

6E3086

Roll No. : _____

Total Printed Pages : 4**6E3086**

B. Tech. (Sem. VI) (Back) Examination, April-May - 2018
Electrical & Electronics Engg.
6EX2(O) Microprocessor & Microcontroller
(EX, EC)

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. NIL2. NIL**UNIT - I**

1 (a) Explain different types of memories and their classification.

8

(b) Explain the following terms with respect to 8085 microprocessor.

(i) Address bus

(ii) Data bus

(iii) Control bus.

8

OR

- 1 (a) The capacity of a memory unit is defined by the number of words multiplied by the number of bits/words. How many separate address and data lines are needed for a memory of $4k \times 16$? 8
- (b) Design a 4×3 RAM. Draw the logic circuit of basic cell also. 8

UNIT - II

- 2 (a) What are different flags available in 8085 microprocessor ? Explain each in brief. 8
- (b) Explain the use of RIM and SIM instruction. Write sequence of instructions to enable RST 7.5, RST 6.5 and RST 5.5 respectively. 8

OR

- 2 (a) Explain the following instructions of 8085 microprocessor with example :
 (i) RLC
 (ii) SHLD
 (iii) STA
 (iv) STAX. 8
- (b) Describe the function of following pin in 8085 :
 (i) INTR
 (ii) S_1 & S_0
 (iii) ALE
 (iv) HLDA. 8

UNIT - III

- 3 (a) Explain different types of instructions of 8085 microprocessor giving suitable examples. 8
- (b) What is a Debugging a program ? Explain the static and dynamic debugging. 8

OR

- 3 (a) Write a program to add two 8-bit values 55H and ABH. Store the result in register C. 8
- (b) Write an 8085 assembly language program to find the largest and smallest numbers out of 10 unsigned 8-bit integers stored at 3000 H onwards. Store the result at 3050 H and 3051 H. 8

UNIT - IV

- 4 (a) Draw the block diagram of programmable interval timer 8253. 8
- (b) Draw the block diagram of interfacing 8155 I/O ports with seven-segment LEDs. 8

OR

- 4 (a) Draw the pin diagram 8255 and explain its various models. 8
- (b) Explain the working of successive approximation A/D converter with the help of a block diagram. 8

UNIT - V

- 5 (a) Draw the pin diagram of 8051 microcontroller and explain its various pin. 8
- (b) Compare the difference between a microprocessor and microcontroller and describe its applications. 8

OR

- 5 (a) Explain the register set of 8051 microcontroller. 8
- (b) Write short notes on :
(i) Counters and timers of 8051
(ii) Interrupts of 8051. 8
-

6E3113	Roll No. : _____	Total Printed Pages : 4
	6E3113	
B. Tech. (Sem. VI) (Back) Examination, April-May - 2018		
Electrical Engineering		
6EE5(O) Data Structures in C		
(EE, EX)		

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) Describe the Doubly Linked Lists with advantages and disadvantages. Write a C program to delete a node from a doubly linked list .ptr is the pointer which points to the node to be deleted. Assume that there are nodes on either side of the node to be deleted. 10
- (b) Differentiate between a Singly Linked List and a Doubly Linked List. 6

OR

- 1 Write a program to implement linear linked list, showing all the operations that can be performed on a linked list.

UNIT - II

- 2 (a) Consider a two dimensional array A of order $[25 * 4]$. The base address of the array is 400, words per memory cell is 4. Find the address of $A[12, 4]$ using a row major and column major addressing. 10
- (b) Explain triangular and symmetric matrix with the help of a suitable example. 6

OR

- 2 (a) Explain Sparse Matrices and their types with the help of suitable examples. 8
- (b) Write a program in C to multiply two matrices A and B. 8

UNIT - III

- 3 (a) Differentiate between an Array and a Stack. 6
- (b) Explain the following : 10
- (i) Tower of Hanoi
- (ii) Circular Queues.

OR

- 3 (a) Write an Algorithm/Program for basic stack operations. 10
- (b) Explain how a chain can be used to implement a queue. Write the functions to insert and delete elements from such a queue. 6

UNIT - IV

- 4 With reference to the figure, answer the following :

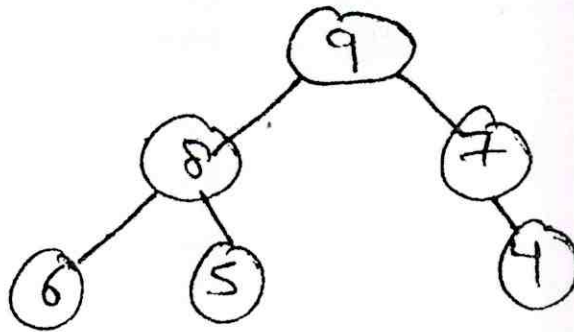


Fig.

