assume suitable data if necessary.***

Q1) Attempt any Eight of the following. **[8 × 1 = 8]**

a) Define bootstrapping.

b) Explain posix pthread.

c) What is role of dispatcher?

d) List the solutions to critical section problem.

e) What do you mean by page hit?

f) What is kernel?

g) What is ready queue?

h) What do you mean by I/O bound process?

i) What are the two types of semaphores?

j) What is virtual memory?

Q2) Attempt any Four of the following. **[4 × 2 = 8]**

a) What is system call? Explain system call related to device manipulation.

b) Write short note on multilevel queue scheduling.

c) Explain producer, consumer problem.

d) Explain paging in brief.

e) Write difference between preemptive and non preemptive scheduling?.

P.T.O.

Q3) Attempt any Two of the following. **[2 × 4 = 8]**

a) What is thread? Explain any 2 multithreading models in brief with diagram.

b) Write short note on logical address and physical address binding with diagram.

c) Consider following set of processes with the length of CPU burst time and arrival time given in milliseconds. Calculate waiting time, turnaround time per each process. Also calculate the average waiting time and average turn around time using preemptive priority scheduling.

Process	Burst time	Arrival time	Priority
P_1	14	4	3
P_2	5	2	1
P_3	6	9	2
P_4	5	5	3
P_5	9	0	4

Q4) Attempt any Two of the following. **[2 × 4 = 8]**

a) Define process. Explain process state diagram in brief.

b) Explain reader-writer problem in brief.

c) Consider a reference string 3,2,1,0,3,2,4,3,2,1,0,4 No. of frames = 3. Find out the number of page faults using i) LRU ii) OPT.

Q5) Attempt any One of the following. **[1 × 3 = 3]**

a) Explain layered operating system in brief with diagram.

b) Explain first fit, best fit, worst fit, next fit algorithm.

Total No. of Questions : 5]

SEAT No. :

P5150

[Total No. of Pages : 2

[5823]-502

T.Y. B.Sc. (Computer Science)

CS - 352 : COMPUTER NETWORKS - II

(2019 Pattern) (Credit) (Semester - V)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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

Q1) **Attempt any Eight of the following (out of Ten)** **[8 × 1 = 8]**

a) SMTP is a push protocol. State true or false, Justify.

b) Write two types of connections used by FTP. Also write their port numbers.

c) What is sampling?

d) What is used of "BYE" message in SIP (Session Initiation Protocol)?

e) What is VPN (Virtual Private Network)?

f) What is multicasting?

g) Write advantages of packet filter firewall.

h) Define cryptography.

i) Encrypt the following plain text with given key using substitution cipher. Plain text: India is my county, Key = 4.

j) List methods for verifying the authenticity of the claimant.

Q2) **Attempt any Four of the following (out of Five)** **[4 × 2 = 8]**

a) Which are traditional ciphers? Write working of shift cipher.

b) List types of server. Write short note on any one type.

c) Write advantage or POP.

d) What is streaming live audio/video?

e) Write note on IPSec modes.

P.T.O.

Q3) **Attempt any Two of the following (out of Three)** **[2 × 4 = 8]**

a) Explain PGP certificates.

b) Using columnar transposition cipher convert the given plain text to cipher text.

Plaintext : COMMUNICATIONMUSTBESECURE, Key = FASTER

c) What is Electronic Code Book (ECB), write it's advantages and disadvantages.

Q4) **Attempt any Two of the following (out of Three)** **[2 × 4 = 8]**

a) Write difference between flat name space and hierarchical name space.

b) Explain symmetric key cryptography.

c) Explain Streaming Stored Audio / Video first approach: using a web server, with advantages and disadvantages.

Q5) **Attempt any One of the following (out of Two)** **[1 × 3 = 3]**

a) Explain Real-Time Interactive Audio / Video with diagram.

b) Explain SSL services in detail.

▽▽▽▽

Total No. of Questions : 5]

SEAT No. :

P5151

[Total No. of Pages : 3

[5823]-503

T.Y. B.Sc.

