3E1651

Roll No. _____ Total No. of Pages : 4

3E1651

B. Tech. (Sem. III) (Mercy Back) Examination, December - 2017
Computer Sc. & Engg.
3CS1A Electronic Devices & Circuits

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 24

*Attempt any **five** questions. selecting one question from each unit, All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. any data you feel missing suitably by assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1. Nil 2. Nil

UNIT - I

1 (a) Calculate the current in diode (silicon) circuit shown in **fig. 1.**

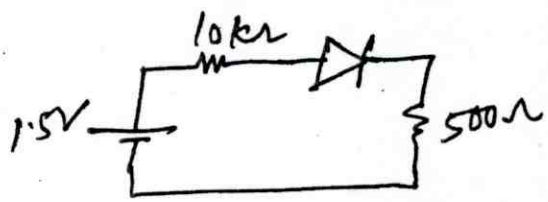

Fig. 1 **6**

(b) Define following :
(i) Mobility and
(ii) Mass action law **3×2=6**

(c) If a silicon sample has 10^{15} boron/cm^3 then calculate the no. of holes and electron density in it. Assume intrinsic concentration is $n_i = 1.5 \times 10^{10}/\text{cm}^3$.

4

OR

1 (a) Draw and define diode load line. Also define the load line under AC conditions.

6

(b) Find the expression for Hall coefficient and explain the application of Hall effects.

6

(c) Define Fermi level in semiconductor material.

UNIT - II

2 (a) If $\alpha = 0.8$ then find the value of common emitter and common collector current gain.

2×2=4

(b) Define following :

(i) Thermal runaway

(ii) Stabilization and

(iii) Compensation

3×3=9

(c) Write interrelation between h-parameter of CE and CB.

3

OR

2 (a) Draw circuit of fixed bias and define its stability factor.

6

(b) Draw Eber's Null model and explain its working for CE configuration.

6

(c) Write the units of all h-parameters.

4

UNIT - III

3 (a) Draw the frequency response of an RC coupled amplifier and mention on it (i) 3-dB cut off frequencies (ii) Bandwidth.

8

(b) Find the voltage gain for common source configuration if $\mu = 10^{-3}$ and $g = 10^{-5}$ then calculate the voltage gain for a load $R_C = 10\ k\Omega$.

8

OR

3 (a) Define Miller's theorem and its dual. How this theorem is useful in solving amplifier circuits ?

8

(b) Why common collector is called "emitter follower" ? Draw its circuit and find the expression for voltage gain.

8

UNIT - IV

4 (a) Define following :

(i) Forward voltage gain

(ii) Gain with feedback

(iii) Feedback factor and

(iv) Stability factor of feedback amplifier.

4×2=8

(b) If $R_i = 10\ k\Omega$ and $A_i = 100$ then find R_{if} and A_{if} in (i) voltage shunt and (ii) voltage series feedback.

4×2=8

OR

4 (a) What is current shunt feedback ? How it modifies input and output resistance of an amplifier ?

8

(b) Find the relation between R_i and R_{if} for

(i) Current series feedback and

(ii) Voltage shunt feedback.

4×2=8

UNIT - V

5 (a) Draw the circuit of Colpitt oscillator and find its oscillation frequency when $C_1 = C_2 = 10\ \mu F$ and $L = 2m\mu$.

8

(b) Draw the electrical equivalent circuit of crystal oscillator. Also find the expression for its series and parallel resonant frequencies.

8

OR

5 (a) Design Wein bridge oscillator for generating a signal at 1.5 kHz.

8

(b) Draw astable multivibrator circuit diagram and explain its working for generate clock.