- (i) Is it a Binary tree. if yes how ?
- (ii) Is it a complete tree, if yes how ?
- (iii) Give the preorder traversal.
- (iv) Give the inorder traversal.
- (v) Give the post order traversal.
- (vi) Give the list notation (using pairs of round brackets)
- (vii) Where will be the left child of node 4 pointing to, if it is converted to a threaded b-tree ?
- (viii) Is it a max heap ?

2×8=16

OR

- 4 (a) Describe the binary search tree with an example. Write a iterative function to search for a key value in a binary search tree.

10

- (b) Explain the following :

- (i) Binary tree and Binary Search tree
- (ii) Complete Binary Tree.

6

UNIT - V

- 5 (a) Write Kruskal's Algorithm for finding the Minimum Spanning Tree. 8
- (b) Outline the distinguishing features of Depth First Search (DFS) and Breadth First Search (BFS) in the context of graphs. 8

OR

- 5 (a) Apply BFS and DFS on the below graph :

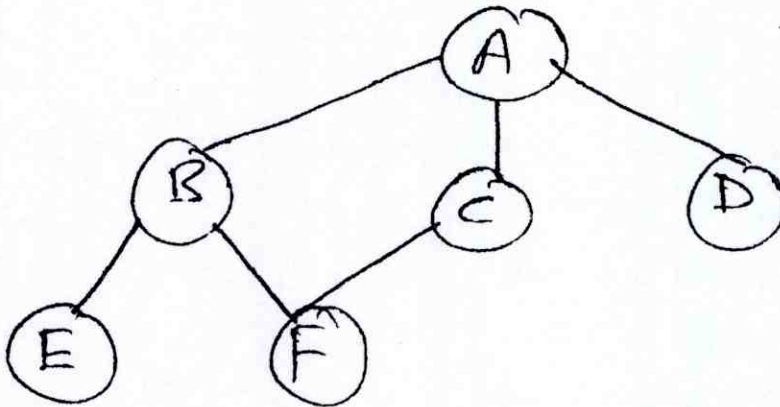


Fig.

- (b) Explain bubble sort, insertion sort and merge sort with examples. 8

8

- (b) Discuss how saturation affects the accuracy of C.Ts. Explain the accuracy limit factor or saturation factor.

8

UNIT - II

- 2 (a) State basic difference between HRC fuse and thermal relay. 4
- (b) Explain what is meant by transient over-reach as applied to high set instantaneous overcurrent relays. What measures are taken to overcome this difficulty ? 8
- (c) Discuss a protective scheme for parallel feeders. 4

OR

- 2 (a) How is directional earth fault relay energized ? 4
- (b) Describe the operating principle, constructional features and area of applications of reverse power or directional relay. What is a directional overcurrent relay ? 12

UNIT - III

- 3 A 13.8 kV, 125 MVA, star-connected alternator has a synchronous reactance of 1.4 per unit per phase and a negligible resistance. It is protected by a Merz-price balanced current system which operates when out of balance current exceeds 10% of the full-load current. If the neutral point is earthed through a resistance of 2Ω , determine what proportion of winding is protected against earth fault.

16

OR

- 3 (a) Describe the general principle of operation of generator differential protection scheme. Give the 3ϕ connection of the biased scheme.

8

- (b) Describe with suitable diagrams how the stator windings of a 3-phase alternators are protected from :

- (i) unbalanced current in the stator winding
- (ii) earth fault on the rotor winding.

8

UNIT - IV

- 4 (a) Discuss the special problems of biased differential protection of a transformer. How are they overcome ? Develop a transformer differential protection scheme using the second harmonic restraint feature.

12

- (b) Why use of single-bus-bar arrangement is restricted to small and medium sized substations and small power stations ?

4

OR

- 4 (a) Name the most commonly used schemes for bus-bar protection.
- (b) What is the drawback of differential overcurrent protection for bus-bars and how is it overcome ?
- (c) On what factors does the choice of a protective gear for transformer depend ?

