6E6071

Roll No. _____ Total No of Pages: 4

6E6071

B. Tech. VI-Sem. (Main & Back) Exam., April/May-2016
Electrical Engineering
6EE1A Modern Control Theory
(Common for EE & EX)

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

Min. Passing Marks (Main & Back): 26

Instructions to Candidates:-

*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 may 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

Q.1 (a) Explain the advantages of modern control theory. Also compare conventional and modern control theory. [8]

(b) Derive the state variable model for the system shown in figure 1. [8]

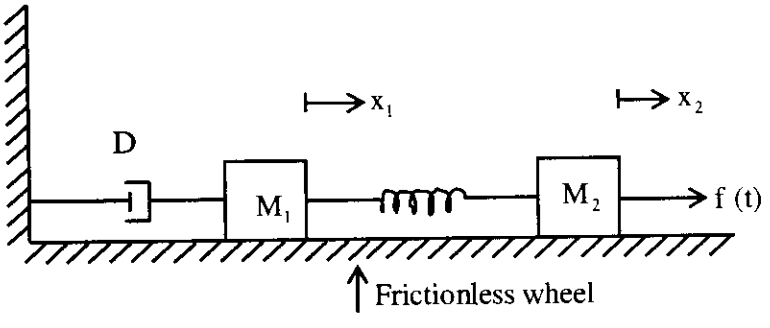

Figure - 1

OR

Q.1 (a) (i) Define domain and range of a function with a suitable example. [4]

(ii) For the function $y = \frac{4}{5-x}$; [4]

Find domain and range.

(b) Write the state equation for the circuit shown in figure 2. [8]

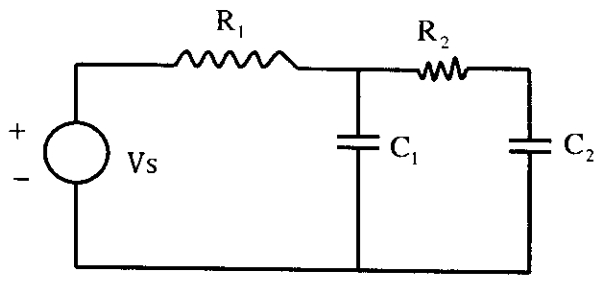

Figure 2

UNIT-II

Q.2 (a) Express the following transfer function (T.F.) in state model. [8]

$$\frac{y(s)}{u(s)} = \frac{1}{s^3 + 6s^2 + 11s + 6}$$

(b) Construct a state model for a system characterized by the differential equation: [8]

$$\dddot{y} + 6\ddot{y} + 11\dot{y} + 6y = u$$

OR

Q.2 (a) Construct the state model in Jordan's canonical form for a system whose transfer function (T.F.) is given by function: [8]

$$\frac{y(s)}{u(s)} = \frac{10}{(s+1)^2(s+2)}$$

(b) Consider a stare model given below: [8]

$$A=\begin{bmatrix}0 & 1 & 0\\ 0 & 0 & 1\\ 0 & -3 & -4\end{bmatrix};\quad b=\begin{bmatrix}0\\0\\1\end{bmatrix};$$

$$C=\begin{bmatrix}40 & 10 & 0\end{bmatrix};\quad d=0$$

Find the transfer function (T.F.)

UNIT-III

Q.3 (a) (i) Define Eigen value and Eigen vectors. [4]

(ii) Explain Cayley – Hamilton theorems. [4]

(b) Find the Eigen values and Eigen vectors of the matrix. [8]

$$\begin{bmatrix}-2 & 1 & 1\\ -11 & 4 & 5\\ -1 & 1 & 0\end{bmatrix}$$

OR

Q.3 (a) The state equation of a system are given below. Define if the system is completely controllable and observable. [8]

$$\dot{x}=\begin{bmatrix}-6 & 2 & -4\\ -18 & 3 & -8\\ -6 & 1 & -3\end{bmatrix}x+\begin{bmatrix}1\\3\\1\end{bmatrix}u$$

$$y=\begin{bmatrix}1 & -1 & 2\end{bmatrix}x$$

(b) Determine the state feedback gain using Ackermann's formula matrix K for the plant given by – [8]

$$\dot{x}=Ax+Bx=\begin{bmatrix}0 & 1\\ 0 & 0\end{bmatrix}+\begin{bmatrix}0\\1\end{bmatrix}x$$