8

3E1652-1612

Roll No. _____ Total No. of Pages : 3

3E1652-1612

B. Tech. (Sem. III) (Main / Back) Examination, December - 2017

Computer Sc. & Engineering

3CS2A Data Structures and Algorithms

CS, IT, EX, EC, EI

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1. Nil 2. Nil

UNIT - I

1 (a) Define algorithm. What do you understand by best, worst and average case analysis of an algorithm. **8**

(b) Using suitable example explain row major and column major form of array. **8**

OR

1 (a) Explain the difficulties in estimating exact execution time of Algorithms. **8**

(b) Explain Asymptotic notations : Big-Oh, theta, Omega using suitable example. **8**

UNIT - II

2 (a) Define the concept of recursion using stack using suitable examples. What are the difficulties in dealing with infix expression ? 8

(b) Convert following expressions in its equivalent postfix expressions.

(i) $A*(B+C*D)+E$

(ii) $A*B\hat{}C+D$ 8

OR

2 (a) Explain tower of Hanoi problem. Explain using suitable diagram and example. 8

(b) Explain transposition of sparse matrices with algorithms of varying complexity. 8

UNIT - III

3 (a) Compare binary search and sequential search. 8

(b) Using suitable diagram explain the concept of Head Node in linked lists. 8

OR

3 (a) Write the algorithm for insertion and deletion in doubly and circularly connected linear linked lists. 8

(b) Write down the following polynomial.

$3x^4-2x^2+9x-11$ by a linked list. 8

UNIT - IV

4 (a) Define the concept of balanced trees. Write pseudo code for insertion into and deletion from AVL tree. **8**

(b) Define the different applications of trees for representation of sets. **8**

OR

4 (a) Define the following binary tree
(i) Complete binary tree.
(ii) Strictly binary tree. **8**

(b) Write an algorithm for inorder travesal of a threaded binary tree. **8**

UNIT - V

5 (a) Compare Internal sorting and External sorting. **8**

(b) By taking suitable example explain the principle of operation of heap sort. **8**

(c) Prove that Heap sort, Merge sort and Quick sort takes $\Omega(n \log n)$ tie in the worst case. **8**

OR

5 Write short notes on following :
(a) DFS traversal Algorithms **8**

(b) Comparison of sorting Algorithms in terms of time complexity. **8**

3E1653

Roll No. : _____ Total Printed Pages : 7

3E1653

B. Tech. (Sem. III) (Main/Back) Examination, December - 2017
Electronics & Communication Engg.
3EC3A Digital Electronics

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. Nil 2. Nil

UNIT - I

1 (a) Find the 11's complement of following numbers :

(i) $(935)_{12}$ (ii) $(267)_{12}$ **6**

(b) X and Y are successive digits in positional number system and $(XY)_r = (25)_{10}$ and $(YX)_r = (31)_{10}$. Determine the value of X, Y and r. **6**

(c) A register contains 2's complement 10010110. What will be the contain of register if it is divided by 2. **4**

OR

1 (a) Consider the signed binary number are A = 01000110 and B = 11010011 where B is in 2's complement form. Find the value of following Mathematical expression :

(i) $A + B$

(ii) $A - B$

(iii) $B - A$

(iv) $-A - B$ **8**

(b) Why the gray code is also known as reflected code ? Write a brief note on gray code and its applications. **8**

UNIT - II

2 (a) What do you understand by following properties of logic family :

(i) Fan out

(ii) Figure of merit

(iii) Noise margin

(iv) Current mode logic. **8**

(b) Find the output boolean function (Y) in terms of A and B as shown in **Fig. 1**.

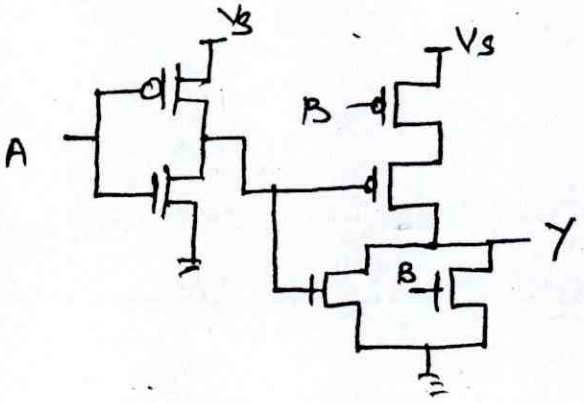

Fig. 1

8

OR

2 (a) A boolean function is implemented using NMOS logic family and shown in **Fig. 2**. How the output Y can be made 0 if C and D both values are 0. Also find implemented boolean function.

