BACHELOR OF COMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

BCA(Revised Syllabus)/ASSIGN/SEMESTER-V

ASSIGNMENTS

(July - 2017 & January - 2018)

(BCS-051, BCS-052, BCS-053, BCS-054, BCS-055

BCSL-056, BCSL-057, BCSL-058)

SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.

2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to BCA Programme Guide.

3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the BCA Programme Guide.

Course Code	:	**BCS-051**
Course Title	:	**Introduction to Software Engineering**
Assignment Number	:	**BCA(5)/051/Assignment/17-18**
Maximum Marks	:	**100**
Weightage	:	**25%**
Last Dates for Submission	:	**15th October, 2017 (For July 2017 Session)**
	:	**15th April, 2018 (For January 2018 Session)**

This assignment has three questions carrying a total of 80 marks. Answer all the questions. Rest 20 marks are for viva-voce. You may use illustrations and diagrams to enhance explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

1. Develop SRS as per IEEE standard for Grade Card Generation System. *(30 Marks)* Make assumptions wherever necessary.

2. Develop Design Document for the System mentioned in Question no.1   *(30 Marks)*

3. What is meant by Verification? How does it differ from Validation?   *(20 Marks)*

There are four questions in this assignment, which carries 80 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

1. (a) Describe the activities to be performed at every layer in the TCP/IP *(10 Marks)* model when information flows from layer to another layer.

    (b) Explain the difference between a port address, a logical address (IP *(6 Marks)* address) and a physical address. Also, write the uses of each in socket programming.

    (c) Explain the importance of three-way handshake method for connection *(4 Marks)* establishment in TCP/IP with the help of suitable diagram

2. (a) How does TCP handle the flow control problem? Explain it with the *(8 Marks)* help of a diagram showing the status of sliding window at the different stages

    (b) Write a TCP client and TCP server program in C language on *(12 Marks)* Unix/Linux platform, where client program interact with the Server as given the client begins by sending a list of numbers; the server sends back a confirmation and smallest number from the given list to the respective client.

3. (a) List and describe all elementary socket systems calls and data transfer *(6 Marks)* calls.

    (b) Explain the connection oriented & connection less services using bind, *(6 Marks)* connect, listen & accept system calls.

    (c) Discuss the functions of Disk Management. Also, list the tasks those *(8 Marks)* are important for secure disk management.

4. (a) Differentiate between Socket and Server Socket class. Illustrate the use *(6 Marks)* of Socket and Server Socket class with the help of an example.

    (b) Explain the working of DHCP. Also, write step by step procedure to *(8 Marks)* configure DHCP.

(c)   Explain different types of messages used by ICMP to notify the sender *(6 Marks)*
      of IP datagram about abnormal events.

Course Code	:	**BCS-53**
Course Title	:	**Web Programming**
Assignment Number	:	**BCA(5)/53/Assignment/17-18**
Maximum Marks	:	**100**
Last Date of Submission	:	**15th October, 2017(For July Session)**
	:	**15th April, 2018 (For January Session)**

This assignment has two questions of 80 marks. Answer all the questions. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Please give precise answers. The word limit for each part is 300 words.

(Covers Block 1)

1. (a) What is Web 2.0? Explain differences of Web 2.0 with Web 1.0 by taking the example of a University website. Also explain the term web services in the context of web 2.0. *(6 Marks)*

    (b) Create a simple examination form consisting of the following information – Enrolment Number of the student (to be validated), Name of the student, programme code (from a drop down list), date of birth of the student, email ID (it should be validated), list of courses for whom student wants to appear for the examination, and a SUBMITFORM button. You must create a CSS file for this form. This CSS file should format font, font size, font colour and background colour of the Form. *(6 Marks)*

    (c) Create a simple web page using HTML5 consisting of two paragraphs about your education and work experience respectively. Both the paragraphs should be created in different divisions and must use tables. You must also create an external CSS file which ensures the following: *(6 Marks)*
      (i) The table in first paragraph should have proper borders and every row of table should have different fill colour. The background of this paragraph should be light blue.
      (ii) The second paragraph table should NOT have any border, but every cell of the table should have different fill colour.
      (iii) Each table must have a proper heading. The format of the heading should be same in both the tables.
      Demonstrate how change in CSS can change the display.