UNIT-IV

Q.4 (a) Find the Z – transform of f (k) = K+ Sin2K ; $K \geq 0$. [8]

(b) Define and prove Initial and find value theorems. [8]

OR

Q.4 (a) Find the Z – transform of following function: [8]

$$f(n) = \frac{a^n}{(n)!}$$

(b) Explain signal reconstruction with a suitable example. [8]

UNIT-V

Q.5 (a) Write a note on digital PID controller. [8]

(b) Explain Jury's stability criterion. [8]

OR

Q.5 (a) Explain a model reference adaptive system with first order control system. [8]

(b) State and Explain Bilinear transformation. [8]

6E6072

Roll No. _____ Total No of Pages: 3

6E6072

B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electrical Engineering
6EE2A High Voltage Engineering

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

Min. Passing Marks (Main & Back): 26

Instructions to Candidates:-

*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 may 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

Q.1 (a) Classify and explain breakdown mechanism in commercial liquid dielectric. [8]

(b) What is treeing & tracking? Explain these two phenomenon in solid dielectrics.[8]

OR

Q.1 (a) What is electronegative gas? Discuss criteria for its breakdown. Why its breakdown strength is higher than other gas? [8]

(b) Define Townsend's first & second ionization co-efficient. Explain Townsend discharge. [8]

UNIT-II

Q.2 (a) What are the components of a multistage impulse generator? Draw & explain Marx circuit and modified Marx circuit of multi stage impulse generator. Discuss the difference between Marx and modified Marx circuit [10]

(b) What is cascaded transformer and explain its working with a diagram. [6]

OR

Q.2 (a) Explain how a sphere gap can be used to measure the peak value of voltages. What are the parameters & factors that influence such voltages measurements?[8]

(b) Explain Vande – Graaf generator with schematic diagram. [8]

UNIT-III

Q.3 (a) Explain the partial discharge phenomenon and draw equivalent circuit for partial discharge phenomenon. [8]

(b) Give the comparison of wide band and narrow band partial discharge detection circuits. [8]

OR

Q.3 Explain the high voltage Schering bridge with a neat diagram for the measurement of capacitance. Discuss the applications of high voltage Schering bridge. [16]

UNIT-IV

Q.4 (a) Describe the mechanism of lightning stroke with neat sketches. [8]

(b) Discuss the causes of over voltages in details. [8]

OR

Q.4 (a) Explain the wave equation for a transmission line. [8]

(b) Explain the factors which are considered in designing of a line based on lightning. [8]

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UNIT-V

Q.5 (a) What is the need to use ground wire? State how they are achieved in practice. [8]

(b) Write a short note on coordination of Insulation levels. [8]

OR

Q.5 Classify the lightning arresters and explain each type of lightning arresters with their advantages and limitations. [16]

6E6073

Roll No. _____ Total No of Pages: 3

6E6073

B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electrical & Electronics Engineering
6EX3A Switch Gear & Protection
Common with EE, EX

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

Min. Passing Marks (Main & Back): 26

Instructions to Candidates:-

*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 may 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

Q.1 (a) What is a 'static relay'? What are the merits & demerits of static relay? Also enumerate different static relays. [8]

(b) Comment on the duality between phase and amplitude comparator. [8]

OR

Q.1 (a) Explain the working principal of static directional over current relays. [8]

(b) Distinguish between definite time & inverse definite time static relays. [8]

UNIT-II

Q.2 (a) Briefly describe static differential relay schemes for single phase system. [8]

(b) Sketch the circuit diagram & working of differential protection of generator (delta connected). [8]

OR

Q.2 Discuss the application of the following distance relays with the help of their characteristics on R –X dig.

(a) Impedance relay [8]

(b) Mho relay [8]

UNIT-III

Q.3 (a) Describe basic apparatus & scheme of power line carrier system. [8]

(b) Explain effect of power swings on the performance of distance protection. [8]

OR

Q.3 (a) Explain the quadrilateral & elliptical relays. [8]

(b) What do you understand by out of step tripping? Discuss the operating principle of an out of step tripling relay. [8]

UNIT-IV

Q.4 (a) In a 132 kV, 3φ, 50hz power system, the line to ground capacitance is 0.02 μF and the inductance is 4 H

Calculate the following -

(i) Voltage appearing across the breaker pole when a magnetizing current of 5A (Inst. Value) is interrupted. [4]