16

UNIT - V

- 5 (a) What is unit type protection ? 4
- (b) What is meant by time graded protection and where it is employed ? 4
- (c) Explain three stepped distance protection of transmission line. 8

OR

- 5 (a) Explain the effect of arc resistance on the performance of distance protection scheme. 8
- (b) Explain the operating principle and characteristics of an electromagnetic impedance relay. Draw the required diagram neatly. 8

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B.Tech. (Sem. VI) (Main & Back) Examination, April-May 2018
Electrical & Electronics Engg.
6EX6.2A Power System Instrumentation

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. NIL2. NIL**UNIT - I**

- 1 (a) Define limiting (guarantee) errors. Derive the expression for relative limiting error. 8
- (b) Consider an instrumentation system when the temperature of water at 100°C is being measured using a thermometer and they are 100.4°C, 100.3°C, 100.5°C and 100.3°C. Find the system's accuracy and precision. 8

OR

- 1 (a) Describe various types of errors and explain the combination of errors. 8

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1

[P.T.O.

- (b) A circuit has three resistances and they have the following values $R_1 = 200 \pm 10\%$, $R_2 = 100 \pm 5\%$, $R_3 = 50 \pm 5\% \Omega$. Determine the magnitude of the resultant resistance and the limiting error if they are connected in (a) series (b) parallel.

8

UNIT - II

- 2 (a) Derive an expression for the gauge factor of strain gauges. Differentiate the bonded and unbounded type strain gauges.
- (b) Describe the method for measurement of temperature with use of RTD's and also describe the advantages and limitations.

8

8

OR

- 2 (a) Differentiate between the following with suitable examples :
- (i) Transducers and Inverse Transducers
 - (ii) Active and Passive Transducers
 - (iii) Primary and Secondary Transducers
 - (iv) Analog and Digital Transducers
- (b) Explain the working principle of LVDT. Explain how the magnitude and direction of the displacement of core of an L.V.D.T. detected.

8

8

UNIT - III

- 3 (a) What do you mean by isolation amplifiers ? Explain the circuit diagram and applications also.

8

- (b) Write short note on the following :
- (i) Shielding and Grounding
 - (ii) Charge Amplifier

8

OR

- 3 (a) Explain the following terms with reference to the instrumentation amplifiers.
- (i) Input offset voltage
 - (ii) Output offset voltage
 - (iii) CMRR
 - (iv) Virtual Ground
- (b) What is timers ? Classify the different types of timers used in signal conditioning system.

8

8

UNIT - IV

- 4 (a) What is a power factor ? Explain the causes of low power factor and methods of improvement of power factor.
- (b) Describe the active and reactive power in the different plants.

8

8

OR

- 4 (a) Explain the industrial metering and various types of industrial tariffs.
- (b) Two-wattmeter method is used to measure the power taken by a 3-phase induction motor on a load. The wattmeter readings are 375 W and -50 W. Calculate
- (i) Power factor of the motor at no load.
 - (ii) Phase angle in two wattmeters.

8

8

UNIT - V

5. (a) Explain the Wilson compensation method for reduction of errors in current transformers. 8
- (b) Describe how high currents and voltages are measured with the help of instrument transformer. Draw HR necessary diagrams. 8

OR

- 5 (a) Explain the various protection criterions for current transformers. 8
- (b) A.C.T. has a single turn primary and 400 sec. turns. The magnetizing current is 90A while core loss current is 40A. Secondary circuit phase angle is 28° . Calculate the actual primary current and ratio error when secondary carries 5A current. 8

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B.Tech. VI-Sem (Main & Back) Exam April-May 2018
Electrical & Electronics Engg.
6EX6.1A Smart Grid Technology

**[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 the concept of resilience grid ? Explain its working and importance in smart grid. 3+5=8
- (b) What is the need of smart grid in the Indian Economy ? 4
- (c) Explain the difference between conventional grid and smart grid. 4

OR

- 1 (a) What is smart grid ? Give a brief idea of smart grid. Describe the benefits of employing smart grid. 2+3+3=8
- (b) Describe the present international policies in smart grid.