COMPUTER SCIENCE

CS - 353 : Web Technologies - I

(CBCS) (2019 Pattern) (Semester - V)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Assume suitable data, if necessary.***
3) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt any eight of the following : **[8 × 1 = 8]**

a) What is hyperlink?

b) List the advantages of CSS

c) Which tag is used to set the text in superscript format?

d) State the purpose of pathinfo()

e) What is DSN?

f) List any two features of HTTP protocol.

g) State the use of foreach() function.

h) What is web server?

i) Give any two functions of random access of file data.

j) How to delete file in PHP?

Q2) Attempt any four of the following : **[4 × 2 = 8]**

a) Write any 2 features of PHP & HTML.

b) Write the output of the following PHP Script

```
<?php
    $ age = array("Anna"=>"45", "Julie"=>"38", "Benne"=>"53");
    usort($age);
    print_r($age);
?>
```

P.T.O.

c) Write the output of the following script?

```
<?php
    $a='PHP';
    $b='$a interpolation ';
    echo $b;
?>
```

d) Write the output of the following PHP Script.

```
$str=' abc,pqr,lmn,xyz';
$p=explode(',',$str,3);
print_r($p);
```

e) What is the output of the following?

```
<?php
    $p=array(1,2,3,4,5);
    $q=array(1,3,5,7,9);
    $s=array_diff($p,$q);
    print_r($s);
?>
```

Q3) Attempt any 2 of the following : **[2 × 4 = 8]**

a) Design HTML form that will accept user input as first name, middle name and last name, address, contact number. Provide buttons to submit the input as well as to refresh form.

b) Explain any two of the following functions with syntax

i) array _ intersect ()

ii) array _ slice ()

iii) shuffle ()

c) Explain how to send email with PHP.

Q4) Attempt any 2 of the following : **[2 × 4 = 8]**

a) Explain different types of arguments passing to function with example.

b) Write a PHP script to read a file abc.txt where file contains character, B,C,T,G and space. Count occurrences of each character and write it to the abccount.txt file.

c) Explain advantages and disadvantages of IMAP4 protocol.

Q5) **Attempt** any ONE of the following **:** **[1 × 3 = 3]**

a) Write a PHP script accept and insert records in employee table.

b) What is associative array? Explain with example how is it different from indexed array?

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Total No. of Questions : 5]

SEAT No. :

P5152

[Total No. of Pages : 2

[5823]-504

T.Y. BSc.

COMPUTER SCIENCE

CS - 354 : Foundations of Data Science

(2019 Pattern) (CBCS) (Semester - V)

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) Attempt any EIGHT of the following : **[8 × 1 = 8]**

a) Define volume characteristic of data in reference to data science.

b) Give examples of semistructured data.

c) Define Data Discretization.

d) What is a quartile?

e) List different types of attributes.

f) Define Data object.

g) What is Data Transformation?

h) Write the tools used for geospatial data.

i) State the methods of feature selection.

j) List any two libraries used in Python for data analysis.

Q2) Attempt any FOUR of the following : **[4 × 2 = 8]**

a) Explain any two ways in which data is stored in files.

b) Explain role of statistics in data science.

c) Explain two methods of data cleaning for missing values.

d) Explain any two tools in data scientist tool box.

e) Write a short note on wordclouds.

P.T.O.

Q3) Attempt any TWO of the following : **[2 × 4 = 8]**

a) Explain data science life cycle with suitable diagram.

b) Explain concept and use of data visualisation.

c) Calculate the variance and standard deviation for the following data.

X : 14 9 13 16 25 7 12

Q4) Attempt any TWO of the following : **[2 × 4 = 8]**

a) Write a short note on hypothesis testing.

b) Differentiate between structured data and unstructured data.

c) Explain data visualization libraries in Python.

Q5) Attempt any ONE of the following : **[1 × 3 = 3]**

a) i) Define data science. **[1]**

ii) Explain any one technique of data transformation. **[2]**

b) i) Write any two applications of data science. **[1]**

ii) Explain any one type of outliers in detail. **[2]**

♣ ♣ ♣

Total No. of Questions : 5]

SEAT No. :

P5153

[Total No. of Pages : 2

[5823]-505

T.Y. B.Sc. (Computer Science)

CS-355 : Object Oriented Programming Using Java - I

(2019 Pattern) (CBCS) (Semester - V) (Paper - V)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any EIGHT of the following : **[8 × 1 = 8]**

a) Define exception

b) Define Interface

c) What is javadoc?

d) What is AWT?

e) What is use of static keyword?

f) What is command line argument?

g) List the types of constructor.

h) What is package?

i) How to open a file in read mode?

j) List any two listener.