    (d) An e-commerce website maintains the addresses of its customers using XML. Every customer is asked two different addresses – Present address and Address for delivery of specified product. Every customer is identified by a unique Customer ID. Both the addresses include optional fields including house number, apartment, Street number, locality, town etc. and compulsory fields like City, State, and Pin code. *(8 Marks)*

Create an XML documents containing information of five customers. Also create the DTD for the XML document.

(8 Marks)

(e) Write a JavaScript code that shows time on the screen in the following format. The program updates the time on completion of every 5 minutes.

For example, if the current time is 10:45 a.m. the on screen time will be shown as:

"**The Time is 10 hours 45 minutes (a.m.)**".
Make suitable assumptions, if any.

(f) Explain the concept of events in the context of WML with the help of *(6 Marks)* an example.

(Covers Block 2) *(10×4=40 Marks)*

2. (a) What is the need of server side scripting? Explain with the help of an example. List any two tools that may be used for server side scripting. What is meant by HTTP methods? Explain the use of GET and POST methods with the help of an example each. Which of these methods is considered safe? Give reason in support of your answer.

(b) Explain the following in the context of JSP with the help of an example.
   (i)   JSP life cycle
   (ii) include and taglib directives
   (iii) Declarations, expression in scripting elements
   (iv) <jsp:forward>
   (v)   Implicit Objects

(c) Explain the concepts of error handling and cookies in the context of JSP with the help of examples. Create a simple form which takes two input – enrolment number and programme code of a student. Write JSP code/Servlet which verifies this information from a database and display suitable error message if the information does not match.

(d) A University stores attendance information of its student in a database for various subjects. The table storing this information includes fields for enrolment number, subject code, number of days student was present, total number of days for which classes were held for that subject. Write a program using JSP which creates subject wise list of students who have less than 70% attendance. Make and state suitable assumptions, if any.

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Course Code	:	**BCS-054**
Course Title	:	**Computer Oriented Numerical Techniques**
Assignment Number	:	**BCA(5)/054/Assignment/17-18**
Maximum Marks	:	**100**
Weightage	:	**25%**
Last Dates for Submission	:	**15th October, 2017(For July Session)**
	:	**15th April, 2018 (For January Session)**

This assignment has eight questions of total 80 marks. Answer all the questions. 20 marks are for viva voce. You may use illustrations and diagrams to enhance explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Illustrations/ examples, where-ever required, should be different from those given in the course material. You must use only simple calculator to perform the calculations.

1. (a) Consider that you are using the eight-decimal digit floating point *(3 Marks)* representation as given in your Block 1, Unit 1, Section 1.3.1 page 29. Perform the following operations:
   (i) Represent 5165485686 and 343456765 as floating point numbers using Rounding in normalised form.
   (ii) Given the above two numbers what is the absolute and relative error in their representation.
   (iii) Subtract the two numbers. What is the error in the resulting number?
   (iv) Divide the first number by the second number. Convert the result into normalized form in the given format.
   (v) Take the first number as 5165485686 and assume any second number to demonstrate the concepts of overflow and underflow for the given representation. (You may assume different second number and different operation for overflow and underflow).
   (vi) Define the concept of binary floating point numbers with the help of an example.

   (b) Consider the following two equations: *(2 Marks)*
   $x + y = 4$
   $0.499 x + 0.501 y = 2$
   Does the problem of solving the above two equations can be categorised as Ill-conditioned? Justify your answer.

   (c) Find the Maclaurin series for calculating cosine x. Use first four terms of *(3 Marks)* this series to calculate the value of cosine of any value of x. Also find the bounds of truncation error for such cases.

   (d) Obtain Approximate the value of $(0.99)^{-1}$ using first four terms of *(2 Marks)* Taylor's series expansion.

2. (a) Solve the system of equations *(5 Marks)*
$$2x + y + z = 3$$
$$x + 3y + 3z = 4$$
$$x - 4y + 2z = 9$$
using Gauss elimination method with **partial pivoting**. Show all the steps.

(b) Perform four iterations (rounded to four decimal places) using *(5 Marks)*
(i) Jacobi Method and
(ii) Gauss-Seidel method ,
for the following system of equations.

$$\begin{bmatrix} 5 & 4 & -3 \\ 4 & -4 & 3 \\ -1 & 2 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ 5 \\ -4 \end{bmatrix}$$

With $\mathbf{x}^{(0)} = (0, 0, 0)^T$. The exact solution is $(1, -4, -5)^T$.

Which method gives better approximation to the exact solution?

