

15/10/22

SKM's J. M. PATEL COLLEGE OF COMMERCE, GOREGAON (W), MUMBAI-90

ATKT EXAMINATION – OCTOBER 2022

TIME: 2 Hr 30 min  
PROGRAMME: F.Y.BSc.IT / SEM – II

MARKS: 75  
COURSE: Web Programming

- N.B.: (1) All questions are compulsory.  
(2) Make suitable assumptions wherever necessary and state the assumptions made.  
(3) Answers to the same question must be written together.  
(4) Numbers to the right indicate marks.  
(5) Draw neat labelled diagrams wherever necessary.

Q 1. Attempt any three of the following.

15 M

- 1) What is Search Engine? Explain its working.
- 2) What is browser? List major browsers and explain in detail.
- 3) Write short note on DNS and IP address.
- 4) Write HTML program to demonstrate the use of external and internal CSS.
- 5) Write html code to design the following web page.

A. Scripting Language

- i. VB SCRIPT
- ii. JAVA SCRIPT

B. DBMS

- ORACLE
- MY SQL

- 6) What is hyperlink? How it is created in HTML? Give example.

Q 2. Attempt any three of the following.

15 M

- 1) Write the purpose of using: Rospan, Colspan, Cellspacing, Cellpadding in table tag. Give example.
- 2) Explain the audio tag with all its attributes.
- 3) Design HTML page with client-side image map having clickable areas of shapes – rectangle, polygon and circle.
- 4) How are the following controls created on a form -password field, checkbox, radio button, submit button, list box.
- 5) Explain the following tags with example.  
i) heading    ii) <U>    iii) <figcaption>    iv) <HR>    v) <PRE>
- 6) Explain the <embed> tag with all its attributes.

Q 3. Attempt any three of the following.

15 M

- 1) Explain the following operators of JavaScript.  
i) new      ii) delete      iii) this      iv) void      v) , (comma)
- 2) Explain the following methods of Math object with example- ceil(), max(), random(), round(), sqrt().
- 3) Define event? List and explain various types of keyboard and click events.
- 4) Write a JavaScript program to accept a number from the user and display sum of its digits.
- 5) Differentiate between Client-side and server-side JavaScript.
- 6) What are conditional statements? Demonstrate the use of different conditional statement.

Q 4. Attempt any three of the following.

15 M

- 1) Explain with example Arithmetic and Logical operators used in PHP.
- 2) Write a PHP program to accept a number from the user and print whether it is prime or not.
- 3) Explain the different data types in PHP.
- 4) Explain the following string functions with example:  
i) lcfirst()      ii) str\_shuffle()      iii) strrev()      iv) str\_replace()      v) substr()
- 5) Explain different types of arrays available in PHP.
- 6) Write a short note on functions in PHP and variables in PHP.

Q 5. Attempt any three of the following.

15 M

- 1) How to start and destroy session and how to store a session variable in PHP. Explain.
- 2) Write short note on regular expression in PHP.
- 3) Write a PHP code to create a database "Company", to create a table "Employee" (emp\_id, emp\_name, emp\_dept, emp\_salary) and insert at least three entries.
- 4) Write a short note on cookies in PHP.
- 5) Explain any five PHP/MYSQL functions with example.
- 6) Write a PHP program to accept Roll no., student name, age, percentage from the user and save the values in table student (rno, sname, sage, percentage) in Database College.

\*\*\*\*\* All the Best \*\*\*\*\*

14/10/22

Subject: MICROPROCESSOR ARCHITECTURE  
APER TIME: 120 MINUTES

MAX MARKS: 75

**Instructions-**

Answer all questions.

ATTEMPT any 3 subquestions

Each question 5 marks.

Q-1 Attempt any three

- a. With suitable diagram, explain how the Address/Data bus (AD0-AD7) of 8085 microprocessor is de-multiplexed.
- b. Differentiate between memory mapped I/O and I/O mapped I/O.
- c. What is an assembler directive? Which assembler directives are used to define a procedure and a macro? How is a macro different from a procedure?
- d. What is the difference between Mode 0, Mode 1 and Mode 2 operations of 8255?
- e. What are vectored interrupts? How is the address of the Interrupt Service routine calculated in vectored interrupts? Explain with an example.