Q2) Attempt any FOUR of the following : **[4 × 2 = 8]**

a) List any two methods of string buffer class.

b) What is use of 'throw' keyword.

c) Differentiate between final and finally keyword.

d) What is method overloading?

e) What is anonymous inner class?

P.T.O.

Q3) Attempt any TWO of the following : **[2 × 4 = 8]**

a) Write a Java program using AWT to change background color of table to 'RED' by clicking on button.

b) Write a Java program to copy content from one file into another file, while copying digits are replaced by '*'.

c) Define an interface shape with abstract method area( ). Write a Java program to calculate area of rectangle.

Q4) Attempt any TWO of the following : **[2 × 4 = 8]**

a) Write a Java program to accept a number from user. If it is zero then throw user defined exception "Number is zero". Otherwise calculate its factorial.

b) Explain uses of super-keyword with suitable example.

c) Differentiate between AWT and swing.

Q5) Attempt any ONE of the following : **[1 × 3 = 3]**

a) Write a Java program to count number of vowels from given string.

b) Explain the features of Java.

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Total No. of Questions : 5]

SEAT No. :

P5154

[Total No. of Pages : 2

[5823]-506

T.Y. B.Sc.

COMPUTER SCIENCE

CS - 356 : Theoretical Computer Science

(2019 Pattern) (CBCS) (Semester - V)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any EIGHT of the following (Out of TEN) : **[8 × 1 = 8]**

a) If A = { $\in$} Find the value of |A|.

b) List all the proper suffixes of the string "0123".

c) Define Useless symbol.

d) Give formal definition of Turning Machine.

e) Define left linear grammar.

f) State True or False. DFA do not have multiple final states.

g) Name the type of language accepted by Pushdown Automata.

h) Write the tuples of LBA.

i) State true or false. Pumping lemma is used to show that language is not context tree.

j) Write smallest possible string accepted by the following regular expression.

a(a+b)*ab

Q2) Attempt any FOUR of the following (Out of FIVE) : **[4 × 2 = 8]**

a) Explain types of grammar.

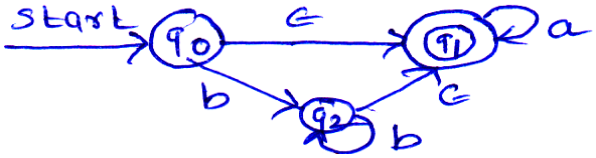
b) Construct FA for regular expression.

(1+0)*0

c) Differentiate between CNF and GNF (any two points).

P.T.O.

d) Write down the ∈-closure of each state from the following FA.



e) Define types of Turing Machine.

Q3) Attempt any TWO of the following (Out of THREE) : **[2 × 4 = 8]**

a) Construct a DFA for a language

L1∩L2

L1={All strings starting with 'a'}

L2={All strings not having 'ab' as substring}

b) Construct the following CFG intNormal Form (CNF)

S–>aSa | bSb

S–>a |b| aa | bb

c) Design TM for language,

$L=\{WCW^R|W \text{ is in } (0+1)^*\}$

Q4) Attempt any TWO of the following (Out of THREE) : **[2 × 4 = 8]**

a) Construct a PDA for the language

$L=\{a^n b^n c^n \mid n>=0\}$.

b) Construct a Moore machine for the language L over ∑ = {0,1} which outputs '*' if the string contains '11' in it and outputs '#' otherwise.

c) Compare DFA and NFA.

Q5) Attempt any ONE of the following (Out of TWO) : **[1 × 3 = 3]**

a) Construct a Mealy machine over alphabet {0, 1} which toggles its input.

b) Show that $L=\{0^n1^n \mid n>=1\}$ is not regular.

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Total No. of Questions : 5]

SEAT No. :

P5155

[Total No. of Pages : 2

[5823]-507

T.Y. B.Sc.