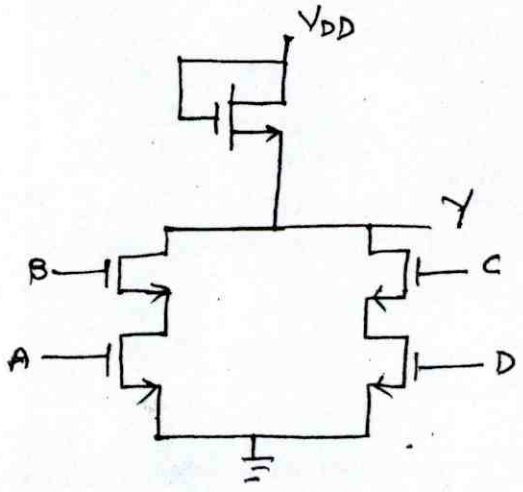

Fig. 2

8

(b) State the advantage of using totem pole output type TTL over open collector output TTL. Also explain the tristate output logic type TTL. **8**

UNIT - III

3 (a) Simplify the following boolean function using tabulation method :

$F = \sum m\,(0, 1, 2, 8, 10, 11, 14, 15) \cdot d(9, 12)$. **10**

(b) Simplify the following boolean function using K-map :

$Y = (A + B)\,(A + \bar{C})\,(\bar{A} + \bar{B})\,(\bar{A} + C)$. **6**

OR

3 (a) The logic gate G_1 and G_2 as shown in **Fig. 3** have propagation delay of 10 ns and 20 ns respectively. If input v_i makes an abrupt change from logic-0 to logic-1 at time $t = t_0$, then draw output waveform (V_0).

ns → nano second.

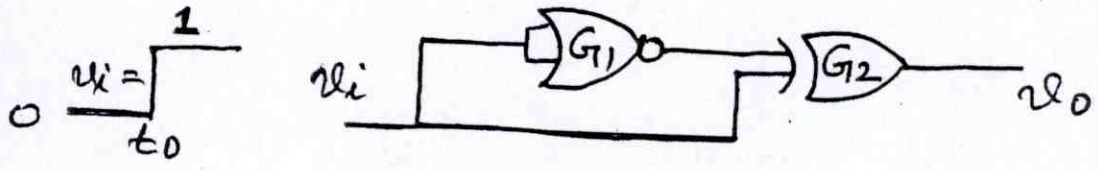

Fig. 3

(b) Minimize the following boolean function using K-map :

$f(a, b, c, d) = \sum m\,(0, 1, 2, 8, 9) \cdot d(4, 10, 12)$ **8**

8

UNIT - IV

4 (a) How many 3 : 8 line decoder with enable input are required to construct 6 : 64 line decoder without using any other logic ? Draw its block diagram also. **8**

(b) Find the boolean function implemented by 4 : 1 mux as shown in **Fig. 4**.

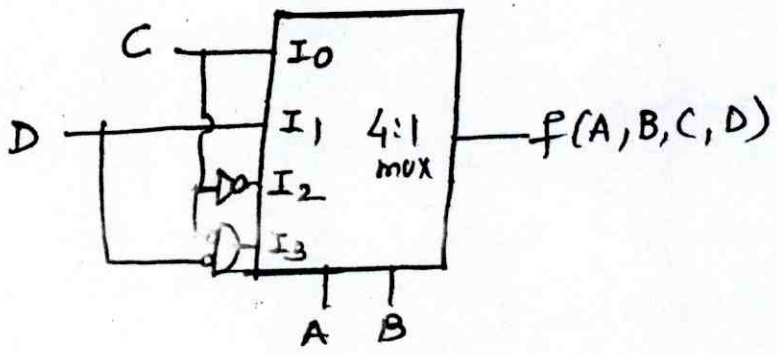

Fig. 4 **8**

OR

4 (a) Implement a full subtractor using two 4 : 1 multiplexer. **8**

(b) Find the output of following decoder circuit as shown in **Fig. 5**.