Q-2 Attempt any three

- a. Differentiate between partial and absolute address decoding. Give an example
- b. Draw the architectural diagram of 8085 microprocessor and list out the following
  - (i) General Purpose Registers
  - (ii) Special Purpose registers with their functions
  - (iii) Flags in the flag register with required explanation
- c. Explain the purpose of the following signals in 8085
  - (i) READY
  - (ii) AD<sub>0</sub>-AD<sub>7</sub>
  - (iii) HOLD
  - (iv) IO/ M
  - (v) INTR
- d. Design a memory system for 8085 such that it should contain 2KB of EPROM and 2 KB of RAM with starting address 0000H and 6000H
- e. Differentiate between Flag and general purpose registers.

Q-3 Attempt any three

- a. Draw the timing diagram of a memory read bus cycle. Suppose the READY signal becomes low at the middle of second T state. Draw the timing diagram for the modified memory read bus cycle.
- b. Explain the memory organization of 8086 microprocessor. Draw the timing diagram of a typical memory write machine cycle.
- c. Draw and explain the architectural diagram of 8086 microprocessor
- d. Suppose [AX] = 85H and [BX] = 64H, [SP] = 2000H. What will be the value of AX, BX and SP

after the following set of instructions are executed?

(i) PUSH AX      b. POP BX

e. 10 numbers are stored from location 1000 onwards. Write an assembly language program to find the average of these.

**Q-4** Attempt any three

- a. With suitable diagram, explain how the Priority Interrupt controller with 8085
- b. Draw and explain the block diagram of 8254 software programmable timer. Explain how the GATE input controls its operation in any two modes of operation.
- c. What is DMA? Which hardware pins are used for DMA control? Draw and explain the architecture of 8237 DMA controller.
- d. What is the advantage of using 8279 for keyboard/display interface?
- e. What are scanlines used for. Explain its following modes of operations
  - (i) Encoded Scan Mode
  - (ii) Decoded scan mode

**Q-5** Attempt any three

- a. What is an addressing mode? With suitable example, explain any 4 addressing modes in 8085
- b. Explain the operation of the DIV instruction. What is the difference between DIV and IDIV
- c. Explain Seven segment display with microprocessor.
- d. compare and contrast between microprocessor and controller
- e. Explain Application (any five) based on micro controller

SKM'S J. M. PATEL COLLEGE OF COMMERCE  
SEMSTER END REGULAR EXAMINATION, APRIL-2023

Class : FYBSc.I.T Course : Fundamentals of Micro Processors & Controllers  
Semester: II Total Marks : 75 Duration : 2 hrs 30 mins.

**Q-1 Attempt any three** **15M**

- a. Draw a neat, labelled pin diagram of 8085 Micro Processor.
- b. What is meant by Read Only Memory? Explain its various types.
- c. Write a short note on following:
  - i. Micro computer
  - ii. Micro controller
- d. What is meant by Computer Bus? Explain its different types.
- e. Explain different types of RAM (Random Access Memory).
- f. Write a short note on Input Output Devices of Microcomputer.

**Q-2 Attempt any three** **15M**

- a. Explain following instruction with demonstration.
  - I. ADI
  - II. LHL D
- b. Write a short note on Data transfer set of micro instruction set.
- c. Write an assembly program to store summation of numeric value stored in memory location D000 & D001 in D002.
- d. What is meant by flag registers? Explain it with diagram.
- e. Explain important of place / label assigning techniques used in assembly program with demonstration.
- f. Write a short note on following instruction used in assembly program.
  - I. JZ
  - II. JPE

**Q-3 Attempt any three** **15M**

- a. Explain how loop counter mechanism can be carried out in assembly program.
- b. Explain Buses and Control Signals with reference to timing diagram.
- c. Write an assembly program to store count of odd and even numbers in range of stored in memory allocation D000 to D009 in memory location E000 to E009.
- d. Explain Various statements which are used for rotating operation.
- e. Write a short note on "logical operation set" of Microprocessor instruction set.
- f. Explain difference between jumps and call instruction.