3. Determine the smallest positive root of the following equation: *(10 Marks)*
$$f(x) \equiv x^3 - 9x^2 - x + 9 = 0$$
to three significant digits using
(a) Regula-falsi method (b) Newton-Raphson method (c) Bisection method (d) Secant method

4. (a) Find Lagrange's interpolating polynomial for the following data. Hence *(5 Marks)* obtain the value of f(4).

x	0	2	3	5
f(x)	2	11	21	121

(b) Using the inverse Lagrange's interpolation, find the value of x when y=3 *(5 Marks)* for the following data:

x	25	35	55	75
y=f(x)	-2	-1	1	5

5. (a) The population of a country for the last 25 years is given in the following *(3+2+3 = 8 marks)* table:.

Year (x)   : 1995 2000 2005 2010 2015
Population in lakhs (y): 678   1205 1855 2745 3403

(i) Using Stirling's central difference formula, estimate the population for the year 2007

(ii) Using Newton's forward formula, estimate the population for the year 1998.

(iii) Using Newton's backward formula, estimate the population for the year 2013.

(b)   Derive the relationship for the operators δ in terms of E.   *(2 Marks)*

6. (a)   Find the values of the first and second derivatives of y = f(x) for x=2.1   *(5 Marks)*
          using the   following table. Use forward difference method. Also, find
          Truncation Error (TE) and actual errors.

x	:	2	2.5	3	3.5
y	:	8.7	12.7	16.8	20.9

(b)   Find the values of the first and second derivatives of y = f(x) for x=2.1   *(5 Marks)*
      from the   following table using Lagrange's interpolation formula.
      Compare the results with (a) part above.

x	:	2	2.5	3	3.5
y	:	8.7	12.7	16.8	20.9

7.   Compute the value of the integral   *(10 Marks)*

$$\int_0^8 (4\,x^4 + 5x^3 + 6x + 5)\ dx$$

          By taking 8 equal subintervals using (a) Trapezoidal Rule and then
          (b) Simpson's 1/3 Rule. Compare the result with the actual value.

8. (a)   Solve the Initial Value Problem, using Euler's Method for the differential   *(4 Marks)*
          Equation:

$$y' = 1 + x^2 y, \text{ given that } y(0) = 1.$$

          Find y(1.0) taking (i) h = 0.2 and then (ii) h = 0.1

(b)   Solve the following Initial Value Problem using (i)R-K method of $O(h^2)$ *(6 Marks)*
      and (ii) R-K method of $O(h^4)$

$$y' = xy + y^2 \text{ and } y(0) = 0.$$

      Find y(0.4) taking h = 0.2, where y' means dy/dx

Course Code	:	**BCS-055**
Course Title	:	**Business Communication**
Assignment Number	:	**BCS(5)/055/Assignment/17-18**
Maximum Marks	:	**100**
Weightage	:	**25%**
Last date of submission	:	**15ᵗʰ October, 2017 (For July 2017 Session)**
	:	**15ᵗʰ April, 2018 (For January 2018 Session)**

This assignment has seven questions. Answer all questions. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation of assignment.

1.   Read the guidelines given for responding to an advertisement:

Thousands of employers use classified ads as a means to advertise vacancies and even more people respond to these ads, but only a few applicants ever get a positive response. You may think, so why bother with these ads? If you consider the competition for one job, it may seem a futile operation, but there are a few secrets for responding to job ads and if you make use of these tips, your chances of landing the job increases tremendously.

Benefits of responding to job ads
The job ads are the ideal place to find a comprehensive directory of businesses that are looking for employees. There is normally a bit of information about the company and the best of all - you get an idea of what the companies are looking for, what they expect, and in some cases, what they are willing to pay.

How to use the classified ads
It is better not to look for entry level jobs since these types of ads will be in the minority, rather scan the ads to find who is hiring and where possible, to find the names of the recruitment officers.

Step 1: Select the advertising vehicle
Subscribe or purchase newspapers that run job ads for the area where you would like to locate a job as well as any national papers or magazines that focus on your particular job industry. Make a list of Internet sites that run classified job ads and browse them regularly as well.

Step 2: The scanning process
If you are a beginner, mark the entry level jobs and respond to them first. You should be prepared to be at the Company first thing in the morning. You secondly, must also mark entry level openings in other job fields. They may not directly apply to you, but it indicates that the enterprise is willing to employ at the entry level.