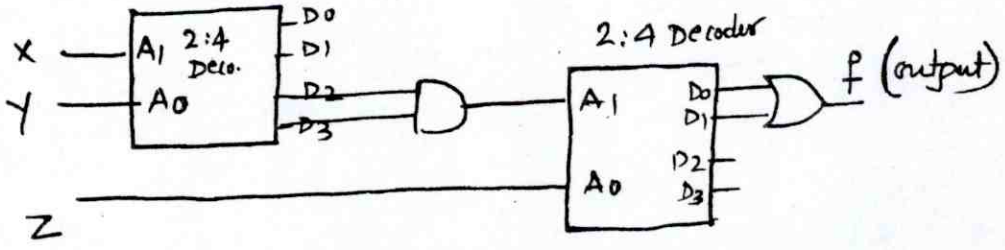

Fig. 5 **4**

(c) Find the output of 4 : 1 multiplexer as shown in **Fig. 6**. 5

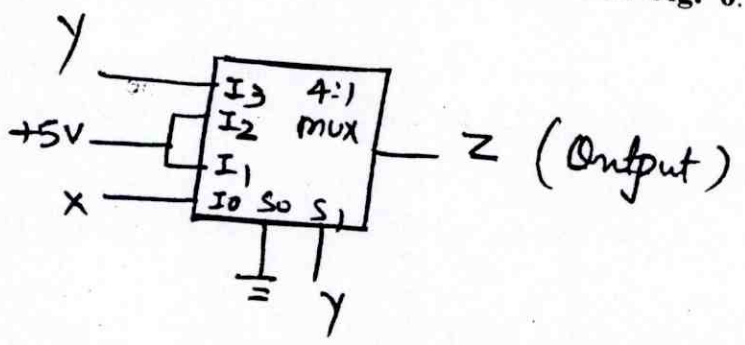

Fig. 6

UNIT - V

5 (a) State the difference between latch and flip flop. 4

(b) Explain the truth table, circuit diagram and working of universal flip flop. 4

(c) What are the counting states (Q_1, Q_0) for the circuit using D - flip flop as shown in **Fig. 7** ? 4

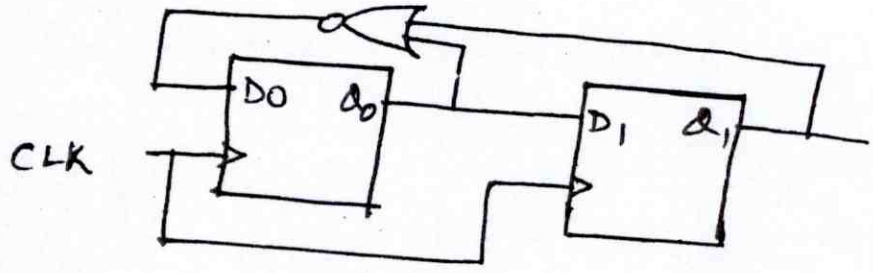

Fig. 7

Assume initial state (Q_1, Q_0) is 00.

OR 8

5 (a) Explain the procedure for conversion of JK flip flop to RS flip flop. **5**

(b) What is race around condition ? How it can be avoided ? **5**

(c) Design a binary counter with following binary sequence using D - flip flop : 0, 1, 3, 2, 6, 4, 5, 7 and repeat. **6**

3E1654

Roll No. _____ Total No. of Pages : 3

3E1654

B. Tech. (Sem. III) (Main / Back) Examination, December - 2017
Computer Sc. & Engg.
3CS4A Object Oriented Programming
EE,EX,CS,IT

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. Nil 2. Nil

UNIT - I

1 (a) Define structure in C and how it is declared. Explain with suitable example. **8**

(b) How are structure element accessed using a pointer ? Which operator is used give example ? **8**

OR

1 (a) Explain nested structure and its need with a suitable example. **8**

(b) How passing structure to function ? Give an example. **8**

UNIT - II

2 (a) Explain the concept of object oriented analysis with explanation of all steps of analysis. **8**