**Q-4 Attempt any three** **15M**

- a. Write a Binary to BCD Conversion Algorithm.
- b. Explain BCD Subtraction using 9's Complement in brief.
- c. Write a short note on how delay loop can be executed in assembly program.
- d. Write a short note on Timing control mechanism for bus and control signal with Diagram.
- e. Write an algorithm for BCD addition of eight bits numbers.
- f. Write a short note on interrupt and interrupt service routing with reference to 8085 microprocessor / controller.

**Q-5 Attempt any three** **15M**

- a. Explain different registers available in Pentium processor.
- b. Explain Arithmetic instruction of Pentium processor with demonstration.
- c. Explain jumping takes place during the execution of assembly program based on signed comparison.
- d. Explain how indirect procedure call takes place in assembly program of Pentium processor.
- e. Explain architecture of SUN SPARC Microprocessor in detail.
- f. Write a short note on Performance of Pentium Pro microprocessor and its available models.

**Program: FYB.Sc.IT**

**Marks: 75**

**Course: Object Oriented Programming with C++**

**Duration: 2<sup>1/2</sup> Hrs.**

**Semester: II**

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- Note: 1. All questions are compulsory.  
2. Figures to the right indicates full marks.  
3. Answer to the same question must be written together.  
4. Make suitable assumption wherever necessary and state the assumption mode.

- 1. Attempt any three of the following** **(5\*3=15M)**
  - A. Explain new and delete operators
  - B. Explain advantages of C++
  - C. Explain If condition with its types.
  - D. Differentiate between Object oriented and Procedure oriented programming.
  - E. Write a short note on C++ Tokens
  - F. Write a short note on scope resolution operators.
  
- 2. Attempt any three of the following** **(5\*3=15M)**
  - A. Explain Friend function with example.
  - B. Write a short note on Recursion.
  - C. Explain Constructor with its type.
  - D. Explain Inline function.
  - E. Explain static data member and static member function using example.
  - F. Explain the concept of Operator overloading with example.
  
- 3. Attempt any three of the following** **(5\*3=15M)**
  - A. Explain Hierarchical Inheritance with help of a program.
  - B. Explain the concept of this pointer with an example.
  - C. Write a short note on Virtual Base Class.
  - D. What are the pure virtual functions? Explain with the help of program.
  - E. Explain Single inheritance in C++.
  - F. What are Manipulators? List the various predefined manipulators supported by C++ I/O Streams.
  
- 4. Attempt any three of the following** **(5\*3=15M)**
  - A. Explain Exception Handling Mechanism.
  - B. Explain Unformatted Input/Output.
  - C. Write a short note on File opening modes.
  - D. Explain Command line argument in detail.
  - E. Write a short note on Random Access in files.
  - F. Explain Function Templates with Multiple parameters.
  
- 5. Attempt any three of the following** **(5\*3=15M)**
  - A. What is an Iterator? Explain with its types.
  - B. Explain Functions objects in detail.
  - C. Write a program to Swap the contents of two strings using swap ().
  - D. What is Namespace Scope? How to define a Namespace? Give an example.
  - E. Write a short note on Components of STL.
  - F. How are string objects created? Also give an example.

11/04/23

**SKM's J. M. PATEL COLLEGE OF COMMERCE, GOREGAON (W), MUMBAI-90**  
**REGULAR EXAMINATION – APRIL 2023**

TIME: 2 Hr 30 min

PROGRAMME: F.Y.BSc.IT / SEM – II

COURSE: Web Applications Development

MARKS: 75

- N.B.: (1) **All** questions are **compulsory**.  
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.  
(3) Answers to the **same question** must be **written together**.  
(4) Numbers to the **right** indicate **marks**.  
(5) Draw neat **labelled diagrams** wherever **necessary**.

Q 1. Attempt **any three** of the following.

15 M

- What is Internet? Explain applications of internet.
- What is browser? List major browsers and explain in detail.
- Write short note on DNS and IP address.
- Write HTML program to demonstrate the use of external and internal CSS.
- Write html code to design the following web page.