COMPUTER SCIENCE

CS-3510 : Python Programming

(2019 Pattern) (CBCS) (Semester - V)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Total number of questions are five.***

Q1) Attempt any 8 of the following : **[8 × 1 = 8]**

a) What is dry run in Python?

b) Give the purpose of selection statements in Python.

c) List the types of type conversion in Python.

d) What is the use of pass statement?

e) Explain the function enumerate( ).

f) Explain the extend method of list.

g) What are required arguments in function?

h) Explain any 2 functions in time module.

i) What are the types of file in Python?

j) Write the use of seek & tell function.

Q2) Attempt any 4 of the following : **[4 × 2 = 8]**

a) How to handle exception in Python?

b) Explain any 2 metacharacters used in regular expression.

c) Explain any 2 built-in list functions.

d) Explain backward indexing in strings.

e) Define identifiers.

P.T.O.

Q3) Attempt any 2 of the following : **[2 × 4 = 8]**

a) Write a Python program to check if a given number is Armstrong.

b) Write a Python program to display power of 2 using anonymous function.

c) Write a Python program to print even length words in a string.

Q4) Attempt any 2 of the following : **[2 × 4 = 8]**

a) Write a Python program to check for Zero Division Error Exception.

b) Write a Python program to find gcd of a number using recursion.

c) Write a Python program to check if a given key already exists in a dictionary.

Q5) Attempt any 1 of the following : **[1 × 3 = 3]**

a) Trace the output of the following :

```
sum = 0
for i in range (12, 2, –2) :
    sum + = i
print sum
```

b) Trace the output of the following :

```
count = 1
def doThis ( ) :
    global count
    for i in (1, 2, 3) :
    count + = 1
doThis( )
```

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Total No. of Questions : 5]

SEAT No. :

P5156

[Total No. of Pages : 2

[5823]-508
T.Y. B.Sc.
COMPUTER SCIENCE
CS - 3511 : Blockchain Technology
(2019 Pattern) (CBCS) (Semester - V)

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) Attempt any EIGHT of the following : **[8 × 1 = 8]**

a) Who published a white paper proposing Ethereum in 2013?

b) In which type of network each and every node is itself client and server?

c) Give the command to find the current difficulty level.

d) What happens if someone loses the private key of his wallet?

e) What is EVM?

f) Which institute standardized AES algorithm?

g) What is Nonce?

h) What is Non-repudiation?

i) What is ICO?

j) Who owns the Blockchain?

Q2) Attempt any FOUR of the following : **[4 × 2 = 8]**

a) What is Gas & Gas limit?

b) What is Public & Private blockchain?

c) List & Explain value data types in solidity.

d) What are the benefits of immutable ledger in blockchain?

e) What is stream cipher and block cipher?

P.T.O.

Q3) Attempt any TWO of the following : **[2 × 4 = 8]**

a) Write a short note on crypto wallet.

b) What are the tasks of miners?

c) Which are the components of blockchain?

Q4) Attempt any TWO of the following : **[2 × 4 = 8]**

a) Write a short note on DES.

b) What are the advantages of smart contract? Explain any four.

c) What are the layers of blockchain?

Q5) Attempt any ONE of the following : **[1 × 3 = 3]**

a) Define transaction and explain its structure.

d) What are the uses of SHA algorithm?

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Total No. of Questions : 5]

SEAT No. : ____

P5157

[Total No. of Pages : 2

[5823]-601

T.Y.B.Sc. (C.S.)

CS-361 : OPERATING SYSTEM-II

(2019 Credit Pattern) (Semester - VI)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All question are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any eight of the following. **[8×1=8]**

a) List any four attributes of files.

b) What is starvation?

c) List the features of ios. mobile OS?

d) What is Access Transparency?

e) Define mobile OS?

f) Define rational latency?

g) Define claim edge?

h) Wha is cloud computing?

i) Define P2P architecture?

j) Define native level programming?

Q2) Attempt any four of the following **[4×2=8]**

a) Define cluster computing. State the advantages and disadvantages of cluster operating system.

b) Differentiate mobile OS and desktop OS.

c) Explain disk formatting in disk management.

d) What is distributed operating system? List the purpose of distributed operating system"?

e) List down the advantages and disadvantages of windows mobile OS?

P.T.O.