(ii) Resistance to be connected across the contacts to eliminate the restriking voltage. [4]

(b) Explain the working phenomena of oil circuit breakers with its various types. [8]

OR

Q.4 (a) Explain the concept of electric arc and its characteristics. Also explain current zero interruption. [8]

(b) Explain the phenomena of current chopping & interruption of capacitive current for circuit breakers. [8]

UNIT-V

Q.5 (a) Discuss the construction & working of a SF_6 circuit breaker. [8]

(b) Briefly describe the block diagram & working principle of digital relay. [8]

OR

Q.5 Write short note on :

(a) Selection of circuit breakers [4]

(b) Rating of circuit breakers [4]

(c) Digital over current [4]

(d) Transmission line distance protection [4]

6E6074

Roll No. _____ Total No of Pages: 4

6E6074

B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electrical & Electronics Engineering
6EX4A Advanced Power Electronics
Common with EE, EX

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

Min. Passing Marks (Main & Back): 26

Instructions to Candidates:-

*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 may 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

Q.1 (a) Explain the operation of single phase AC voltage controller with R load. What changes will take place in output voltage? [8]

(b) A three phase, 3 wire bidirectional controller supplies a star connected R load of R = 5Ω and line to line voltage of 210V (RMS) at 50 Hz. The firing angle $\alpha = \pi/2$. Determine: [8]

(i) RMS output phase voltage E_o

(ii) Input power factor P. f.

(iii) Expression for instantaneous output voltage of phase 'A'

OR

Q.1 (a) Explain the working principle of three phase full wave controller. [8]

(b) A single phase voltage controller has input voltage of 230V, 50Hz and a load of R = 16Ω for cycle off. Determine - [8]

(i) RMS output voltage.

(ii) Input power factor.

(iii) RMS thyristor current.

UNIT-II

Q.2 (a) Describe three phase to three phase cyclo converter with relevant circuit arrangement using 18 SCRs. [8]

(b) Explain the working principle of control circuit of three phase cyclo converter. [8]

OR

Q.2 (a) Explain the operation of three phase to single phase cycle converters. [6]

(b) A 3-ϕ cycle converter feeds a 1--ϕ load of 190V, 45A at power factor of 0.7 (lagging). Determine - [10]

(i) The required supply voltage.

(ii) Thyristor rating, and

(iii) Power factor of supply current.

UNIT-III

Q.3 (a) Explain 120° mode of operation of VSI. Compare VSI and CSI with respect to their merits and demerits. [8]

(b) A capacitor commutated 1--ϕ bridge inverter is operated at 50Hz with resistive load of 5Ω. Thyristor turn off time is 62 μsec. Find - [8]

(i) Commutation capacitor C for successful commutation of SCR.

(ii) Load current.

(iii) F critical.

(iv) R critical.

OR

Q.3 (a) Discuss the method of harmonic reduction in inverters. Explain harmonic reduction by PWM. [8]

(b) A single phase bridge inverter, fed from 230V dc, is connected to load R = 20Ω, L = 0.6 H. Find the power delivered to load when inverter operates at 50Hz with square wave output. [8]

UNIT-IV

Q.4 (a) Explain the series resonant inverter with unidirectional switches. [8]

(b) Write about class E resonant inverter with diagram. [8]

OR

Q.4 (a) Explain the M type ZCS resonant. [8]

(b) Explain working principle of ZVS resonant converter in detail. [8]

UNIT-V

Q.5 (a) Discuss the comparative analysis of fly back and forward converter in detail. [8]

(b) Discuss the operation of bidirectional AC power supply. [8]

OR

Q.5 (a) What is the conditioning of power factor? Discuss multistage converter used for conditioning of power factor . [10]

(b) Explain the resonant AC power supplies. [6]

6E6075

Roll No. _____ Total No of Pages: 3

6E6075

B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electrical Engineering
6EE5A Smart Grid Technology
Common with EX, EE

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

Min. Passing Marks (Main & Back): 26

Instructions to Candidates:-

*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 may 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

Q.1 (a) Describe the desirable features and characteristics of an ideal smart grid. [8]

(b) What are major points which are forced drivers for demanding smart grid? [8]

OR

Q.1 (a) What are resilient and self – healing grid? Describe principle of self – healing grid and its need in smart grid networks. [3+5=8]

(b) What are major global smart grid initiatives in India? What are the prominent international policies in smart grid presently? [3+5=8]