**A nested List:**

- Coffee
- Tea
  - Black tea
  - Green tea
- Milk

- What is hyperlink? How it is created in HTML? Give example.

Q 2. Attempt **any three** of the following.

15 M

- Explain different tags and attributes used for Image Mapping. Give Example.
- Explain following tags with example:  
i) <I>                      ii) <Sup>    iii) <BR>    iv) <HR>    v) <Blockquote>
- Explain the audio tag with all its attributes. Give Example.
- Write HTML code for creating a table with 3 rows and 2 columns with border effects and foreground & background color effects. (use CSS)
- Write a program to demonstrate the use of inline frame.
- Write html code to design the following web page.

The image shows a registration form with the following fields and controls:

- Surname:
- Middlename:
- Firstname:
- Course:
- Gender:
  - Male
  - Female
  - Other
- Phone:
- Address:
- Email:
- Password:
- Re-type Password:
- 

Q 3. Attempt ***any three*** of the following.

15 M

- Write a JavaScript program to accept a number from the user and display sum of its digits.
- Explain the different conditional statements available in JavaScript.
- Define event? List and explain various types of keyboard events.
- List and explain the methods of String object of JavaScript.
- Explain with example Assignment and Comparison operators used in JavaScript.
- Write the code to design following web page and validate all the controls placed on the form using JavaScript as given: name should not be blank, check email id is valid, check Pin code is 6 digit long:

Name:

Email-id:

Pin code:



Q 4. Attempt ***any three*** of the following.

**15 M**

- a) What are different types of looping statements used in PHP. Explain with example.
- b) Explain the different types of arrays in PHP.
- c) Write a PHP Program to accept a number from the user and print its factorial.
- d) Explain superglobals in PHP.
- e) Write a short note on functions in PHP and variables in PHP.
- f) Write a PHP program to find greatest of two numbers. Accept input from user.

Q 5. Attempt ***any three*** of the following.

**15 M**

- a) Write a PHP code to create: Create a database College, Create a table Department (Dname, Dno, Number\_Of\_faculty) and insert three values on the table.
- b) Explain any five PHP/MYSQL functions with example.
- c) Design a PHP page for authenticating a user.
- d) Write a PHP program to create a cookie using PHP and retrieve its value.
- e) Write a short note on sessions in PHP.
- f) Explain the following in MySQL: Create table, Insert values in table, delete values from table.

\*\*\*\*\* All the Best \*\*\*\*\*

13104/28

SKM's J. M. Patel College of Commerce, Goregaon, Mumbai  
Semester -End & ATKT Examination – April 2023

Program: FYB.Sc.IT  
Course: Green IT  
Semester: II

Marks: 75  
Duration: 2<sup>1/2</sup> Hrs.

- Note:**
1. All questions are compulsory.
  2. Figures to right indicate full marks.
  3. Answer to same questions must be written together.
  4. Make Suitable assumption wherever necessary and state the assumptions made.

**Q.1. Attempt any 3 among the following.**

[15 M]

1. Explain the term Green Computing. Explain various pathways for Green IT.
2. What are the four major steps of measuring carbon footprint?
3. Write a Short note on Equipment disposal.
4. Short note on RoHS, REACH.
5. Explain Green Building standards.
6. Explain the factors for measuring the Effectiveness of Regulatory or Non-Regulatory Approaches.

**Q.2. Attempt any 3 among the following.**

[15 M]

1. Define the following terms i) Green drive ii) MAID iii) RAID iv) Virtualization v) Data de-Duplication.
2. Explain net-metering.
3. List and explain the various low-cost solutions for checking power on your workstations.
4. What are the causes of cost of power?
5. Explain how are cooling needs calculated?
6. What are the ways to prevent recirculation of equipment exhaust?

**Q.3. Attempt any 3 among the following.**

[15 M]

1. What is Green software? Explain benefits of Green Software.
2. Short note on green data storage.
3. What is Telecommuting? Explain benefits of telecommuting.
4. How to select proper service provider as per need?
5. What are the benefits of having paperless office?
6. What is EDI and explain the advantages of using EDI?