Thirdly, scan the ads that indicate that experience and higher qualifications are needed. Even though you won't get the advertised job, you get valuable information such as who the manager is, the name of the recruitment officer, and the types of job responsibilities that you can expect.

Step 3 Make a list
Before you start responding to job ads, you need to make a list of all the relevant hiring Companies and the positions advertised.

1a   What kind of information does one get from these classified advertisements?   *(2 Marks)*

1b   Where would you find classified advertisements? List them.   *(2 Marks)*

1c   Why do we call a newspaper an advertising vehicle?   *(2 Marks)*

1d   Why must one scan jobs that require 'experience' and 'higher qualifications'?   *(2 Marks)*

1e   Describe the steps that are necessary when responding to a job. Why?   *(4 Marks)*

1f   Pick out the words from the passage which mean the opposite of the following words: *(5 Marks)*

negative -   para 1,   majority -   para 3,
slightly -   para 1,   veteran -   para 5,
limited -   para 2

1g   Make sentences with the following words/phrases from the passage: *(3 Marks)*

respond, subscribe, valuable information

2.   (a)   Write a letter to a friend about your new job. Talk about the type of work that you do and the experience that you derive from it. Also talk about your colleagues. Write in about 150 words.   *(10 Marks)*

(b)   Write a letter complaining about the in-efficient bus service which you use every day to get to work. Explain the inconveniences that you and others have to put up with and suggest ways to improving the services.   *(10 Marks)*

3.   (a)   Fill in the blanks with *a/ an, the* or *no* article: *(10 Marks)*

The larger ………. meeting, the more difficult it becomes to reach at ………..decision. ………..ideal size of ………..meeting depends on ………. purpose of ………..meeting. If ………. meeting has been called to give ………. information to the members, views of the participants do not matter. But if ………. meeting has been called to take ………. decision on any topic, it is advisable to call just few individuals for it.

(b)   Make negatives of the following sentences using *not*:   *(5 Marks)*

i   Vinay opened the door.

ii　You should reply to her letter.

iii　She is writing a novel these days.

iv　He works every Sunday.

v　Subhash became a dentist.

(c)　Fill in the blanks in the following sentences with an appropriate phrasal *(5 Marks)* verbs from those given below (there are two extra phrasal verbs). Make changes in the form of the verb, where necessary.

go off,　go with,　break into,　run into,　run down,　look after,　go for

i　The colour of the curtain ……….. the colour of the wall.
ii　The fireworks ……….. in a cascade of colour.
iii　The thief ……….. the house last night.
iv　I ……….. an old friend at the library.
v　She ……….. her elderly parents very tenderly.

4.　Write short notes on the following:　*(20 Marks)*

i　Small talk in business communication
ii　Preparing for an interview
iii　The importance of understanding different cultures
iv　Difference styles of communication

5.　Your company is about to begin planning a major renovation and *(20 Marks)* remodeling of one of its buildings. You believe this would be an ideal opportunity to investigate solar heating applications and see if they will save money. Do the necessary research and then write a proposal that recommends that the company investigate using solar energy in its remodeling plans.

Course Code	:	**BCSL-056**
Course Title	:	**Network Programming and Administration Lab**
Assignment Number	:	**BCA(5)/L-056/Assignment/17-18**
Maximum Marks	:	**50**
Weightage	:	**25%**
Last date of Submission	:	**15ᵗʰ October, 2017 (For July 2017 Session)**
	:	**15ᵗʰ April, 2018 (For January 2018 Session)**

Note: This assignment has two questions. Answer all the questions. These questions carry 40 marks. Rest 10 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Make suitable assumption is necessary.

1. Write a TCP client and TCP server program in C language on *(20 Marks)* Unix/Linux, where client program interact with the Server as given below:
   - The client begins by sending a number to the server.
   - Server program will check whether number is a prime number or not.
   - In case of number is Prime number: The server sends a message "Successful Attempt" to the respective client.
   - In case of number is not a Prime number: The server sends a message "Unsuccessful Attempt, Please try again" to the respective client.
   - This TCP Server can handle maximum 4 client concurrently..

2. (a) Write the step by step procedure to customize and configure IPsec *(10 Marks)* policy and rules for transport mode on the local computer.