UNIT-II

Q.2 (a) Explain the ideal design and the mechanism of smart energy system. [10]

(b) Describe the driving elements of substation automation and functions of substation automation system. [6]

OR

Q.2 (a) Explain the outage management system principles and integration requirements. [10]

(b) How a phase shifting transformer is used to control the real power flow on three – phase electricity transmission network. [6]

UNIT-III

Q.3 (a) Give an overview of advanced metering infrastructure and its integration with home automation. [10]

(b) Explain protocols and benefits of advanced metering infrastructure. [6]

OR

Q.3 (a) Explain fundamentals of phasor measurement unit and their applications in power system. [10]

(b) What are the functions of intelligent electronic devices as smart grid components? [6]

UNIT-IV

Q.4 (a) Describe the significance of electromagnetic compatibility in power system with smart grid. [10]

(b) Describe & explain the power quality issues of grid connected renewable energy resources. [6]

OR

Q.4 (a) Explain power quality conditioners principle and control circuit. [10]

(b) Illustrate power quality monitoring concept and explain monitoring considerations. [6]

UNIT-V

Q.5 Explain following network architecture types in smart grid communication entities:

(a) Local Area Network

(b) Wide Area Network [6]

[10]

OR

Q.5 (a) Describe the various layers of Internet protocol layers. [6]

(b) Explain service modules types provided in cloud computing and role of cloud computing in smart grid. [10]

6E6077

Roll No. _____ Total No of Pages: 4

6E6077

B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electrical Engineering
6EE6.2A Power System Instrumentation
Common with EE, EX

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

Min. Passing Marks (Main & Back): 26

Instructions to Candidates:-

*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 may 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

Q.1 (a) Define the following for Gaussian distribution of data: [8]

(i) Precision index

(ii) Probable error

(iii) Standard deviation of mean

(iv) Standard deviation of standard deviation

(b) A circuit was turned for resonance by eight different students and the frequency of resonance in KHz were recorded as. [8]

532, 548, 543, 535, 546, 531, 543, 536 calculate the

(i) Arithmetic means

(ii) Standard deviation

(iii) Deviation from means

(iv) Variance

(v) Average deviation

OR

Q.1 (a) Explain the systematic error and classify the systematic error . [8]

(b) Current was measured during a text 30.4A, flowing in Resister by 105Ω. It was discovered later that the ammeter reading was low by 1.2 precent ammeter and marked resistance was high by 0.3% find the true power as a percentages of the power that was originally calculated. [8]

UNIT-II

Q.2 (a) Develop the relation between quake factor and Poisson ratio in strain quake. [8]

(b) Define classification of transducer. [8]

OR

Q.2 (a) Explain the method of temperature measurement with use of :- [8]

(i) RTDs

(ii) Thermistor

(b) Explain the construction and working principle of LVDT [8]

UNIT-III

Q.3 (a) Write down short note on function generator. [8]

(b) Explain the instrumentation amplifier with op – amp. [8]

OR

Q.3 (a) Explain sample and hold circuit in detail. [8]

(b) Explain the frequency to voltage converter and temperature to current converter. [8]

UNIT-IV

Q.4 (a) Explain the measurement of power and power factor in delta connection using two wattmeter method. [8]

(b) The power flowing in 3 - ϕ 3 – wire balanced load system in measured by two wattmeter method. [8]

The reading of wattmeter A in 7500Wand reading of wattmeter B in – 1500W

(i) What is power factor of system.

(ii) If the voltage of circuit is 400v, what is the value of capacitance which must be introduced in each phase to cause the whole power of power measured to appearan wattmeter A the frequency in 50Hz.

OR

Q.4 (a) Explain the measurement of reactive power using 1- ϕ varmeter and also draw its phasor diagram. [8]

(b) What are the different methods of measurement of frequency in power frequency range? Explain resonance type frequency meter. [8]

UNIT-V

Q.5 (a) Draw the equivalence circuit and phasor diagram of current transformer. Drive the expression for ration and phase angle error. [8]

(b) Explain the effect of following on the performance of CT [8]

(i) Change in primary winding current

(ii) Change in secondary circuit burden

(iii) Change in frequency

OR

Q.5 (a) Explain the working principle of capacitive voltage transformer. [8]

(b) Describe transient behavior of capacitive voltage transformer. [8]