**Q.4. Attempt any 3 among the following.**

[15 M]

1. Describe the term Cradle to Grave.
2. What are the different ways to clean the hard drive? Explain any two?
3. What are the problems related to E-waste.
4. What are the different types of certification program? Explain any two in detail.
5. Write short note on Blade server along with its advantages?
6. What are the advantages and disadvantages of having thin client?

**Q.5. Attempt any 3 among the following.**

[15 M]

1. Explain the following terms i) Datacenter Efficiency (DCE) ii) Power Usage Effectiveness (PUE) iii) CPU Utilization iv) Data Center density v) Storage Utilization
2. Explain the characteristics of SaaS.
3. Discuss in brief green procurement and its process.
4. What do you understand by SMART Goals?
5. Write a short note on Chief Green Officer.
6. Explain the Steps to be followed while conducting audits.

SKM's JASHBHAI MAGANBHAI PATEL COLLEGE OF COMMERCE,  
GOREGAON (WEST), MUMBAI: 90

ATKT SEMESTER END EXAMINATION-APRIL-2023

DURATION: 2 ½ HOURS

MARKS: 75

PROGRAMME: F. Y. B. Sc. (I.T.)-SEM-II

COURSE: NUMERICAL AND STATISTICAL METHODS

**N.B.**

1. All questions are compulsory.
2. Make suitable assumption wherever necessary and state the assumption made.
3. **Answer to the same question must be written together.**
4. Number to the right indicate marks.
5. Draw neat labelled diagrams wherever necessary.
6. Use of non-programmable calculator is allowed.

**Q.1 Attempt any three of the following.**

15

- a) Explain the concept behind the conservation laws in science and engineering with example.
- b) Define : (i) Truncation error (ii) absolute error (iii) precision  
(iv) Significant Figure (v) Error
- c) Find the percentage and relative error by rounding up the 240.987689 up to four significant figures.
- d) Use Zero through third order Taylor series expansion to approximate the function  
 $f(x) = 10x^3 + 5x^2 + 7$  From  $x_i = 0$  with  $h=1$  that is predict the functional value at  $x_{i+1} = 1$
- e) Evaluate  $e^{-8}$  using two formula  
 $e^{-x} = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$  And  $\frac{1}{e^{-x}} = \frac{1}{1+x+\frac{x^2}{2!}+\frac{x^3}{3!}+\dots}$  and compare with the true value. Use four terms to evaluate each series and compute true and approximate error as terms are added.
- f) Write a short note on Blunder and Total Numeric Error.

**Q.2 Attempt any three of the following.**

15

- a) Find the approximate root of  $f(x) = x^3 + x - 10$  by using Bisection method.
- b) Given that equation  $f(x) = 3x^2 - 5x + 1$  has root between 4 and 5 find the approximate root by using Regular falsi method correct up to two decimal places.
- c) Use Newton Raphson method to obtain approximate root of  $f(x) = x^5 - 18$  correct up to two decimal places.
- d) From the following table estimate the number of student who score the marks 56 by using Newton Forward difference interpolation formula.

Marks	:	30-40	40-50	50-60	60-70	70-80
No. of students	:	10	22	68	45	50

- e) Estimate population for the year 1985 by using Newton Backward difference interpolation formula.

Year	:	1960	1970	1980	1990	2000
Population (in lacs)	:	10	20	40	60	100

- f) Using Lagrange's Interpolation Formula to calculate  $f(9)$

X	:	1	2	3
Y	:	3	5	6

**Q.3 Attempt any three of the following.**

15

- a) Solve the given linear equation by Gauss Jordan Method:  
 $20x - y + 2z = 6$  ;  $2x - 10y + z = 3$  ;  $30x + 3y - z = 4$
- b) Solve the given system linear equation by Gauss Seidle Method:  
 $15x + 2y + z = 60$  ;  $x - 2y + 8z = 20$  ;  $x + y - z = 30$
- c) Use Simpson's  $(1/3)^{rd}$  rule to evaluate :  $\int_0^1 \frac{dx}{3+5x^2}$  take  $h = 0.25$
- d) Evaluate  $\int_0^1 (10 + 2^x) dx$  by trapezoidal rule an approximate value in step of size 0.2.
- e) Using Euler's modified method find  $y(1.4)$ , if  $\frac{dy}{dx} = 1 - \sqrt{xy}$ ,  $y(1.2) = 1$  and  $h = 0.2$
- f) Using Runge Kutta method of fourth order find  $y(1.2)$  if  $\frac{dy}{dx} = x^3 + 3y$ ,  $y(0) = 1$  take  $h = 0.2$