Q3) Attempt any two of the following. **[2×4=8]**

a) List down the architectural styles in distributed operating system & explain any one in detail.

b) What is deadlock? Explain different ways of deadlock recovery.

c) List down different file allocation methods explain any one in detail.

Q4) Attempt any two of the following. **[2×4=8]**

a) Differntiate between cluster, grid & cloud computing.

b) Consider the following snap shot of a system with 5 processes P_0, P_1,P_2,P_3,P_4 and resources A, B,C.

Process	Allocation			Max		
	A	B	C	A	B	C
P_0	2	3	2	9	7	5
P_1	4	0	0	5	2	2
P_2	5	0	4	11	0	4
P_3	4	3	3	4	4	4
P_4	2	2	4	6	5	5

Available		
A	B	C
3	3	2

Answer the following using Banker's algorithm

i) What are the contents of matrix need?

ii) Is the system in a safe state? If yes find safe sequence.

c) Write a note on tree structured directories.

Q5) Attempt any one of the following **[1×3=3]**

a) Suppose the request sequence is 176, 79, 34, 60, 92, 11, 41, 114, and initial head position is 50. Calculate total head movements using SSTF disk scheduling algorithm.

b) Write a short note on kernel architecture of mobile OS.

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Total No. of Questions : 5]

SEAT No. :

P5158

[Total No. of Pages : 2

[5823]-602

T.Y.B.Sc. (Computer Science)

CS - 362 : SOFTWARE TESTING

(New CBCS 2019 Pattern) (Semester - VI)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data if necessary.***

Q1) Attempt any eight of the following. **[1 × 8 = 8]**

a) Define software testing.

b) What is mean by validation?

c) What is stub?

d) Write goal of white box testing.

e) Define regression testing.

f) List any 2 agile principles.

g) List dimensions of quality.

h) Define web application, testing.

i) List levels of testing.

j) What is test plan?

Q2) Attempt any four of the following. **[2 × 4 = 8]**

a) Write 2 differences between bugs, Faults & Failures.

b) Write short note on black box testing.

c) Explain equivalance partitioning.

d) Explain performance testing.

e) Write features of agile testing.

P.T.O.

Q3) Attempt any two of the following. **[2 × 4 = 8]**

a) With the help of diagram explain V-model.

b) What is test case? Explain with example.

c) Explain Navigation testing in detail.

Q4) Attempt any two of the following. **[2 × 4 = 8]**

a) What is performance testing? Write steps in performance testing.

b) Differentiate between alpha & beta testing.

c) What is integration testing? Explain top-down integration.

Q5) Attempt any one of the following. **[1 × 3 = 3]**

a) Write a short note on Automated tests.

b) What is internationalization testing? Explain with types.

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Total No. of Questions : 5]

SEAT No. : ____

P5159

[Total No. of Pages : 2

[5823]-603

T.Y.B.Sc.

COMPUTER SCIENCE

CS-363 : Web Technologies-II

(2019 CBCS Pattern) (Semester - VI)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any Eight of the following. **[8×1=8]**

a) Which function is used to remove all global session variables?

b) Which information is stored in $_FILES?

c) What are the characteristics of XML?

d) XML tags are case sensitive. Justify true of false.

e) Write the primitive datatypes in JavaScript.

f) Define DOM.

g) What is the use of XML Http Request object?

h) What is Ajax?

i) What is codeIgniter?

j) Which function is used for page redirection in codeIgniter?

Q2) Attempt any four of the following **[4×2=8]**

a) What is the significance of POST method?

b) What is session? How to start the new session?

c) Give relationship between XML and PHP.

d) Explain Synchronous request to the server in Ajax.

e) What is page redirecting? Write down syntax of the function used for page redirection.

P.T.O.

Q3) Attempt any two of the following (out of three). **[2×4=8]**

a) What is XML parser? Explain with its types.

b) What is the scope of variable in JavaScript?

c) What are the advantages and disadvantages of AJAX?

Q4) Attempt any two of the following. (out of three) **[2×4=8]**

a) Write a JavaScript code to accept username and password validate it with username should not be null and password should be at least 6 digit long.

b) Write a php program to strore current date-time in COOKIE and display last visited on". date-time on the webpage upon reopening of the same page.

c) Create student table as follows student (sno. sname, per). Write Ajax program to select the student name and print the selected student's details.