(b) What is the meaning of message passing ? Explain in brief. **8**

OR

2 (a) How we create and destroy object dynamically using new and delete operator discuss with example. **8**

(b) Write short note on constructors and destructors in C++. **8**

UNIT - III

3 (a) What is type conversion in C++ ? How it is achieved in user defined data types ? **8**

(b) What is operator overloading ? Why do need operator overloading ? **8**

OR

3 (a) What are the limitation of overloading unary increment / decrement operator ? Write a program to overload unary operator. **8**

(b) How we concatenate two string by (+) operator give suitable example. **8**

UNIT - IV

4 (a) What is inheritance ? What are the various forms of inheritance ? Explain each with the help of examples. **10**

(b) Define virtual function. Why we need it ? **6**

OR

4 (a) Explain the term dynamic binding. How it is useful in OOPs ? **8**

(b) Discuss abstract data type concept. How is an abstract class useful ? **8**

UNIT - V

5 (a) Design two classes to show the multiple inheritance. How does a object of derived class access the member of base class ? **8**

(b) Write short note on Templates. **8**

OR

5 (a) Explain the effect of using the access specifiers with class members on inheritance. **8**

(b) Write short note on exception handling. **8**

3E1655

Roll No. _____ Total No. of Pages : 3

3E1655

B. Tech. (Sem. III) (Main / Back) Examination, December - 2017

Computer Sc. & Engg.

3CS4A Linux and Shell Programming

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. Nil 2. Nil

UNIT - I

1 (a) What is Permissions ? How can we apply permissions for the files and directories ? **8**

(b) Explain the linux file system architecture with the help of its diagram. **8**

OR

1 Explain the following commands with their syntax and examples :

(i) Uname (ii) stty

(iii) ls - lR (iv) chmod --x

(v) mount -v-o (vi) ln

(vii) gcc -o prog.c (viii) touch

8×2=16

UNIT - II

2 (a) Explain the programming utility in linux file system.

8

(b) How can we use the debugging C programs using gdb ?

8

OR

2 (a) What is exrc file for different setting parameters ? Explain.

8

(b) Describe the advance editing techniques.

8

UNIT - III

3 What do you mean by X ? Explain different components of X and also describe the X-clients.

16

OR

3 Write short notes on the following :

(i) xinitrc file

(ii) Concept of window manager.

8×2=16

UNIT - IV

4 (a) What is redirection ? Explain input output and error redirection. **8**

(b) Write short notes on :

(i) Types of shell

(ii) Command line editing **4×2=8**

OR

4 (a) What do you mean by directory stack manipulation ? Explain. **8**

(b) Write short notes on :

(i) Variables and keywords

(ii) Piping process **4×2=8**

UNIT - V

5 (a) What is the Here document ? Explain. **8**

(b) Write a shell script to generate the factorial of N numbers using through keyboard. **8**

OR

5 Explain the following terms :

(i) Aliases (ii) Source code management

(iii) awk utility (iv) NULL or USET variables. **4×4=16**

3E1656

Roll No. : _____ Total Printed Pages : 4

3E1656

B. Tech. (Sem. III) (Main/Back) Examination, December - 2017
Computer Sc. & Engg.
3CS6A Advanced Engg. Mathematics - I

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1. Nil 2. Nil

UNIT - I

1 (a) Define optimization techniques and write its various engineering applications **8**

(b) Solve the problem by constrained variation method.