**Q.4 Attempt any three of the following.**

15

- a) Use least Square method to fit a straight line  $y = a + bx$  to the following data:

X	:	0	1	2	3	4
Y	:	1	3.1	1.5	2	2.5

- b) Fit a second degree parabolic curve  $y = a + bx + cx^2$  for the following data:

X	:	-4	1	2	4	15
Y	:	1	1.2	2	3	3.1

- c) Use multiple regression to fit the following data:

X	:	0	2	4	6	8
Y	:	3	2	1	7	4
Z	:	2	3	4	5	6

- d) A firm manufacturer headache pills in two sizes A and B. Size A contain 2 aspirin, 5 grains of bicarbonate and 1 grains of codeine. Size B contain 1 grains of aspirin, 8 grains of bicarbonate and 6 grains of codeine. It is found by users that it requires at least 12 grains of aspirin, 74 grains of

bicarbonate and 24 grains of codeine for providing immediate effect. It is required to determine the least number of pills a patient should be take to get immediate relief. Formulate the problem as standard LPP

e) Solve the following linear programming problem graphically

$$\text{Min. } z = 20x + 30y$$

$$\text{Subject to } : \quad 2x + 4y \leq 8$$

$$3x + 4y \leq 36$$

$$x \geq 0, y \geq 0.$$

f) A factory manufactures two products P and Q. To manufacture one unit of P, 1 machine hours and 2 labour hours are required. To manufacture product Q, 2 machine hours and 1 labour hours are required. In a month, 30 machine hours and 24 labour hours are available. Profit per unit for P is ₹ 30 and for Q is ₹ 20. Find the MAXIMUM profit.

**Q.5 Attempt any three of the following.**

15

a) Consider the following probability distribution of X.

$$X=x \quad : \quad -3 \quad -2 \quad 0 \quad 1 \quad 2 \quad 3$$

$$P(X=x) \quad : \quad 0.3 \quad 10k \quad 0.1 \quad 20k \quad 0.1 \quad 20k$$

$$\text{Find (i) } k \quad (\text{ii}) P(X \geq 1) \quad (\text{iii}) P(-2 \leq X < 2) \quad (\text{iv}) P(x > 4)$$

b) For the following probability distribution of random variable X find mean and variance of X.

$$X=x \quad : \quad 1 \quad 2 \quad 3 \quad 4$$

$$P(X=x) \quad : \quad 0.25 \quad 0.3 \quad 0.15 \quad 0.3$$

c) A random variable X follows normal distribution with mean 58 and standard deviation 5, hence find the probability of (i)  $P(X > 35)$  ii.  $P(10 < X < 32)$

Given that area between  $z=0$  to  $z=1$  is 0.3413

Area between  $z=0$  to  $z=2$  is 0.4772 ; Area between  $z=0$  to  $z=0.4$  is 0.1554

d) On an average 250 telephone call during afternoon nap period 1400-1405 hrs. Find the probability that on a certain day, receives

(i) No phone calls (ii) Exactly 5 telephone calls during the same periods.

e) In a class of 150 students there are 4 girls and rest are boys. A group of five student is selected randomly selected from this class. Find prob. of that group consist of

(i) Two girls (ii) two boys

f) The mean and variance of continuous uniform distribution are 2.5 and 3 respectively. Find the parameter of the distribution.

Sansakardham Kelavani Mandal's  
JASHBHAI MAGANBHAI PATEL COLLEGE OF COMMERCE

Regular Semester End Examination April 2022-23

PROGRAMME: F.Y.B.SC.I.T. (Sem-II)

COURSE: Numerical Methods.