Q5) Attempt any one of the following (out of two) **[1×3=3]**

a) Explain use of setcookie () function with its arguments.

b) Explain MVC framework.

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Total No. of Questions : 5]

SEAT No. :

P5160

[Total No. of Pages : 2

[5823] - 604
T.Y.B.Sc.
COMPUTER SCIENCE
CS-364 : Data Analytics
(CBCS 2019 Pattern) (Semester -VI)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

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

Q1) Attempt any EIGHT of the following : **[8×1=8]**

a) Define Data Analytics.

b) Define Tokenization.

c) Define Machine Learning.

d) What is clustering?

e) What is Frequent Itemset?

f) What is data characterization?

g) What is outlier?

h) What is Bag of words?

i) What is Text Analytics?

j) Define Trend Analytics?

Q2) Attempt any FOUR of the following : **[4×2=8]**

a) What is confusion matrix?

b) Define support and confidence in association rule mining.

c) Explain any two Machine Learning (ML) Applications.

d) Write a short note on stop words.

e) Define supervise Learning and unsupervise Learning.

P.T.O.

Q3) Attempt any Two of the following : **[2×4=8]**

a) What is prediction? Explain any one regression model in detail.

b) Differentiate between Stemming and Lemmatization.

c) Describe types of Data Analytics.

Q4) Attempt any TWO of the following : **[2×4=8]**

a) Consider the following transactional database and find out Frequent Itemsets using Apriori algorithm with minimum support count=2

TID	List _ of _ Item_IDs
T_1	I_1, I_2,I_5
T_2	I_2,I_4
T_3	I_2, I_3
T_4	I_1,I_2,I_4
T_5	I_1, I_3
T_6	I_2, I_3
T_7	I_1, I_3
T_8	I_1, I_2, I_3, I_5
T_9	I_1, I_2, I_3

b) Which are the challenges in social media analytics?

c) Explain Reinforcement learning.

Q5) Attempt any ONE of the following : **[1×3=3]**

a) Write a short note on support vector machine.

b) Explain life cycle of Data Analytics.

Total No. of Questions : 5]

SEAT No. :

P5161

[Total No. of Pages : 2

[5823] - 605
T.Y. B.Sc.
COMPUTER SCIENCE
CS - 365 : Object Oriented Programming Using Java - II
(2019 Pattern) (Semester - VI) (CBCS) (Paper - V)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) Attempt any EIGHT of the following. **[8×1=8]**

a) Define map interface.

b) What is use of wait ( )?

c) What is use of get connection ( )?

d) What is scriplet?

e) What is purpose of JSP directives?

f) Define spring framework.

g) Give the name of JDBC API.

h) Define Iterator Interface.

i) What is ArrayList?

j) Define cookie.

Q2) Attempt any FOUR of the following. **[4×2=8]**

a) How to create thread?

b) List JDBC driver.

c) Differentiate between set & list interface.

d) Write any two methods of HTTP_session.

e) What are the applications of spring?

P.T.O.

Q3) Attempt any TWO of the following. **[2×4=8]**

a) Write a JDBC program to accept details of Book (B_id, B_name, B_cost) from user & display it.

b) Write a java program in multithreading to display all the alphabets between 'A' to 'Z'. Each alphabet should display after two seconds.

c) Write a JSP script to check whether given number is perfect or not & display the result in yellow colour.

Q4) Attempt any TWO of the following. **[2×4=8]**

a) Write a servlet program to count the number of times a servlet has been invoked [use cookies].

b) Explain life cycle of thread.

c) Differentiate between statement & prepared statement interface.

Q5) Attempt any ONE of the following. **[1×3=3]**

a) Explain JDBC architecture.

b) Write a java program to accept 'n' numbers from user, store them into LinkedList collection. Display only odd numbers.