   (b) Configure a remote server and transfer a Directory to Remote Server. *(10 Marks)*

Course Code	:	**BCSL-057**
Course Title	:	**Web Programming Lab**
Assignment Number	:	**BCA(5)/L-057/Assignment/17-18**
Maximum Marks	:	**50**
Weightage	:	**25%**
Last Dates for Submission	:	**15th October, 2017(For July Session)**
	:	**15th April, 2018 (For January Session)**

This assignment has one question of 40 marks. Rest 10 marks are for viva voce. Please go through the guidelines regarding assignments given in the programme guide for the format of presentation.

Question 1

Create a website for a Bank which offers online services on Savings Accounts. The website uses divisions and an external CSS file. Every page of the website is divided into four divisions namely – HEADER, FOOTER, LINK and DISPLAY as displayed in the following figure:
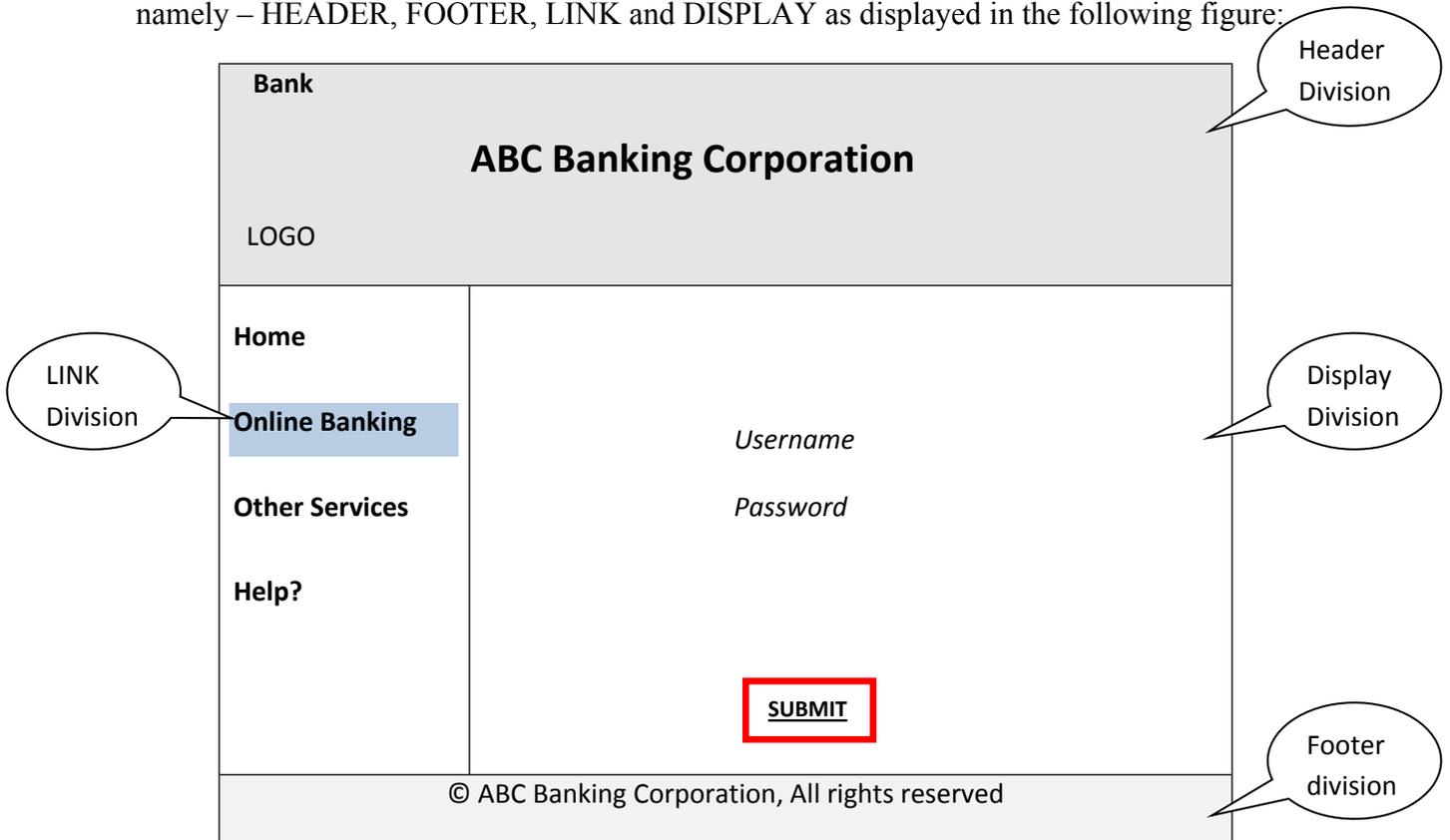
Perform the following tasks for the website as given above:

(a) Create four pages for the website viz Home, Online Banking, Other Services   *(12 Marks)*
    and Help; all the four pages should have same Header, Footer and Link

division but different Display division. The Link division should be linked to these pages. The **Display division** of the four pages should display information as given below:

(i)   The Home page should display a Welcome message from the CEO of the Bank.