DURATION: 2 ½ hours.

MARKS: 75

Note: All questions are compulsory.

Make Suitable assumptions wherever necessary and state the assumptions made.

Figures to the right indicates full marks

Answer to the same questions must be written together.

Use of Non-programmable Calculator is allowed.

Q.1. Attempt any three of the following.

( 5 x 3 = 15M )

- A. Explain the concept behind of Law of conservation in science and engineering with example.
- B. Explain: Overloading and Blunder.
- C. Write a short notes on Total Numeric Error and Truncation Error.
- D. Let  $y = 306.89765876869$ , approximate up-to three decimal places then find,
  - i. Significant digit
  - ii. Absolute Error
  - iii. Relative Error
  - iv. Percentage Error.
- E. Evaluate  $e^{-3}$  by using the formula  $e^{-x} = 1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \dots$  with true value  $e^{-3} = 0.04978706837$  up-to 5 decimal places.
- F. Use Taylor series expansions with  $n = 0$  to 4 to approximate  $f(x) = x^3 - 2x + 11$  at  $x = 7$  on the basis of the value  $f(x)$  and it's derivative at  $x = 7$

Q.2. Attempt any three of the following.

( 5 x 3 = 15M )

- A. Find approximate root of  $2x^3 - 5x - 3 = 0$  by using Bisection method correct up-to two decimal places.(Perform three iterations)
- B. Find approximate root of  $x^4 - 90 = 0$  by using Regular falsi method correct up-to two decimal places.(Perform two iterations)

- C. Find approximate root of  $x^3 - 6x + 3 = 0$  by using Newton Rapson method correct up-to 4 decimal places. (Take  $x_0 = 2$  Perform two iterations)
- D. By using Newton Forward Difference interpolation formula find  $f(2.5)$  for the given information

x	1	3	5	7
f(x)	24	12	33	72

- E. By using Lagrange's interpolation formula find  $f(142)$  for the given information:

Temperature	0.1	0.2	0.3	0.4
Pressure kg/cm <sup>2</sup>	3.6	4.5	2.4	2

- F. Find approximate root of  $2x^5 - 5x - 10 = 0$  by using Secant method correct up-to two decimal places. (Take  $x_0 = 1$  and  $x_1 = 2$  Perform three iterations)

**Q.3. Attempt any three of the following.**

( 5 x 3 = 15M )

- A. By using trapezoidal method Evaluate:  $\int_1^5 (2x^3 - 5x + 1) dx$  (take  $h = 1$ )
- B. By using Simpson's (1/3)<sup>rd</sup> method Evaluate:  $\int_1^4 (4x^2 - 1) dx$  (take  $h = 0.5$ )
- C. By using Simpson's (3/8)<sup>th</sup> method Evaluate:  $\int_0^\pi e^x \cos(x) dx$  (take  $n = 6$ )
- D. Solve the given Linear Equation by Gauss Jordan Method:  
 $4x + y + z = 4$  ;  $x + 4y - 2z = 4$  ;  $3x + 2y - 4z = 6$
- E. Solve the given Linear Equation by Gauss Seidle Method:  
 $20x + 2y + 2z = 24$  ;  $4x + 20y + 2z = 26$  ;  $x + y + 5z = 7$
- F. Using following table find  $\frac{dy}{dx}$  and  $\frac{d^2y}{dx^2}$  at  $x = 1.1$

X	1	1.1	1.2	1.3	1.4	1.5
Y	7.9	8	8.2	9	9.5	10

**Q.4. Attempt any three of the following.**

( 5 x 3 = 15M )

- A. Use Taylor series method to obtain the solution of  $\frac{dy}{dx} = x - 2y$ . Given that  $y(0) = 1$ , find  $y(0.1)$
- B. Use Euler's modified methods to obtain the solution of  $\frac{dy}{dx} = 2x^2 + 3y$ . Given that  $y(0) = 1$ , find  $y(0.1)$

- C. Use Runge Kutta method of second order methods to obtain the solution of  $\frac{dy}{dx} = 2x + 3y$ .  
Given that  $y(0) = 1$ , find  $y(0.1)$

- D. Fit a straight line for the following data:

Year	1980	1981	1982	1983	1984	1985	1986
No. of employee exchanges	12	10	15	13	18	14	8

- E. Fit a second degree polynomial of  $y$  on  $x$  to the following data:

X	0	1	2	3	4
Y	1.1	1.3	0	2	2.1

- F. Use multiple regression to fit the following data:

X	0	1	2	3	4
Y	-2	-1	1	3	5
Z	1	2	4	7	11

- Q.4. Attempt any three of the following.