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6E3111

Roll No. _____ Total No of Pages: 3

6E3111

B. Tech. VI-Sem. (Old Back) Exam., April/May-2016
Electronics Engineering
6EE 3 (O) Protection of Power Systems
EE, EX

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

Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*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 may suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL 2. NIL

UNIT-I

Q.1 (a) Explain the nature and causes of faults. Discuss the consequences of faults on a power system. [8]

(b) What do you understand by primary and back-up protection? Discuss various methods of providing back-up protection. [8]

OR

Q.1 (a) Explain the different types of P.Ts. with their areas of application. [8]

(b) Write short note on "Transient errors in CT and CVT". [8]

UNIT-II

Q.2 Explain, how inverse time over-current relay is different in operation from definite time over-current relay. Discuss working of static over current relay with block diagram. [16]

OR

Q.2 (a) With the help of block diagram explain the working of directional static over-current relay. [8]

(b) How the 'parallel feeders' and 'ring mains' are protected? Explain. [8]

UNIT-III

Q.3 Explain any two protective schemes which are used for the protection of stator of a generator get. [16]

OR

Q.3 How the rotor of a generator get is protected by 'Field ground-fault protection' system and 'Loss of excitation protection' system? Explain with diagram. [16]

UNIT-IV

Q.4 (a) What is Buchholz relay? Which equipment is protected by it? Discuss its working principle. [2+2+4=8]

(b) What is frame leakage protection? Explain its working principle and filed of application. [8]

OR

Q.4 (a) What is magnetizing inrush current? What measures are taken to distinguish between the fault current and magnetizing inrush current? [8]

(b) Discuss the protective scheme which protects the transformer against faults but does not operate in case of magnetizing inrush current. [8]

UNIT-V

Q.5 (a) Explain the points to be considered while selecting a fuse. Discriminate, fuses and over current protective devices. [8]

(b) What are the abnormal conditions in a large induction motor against which protection is necessary? [8]

OR

Q.5 In what way is distance protection superior to over-current protection for transmission lines? Explain operating principle and characteristics of on electromagnetic impedance relay. [16]

6E3113

Roll No. _____ Total No of Pages: 3

6E3113

B. Tech. VI-Sem. (Old Back) Exam., April/May-2016

Electrical Engineering

6EE5 (O) Data Structures in C

Common for EE and EX

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

Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*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 may suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL 2. NIL

UNIT-I

Q.1 (a) What do you understand by time-space tradeoff? [8]

(b) What is rate of growth of any function? Explain all asymptotic notations in details. [8]

OR

Q.1 (a) What is difference between array and linked list? [6]

(b) Write an algorithm for creating and traversing a doubly linked list. [10]

UNIT-II

Q.2 (a) Explain row and column major mapping. [6]

(b) There is a matrix A with 50 rows and 40 columns and the base address is 2000. Size of data type is 2 byte. Calculate the address of:

(i) A [20] [30] in row major mapping [2.5]

(ii) A [17] [37] in row major mapping [2.5]

(iii) A [49] [39] in column major mapping [2.5]

(iii) A [18] [7] in column major mapping [2.5]

OR

Q.2 (a) What do you understand by sparse matrix representation? How elements are stored in sparse matrix? [10]

(b) Write steps to add two sparse matrixes. [6]

UNIT-III

Q.3 (a) Define stock? Explain its basic operation and implement stack using linked list. [8]

(b) Transform each of the following infix expression into post fix expression:

(i) a * (b+c) – d/e [4]

(ii) A + (B*C – (D/E ^F) * G) * H [4]

OR

Q.3 (a) Write short note on Tower of Hanoi problem and also write a recursive solution for TOH problem. [10]

(b) What are dequeue and priority queues? What are their uses? [6]

UNIT-IV

Q.4 Write short notes on:

(a) Strictly binary tree [4]

(b) Complete binary tree [4]

(c) Almost complete binary tree [4]

(d) Binary search tree [4]

OR

Q.4 What do you understand by Height balanced tree? Explain the insertion in height balanced tree.

Insert the following keys in AVL tree -

A, Z, B, Y, C, X. [16]

UNIT-V

Q.5 (a) Define the following terms with suitable examples -

(i) connected graph [2]

(ii) non-connected graph [2]

(iii) complete graph [2]

(iv) directed graph [2]

(b) Define BFS and write steps to explain BFS. [8]

OR

Q.5 Write quick – sort algorithm? Explain its complexity in details. [16]