Total No. of Questions : 5]

SEAT No. :

P5162

[Total No. of Pages : 3

[5823]-606
T.Y.B.Sc. (Computer Science)
CS-366: COMPILER CONSTRUCTION
(CBCS 2019 Pattern) (Semester-VI)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Figures to the right indicate full marks.***
2) ***All questions are compulsory.***

Q1) Attempt any Eight of the following (out of 10). **[8×1=8]**

a) What is the use of lookahead pointer.

b) State true or false, "Target code is generated in the analysis phase of the compiler".

c) What is the output of LEX program?

d) Terminals can have synthesized attributes, but not inherited attributes. State true or false.

e) Define operand descriptors.

f) State True or False. The yywrap() lex library function by default always return 1.

g) List the two aspects of compilation.

h) List the different types of conflicts that occur in LR parser.

i) What is handle pruning?

j) List the techniques used in code optimization.

P.T.O.

Q2) Attempt any Four of the following (out of 5). **[2×4=8]**

a) Define Annotated Parse tree. Give an example.

b) List and explain in short any two LEX library function.

c) Calculate FIRST and follow for the following.

$S \rightarrow a \mid \hat{} \mid (R)$

$T \rightarrow S, T \mid S$

$R \rightarrow T$

d) Give 2 differences between synthesized and inherited attributes.

e) Compute LEADING and TRAILING symbols of the following grammar.

$E \rightarrow E+T \mid T$

$T \rightarrow T*F \mid F$

$F \rightarrow (E) \mid id$

Q3) Attempt any two of the following (out of 3) **[2×4=8]**

a) Write a RDP parser for the following grammar.

$S \rightarrow aA \mid SbB$

$A \rightarrow aA \mid bB$

$B \rightarrow b$

b) Give difference between single pass compiler & multipass compiler.

c) Check whether the given grammar is LL(1) or not.

$S \rightarrow A$

$A \rightarrow aA \mid Ad$

$B \rightarrow bBc \mid f$

$C \rightarrow g$

Q4) Attempt any Two of the following (out of 3) **[2×4=8]**

a) Check whether the given grammar is SLR(1) or not.

$N \rightarrow V = E \mid E$

$E \rightarrow V$

$V \rightarrow a /* E$

b) Consider the expression $a = b*(-c) + b*(-c)$. Give Triple representation and quadruple representation.

c) Check whether given grammar is operator precedence or not.

$S \rightarrow < L > \mid a$

$L \rightarrow L,S \mid S$

Q5) Attempt any ONE of the following (out of 2) **[3×1=3]**

a) Write a LEX program to find sum of first n numbers.

b) Construct DAG for the following expressions

- b * (a + c) + (a + c) * d

- i = i + 5

Total No. of Questions : 5]

SEAT No. :

P5163

[Total No. of Pages : 2

[5823] - 607
T.Y.B.Sc. (Computer Science)
CS-3610 : SOFTWARE TESTING AND TOOLS
(2019 Credit Pattern) (Semester -VI) (Paper-VII)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to be right indicate full marks.***

Q1) Attempt any EIGHT of the following. (out of ten) **[8×1=8]**

a) Define test case.

b) Define static testing.

c) What is test incident report?

d) What is test plan?

e) What is design defect?

f) McCabe's Cyclomatic complexity defines an lower bound for the number of linearly path through a program. State true of false.

g) Enlist the two open source automation testing tools.

h) What is defect?

i) What is entry criteria?

j) Write two limitation of manual testing.

Q2) Attempt any FOUR of the following. (out of five) **[4×2=8]**

a) Define errors with its different types.

b) Enlist the different types of loop testing.

c) Write objective of writing test cases.

d) What is testing defect? List its different types.

e) Write the name of test automation frameworks.

P.T.O.

Q3) Attempt any TWO of the following. (Out of Three). **[2×4=8]**

a) Define bug and explain bug tracking tools.

b) Explain branch coverage testing with its advantages and disadvantages.

c) Explain IEEE Std. test summary report with its various parameters.

Q4) Attempt any TWO of the following. (out of three) **[2×4=8]**

a) Write a test case for facebook login functionality of the web page application.

b) Consider following code.

```
Input (int x, int y)
{
    int z = ((x+y)/200) * 100;
    If (z>50)
    Printf("PASS");
    Else
    Printf("FAIL");
}
```

Test case 1 : x=20, y = 30, Test case 2: x=100, y=75

Consider above test cases scenarios and find the percentage of statement coverage.

c) Write benefits of automated testing.

Q5) Attempt any ONE of the following. (out of Two). **[3×1=3]**

a) Explain defect life cycle.

b) Write selenium installation steps.