(5 x 3 = 15M)

- A. ABC company produces two products  $p_1$  and  $p_2$  processed on three machines  $m_1$ ,  $m_2$  and,  $m_3$ . Daily time available on these machines is 60, 72 and 48 hours. Products  $p_1$  and  $p_2$  requires 2, 1 and 1 hours on machine  $m_1$ ,  $m_2$  and  $m_3$  respectively and products  $p_2$  requires 1, 3 and 1 hours on machine  $m_1$ ,  $m_2$  and  $m_3$  respectively. Profit per unit of products  $p_1$  and  $p_2$  are ₹ 150 and ₹ 200 respectively. Formulate the problem as linear programming problem to maximize the profit.

- B. Solve the given LPP graphically.

$$\text{Min. } Z = 50x + 70y$$

$$\text{Sub. To. } 2x + y \geq 8,$$

$$x + 2y \geq 10,$$

$$3x + 6y \geq 18,$$

$$x \geq 0 \text{ and } y \geq 0$$

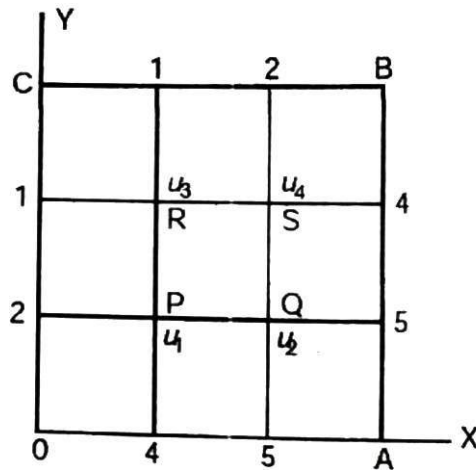
- C. Classify the following partial differential equation.

i. 
$$\frac{\partial^2 u}{\partial x^2} + 4 \frac{\partial^2 u}{\partial x \partial y} + 4 \frac{\partial^2 u}{\partial y^2} - \frac{\partial u}{\partial x} + 5 \frac{\partial u}{\partial y} = 0$$

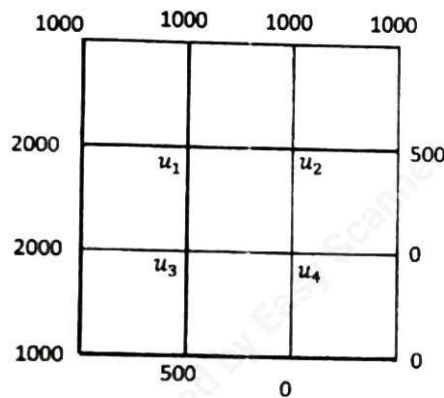
ii. 
$$(1 + x^2) \frac{\partial^2 u}{\partial x^2} + (5 + 2x^2) \frac{\partial^2 u}{\partial x \partial y} + (4 + x^2) \frac{\partial^2 u}{\partial y^2} = 0$$



- D. Solve the Laplace's equation for the given square region boundary value being indicated.



- E. Given the values of  $u(x, y)$  on the boundary of the squares in the given figure, calculate the function  $u(x, y)$  satisfying the Laplace equation at the mesh point of the given figure by Jacobi method.



- F. Using crank-Nicolson's Method solve

$$u_{xx} = 16u_{tt}, \quad 0 < x < 1, t > 0 \text{ given}$$

$$u(x, 0) = 0, u(0, t) = 0, u(1, t) = 50t$$

Compute  $u$  for two steps in  $t$ -direction taking  $h = \frac{1}{4}$