$$\text{Min} \quad f(X) = \frac{1}{2}\left(x_1^2 + x_2^2 + x_3^2\right)$$

$$\text{Sub. to} \quad g_1(X) = x_1 = x_2$$

$$g_2(X) = x_1 + x_2 + x_3 = 1$$

8

OR

1 (a) Optimize $Z = 4x_1^2 + 2x_2^2 + x_3^2 - 4x_1x_2$,

Subject to $x_1 + x_2 + x_3 = 15$,

$2x_1 - x_2 + 2x_3 = 20$,

$x_1, x_2, x_3 \geq 0$

8

(b) Maximum $Z = 2x_1 + 3x_2 - \left(x_1^2 + x_2^2 + x_3^2\right)$

Subject to $x_1 + x_2 \leq 1$,

$2x_1 + 3x_2 \leq 6$,

$x_1, x_2 \geq 0$

8

UNIT - II

2 (a) A firm manufacturing two types of electric items, A and B can make a profit of Rs. 20 per unit of A and Rs. 30 per unit of B. Each unit of A requires 3 motors and 4 transformers and each unit of B requires 2 and 4 respectively. The supply of these per month is 210 and 300 respectively. Type B requires a stabilizer with supply of 65 units per month. Formulate the LPP for maximum profit and solve it graphically.

8

(b) User two-phase method to solve :

Min $Z = x_1 + x_2$,

Subject to $2x_1 + x_2 \geq 4$,

$x_1 + 7x_2 \geq 7$

and $x_1, x_2 \geq 0$

8

OR

2 (a) Find the dual of the problem

Min $Z = 2x_2 + 5x_3$

Subject to $x_1 + x_2 \geq 2$,

$2x_1 + x_2 + 6x_3 = 6$,

$x_1 - x_2 + 3x_3 \leq 4$

and $x_1, x_2, x_3 \geq 0$

8

(b) Solve the following transportation problem to minimize the cost

From \ TO	D_1	D_2	D_3	*Supply*
A	2	7	4	5
B	3	3	1	8
C	5	4	7	7
D	1	6	2	14
Demand	7	9	18	34

8

UNIT - III

3 (a) If p is prime and a is an integer not divisible by p, then prove $a^{p-1} \equiv 1 (\text{mod } p)$

8

(b) State the Chinese Remainder Theorem. And solve the linear system $x \equiv 1(\text{mod } 3), x \equiv 2(\text{mod } 4), x \equiv 3(\text{mod } 5)$

8

OR

3 (a) Show that the set $U_9 = \{1, 2, 3, 5, 7, 8\}$ with an operation defined as multiplication modulo 9, i.e. $a \cdot b = 9m + c$ for all $a, b \in U_9$ and $c \in U_9$ is a cyclic group.

Find the order of various elements and subgroup generated by them.

8

(b) If $\{G, *\}$ is a finite cyclic group generated by on element $a \in G$ and is of order n, then $a^n = e$ so that $G = \{a, a^2 \ldots\ldots a^n (= e)\}$. Also n is the least positive integer for which $a^n = e$.

8

UNIT - IV

4 (a) Find inverse L-transform of function of $\frac{s}{s^4+4a^4}$. **8**

(b) Find the bounded solution $u(x,t), 0<x<1, t>0$ of the boundary value problem $\frac{\partial u}{\partial x}-\frac{\partial u}{\partial t}=1-e^{-t}, u(x,0)=x.$ **8**

OR

4 (a) Find Laplace transform of $\sin\sqrt{t}$ and deduce $L\left[\frac{\cos\sqrt{t}}{\sqrt{t}}\right]=\sqrt{\frac{\pi}{s}}e^{-\frac{1}{4s}}$. **8**

(b) Solve $\frac{d^2y}{dt^2}-3\frac{dy}{dt}+2y=1-e^{2t}$; $y(0)=1$; $y'(0)=0$. **8**

UNIT - V

5 (a) The population of a country is the decimal eensus were as under; estimate the population for the year 1925.

Year (X)	1891	1901	1911	1921	1931
Population (in thousands) $f(x)$	46	66	81	93	101

8

(b) Evalute $\int_0^1 \frac{1}{1+x^2}dx$ by Simpson's $\frac{1}{3}$ and $\frac{3}{8}$ rule. Hence obtain the approximate value of π in each case. **8**

OR

5 (a) Given $2\frac{dy}{dx}=\left(1+x^2\right)y^2$ *and* $y(0)=1$, evaluate $y(0.4)$ by Milne's Prodictor-corrector method. **8**

(b) Solve $y_{n+2}+y_{n+1}+y_n=n^2+n+1.$ **8**