(ii) The Online Banking page should display a form for logging into Online Banking.

(iii) The Other Services should list at least four other services offered by the Bank. This page should be properly structured.

(iv) The Help page should show the site map of the website

(b) Create an external CSS that give different background colour to each area. You may choose the format of other elements as per your choice. *(5 Marks)*

(c) Create a JavaScript program that checks if *username* field is left blank in Online Banking form or the length of string filled up in *Password* field is less than 4 character long when the user clicks Submit button, if so an error message is displayed and the user is taken back to Online Banking page. *(5 Marks)*

(d) You must implement the following using jsp servlets, java classes, database(s), etc. *(6X3=18 Marks)*

(i)   If a user presses Submit button in Online Banking form after filling both *username* and *password*, then this information should be checked from the Bank users table in the database having similar structure (you must create this table as well as create some data against which you check an online banking logging). On successful login the *Other Services* page may be displayed.

(ii) When you select *other services* page, it should display list of four services and list of requirements for the first service in a table.

(iii) In addition to site map, the Help page should draw information from a database. This database should have a table containing fields – keyword, topic number, section number etc. You may make suitable assumptions for this page.

Course Code	:	BCSL-058
Course Title	:	**Computer oriented Numerical techniques Lab**
Assignment Number	:	**BCA(5)/L-058/Assignment/17-18**
Maximum Marks	:	**50**
Weightage	:	**25%**
Last Dates for Submission	:	**15th October, 2017 (For July Session)**
	:	**15th April, 2018 (For January Session)**

This assignment has eight problems of 40 marks, each of 5 marks. All problems are compulsory. 10 marks are for viva voce. Please go through the guidelines regarding assignments given in the programme guide for the format of presentation.

1. Write a program that implements (Do not use pivot condensation) Gaussian elimination method for solving n linear equations in n variables, that calls procedures *(5 Marks)*
   (i) Exchange of rows
   (ii) lower-triangularisation and
   (iii) back substitutions
       (*codes of procedures are also to be written*).

   Use the program for solving the following system of linear equations:
   $2x+ y+z= 7$
   $3x+ 2y+3z=16$
   $4x+5y+ 3z =23$

2. Write a program that uses **Gauss-Seidal iterative method** to solve system of linear equations. Use the method to solve the system of linear equations given in Q. No. 1 above. *(5 Marks)*

3. Write a program that approximates a root of the equation $f(x) = 0$ in an interval [a, b] using **Newton-Raphson method**. The necessary assumptions for application of this method should be explicitly mentioned. Use the method to find one root of the equation *(5 Marks)*
   $x^3 + 4x^2 - 19=0$.

4. Write a program that uses Lagrangian polynomials for interpolation. You must use only three nodes such that the interpolating polynomial is at most quadratic. Using this program to find approximate value of $f(x) = x^2$ at x=0.5. The nodes given may be assumed as $x_0 = 0$, $x_1 = 1$, $x_2 = 2$. *(5 Marks)*

5. Repeat Problem No. 4 using Newton's Interpolating polynomial (instead of Lagrangian Polynomial). *(5 Marks)*

6. Write a program that approximates the derivative of a given (differentiable) function $f(x)$ at $x = x_0$, using backward–difference formula. Using the program find the derivative of function f(x)=log x at x=1 *(5 Marks)*

7.   Write a program that approximates the value of a definite integral *(5 Marks)*
$\int_a^b f(x)dx$ using **Simpson 1/3 Rule**, with M sample points. Find an
approximate value of the integral of $2\ x^{3/2}$ using the program with 8 intervals
over the interval [1, 9].

8.   Write a program that approximates the solution of the initial value problem: *(5 Marks)*
$y' = f(t,y)$ with $y(a) = y_0$ over $[a,b]$ using **Euler's method**. Using the
program to approximate the solution of the initial value problem:
$$y^1 = -2xy \quad \text{with} \quad y(0) = 1$$