UNIT - II

- 2 (a) Define FACTS technology in AC transmission system. Explain different types of FACTS devices and their benefits in AC transmission system.
2+8=10
- (b) What are high efficiency distribution transformer ? How they are better than conventional distribution transformer ?
2+4=6

OR

- 2 (a) What do you mean by wide area monitoring and why it is required in smart grid ?
2+3=5
- (b) Explain smart substations. What are the advantages of smart substations over conventional substations ?
3+4=7
- (c) Explain outage management system (OMS) in short.
4

UNIT - III

- 3 (a) How AMI being an essential part of smart grid ? Explain.
8
- (b) What is intelligent electronic devices (IED) ? Explain the applications of IED.
2+6=8

OR

- 3 (a) Write a short note on smart meter and how it is different from conventional energy meter.
4+4=8
- (b) What do you mean by phasor measurement unit (PMU) ? Explain the components of PMU.
3+5=8

UNIT - IV

- 4 (a) Explain EMC in smart grid. Write its importance in smart grid. 4+4=8
- (b) Explain the various steps used in power quality audit. 8

OR

- 4 (a) Explain the various power quality issues of grid connected renewable energy sources. 8
- (b) Describe power quality conditions for smart grid in brief. 8

UNIT - V

- 5 (a) Describe the following network topologies in brief :
 (i) LAN 4
 (ii) HAN 4
- (b) Explain the CLOUD computing in smart grids. How can CLOUD computing make smart grids smarter ? 4+4=8

OR

- 5 (a) Explain broad band over power line. Explain its advantages. 4+4=8
- (b) Write a short note on cyber security in smart grid. 4
- (c) What is the use of IP based protocols ? 4

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Roll No. : _____

Total Printed Pages : **3****6E6074**

B.Tech. (Sem. VI) (Main & Back) Examination, April-May 2018
Electrical Engineering
6EE4A Advanced Power Electronic
EE, EX

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. NIL2. NIL**UNIT - I**

- 1 (a) Explain the principle of on-off control of AC voltage controllers with inductive loads.

8

- (b) What are the steps involved in determining the output voltage waveforms of three phase bidirectional controllers ?

8**OR**

- 1 (a) Explain AC voltage controller with PWM control.

8**6E6074]****1****[P.T.O.**

- (b) Analyze the output wave form of a single phase AC regulator into various harmonics with Fourier series and find the expression for the magnitude of 4th harmonics E_{nm} and its phase ϕ_4 .

8

UNIT - II

- 2 (a) What are the advantage and disadvantage of cyclo-converters ?
- (b) Explain the control circuit and output equation of three phase to single phase cyclo-converter.

8

8

OR

- 2 (a) What is a line commutated cyclo-converter ? How does it differ from load commutated cycloconverter ?
- (b) Explain the basic operational principle of cycloconverter with waveforms.

8

8

UNIT - III

- 3 (a) A 3 phase bridge inverter is operated in 120° degree of conduction. Draw the output line voltage waveforms.
- (b) Explain the method of harmonic reduction in inverters with necessary equations.

8

8

OR

- 3 (a) Explain 180° mode of operation of V.S.I. Compare V.S.I. and C.S.I. with respect to their advantages and disadvantages.

8

- (b) Discuss the working of a mid-point cycloconverter and also explain why cycloconverters are more efficient than the DC link converter.

8

UNIT - IV

- 4 (a) Explain the methods for voltage control of series resonant inverters with uni-directional switches.

8

- (b) What is ZVS resonant converters ?

8

OR

- 4 (a) What are the merits and demerits of ZCS resonant converters ?

8

- (b) What is class E resonant inverters ?

8

UNIT - V

- 5 (a) Explain the voltage mode control and current mode control of control circuit.

8

- (b) Discuss the operation of switch-mode DC power supplies.

8

OR

- 5 (a) Give the comparison between fly-back and forward converter in detail.

8

- (b) What are the elements of SMPS ? Discuss multistage converter used for conditioning of power factor.

8

Total Printed Pages : 3

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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 relays ? Explain its merits, demerits and its applications. 8
- (b) Explain phase splitting type and sampling type. 8

OR

- 1 (a) What is phase comparators ? Explain direct phase comparison techniques. 8
- (b) Explain the following :
- (i) Directional overcurrent delays
 - (ii) Coincidence type
- $4 \times 2 = 8$

UNIT - II

- 2 (a) What is static differential relay schemes ? Explain the various types. 8
- (b) Explain static differential protection of generator. 8

OR

- (a) What is protective gear ? Explain all the factors on which this transformer depend. 8
- (b) Explain the following : 4×2=8
- (i) Static Impedance
- (ii) MHO Relays

UNIT - III

- 3 (a) What is the difference between directional comparison and phase comparison ? Explain. 8
- (b) Explain scheme of power line carrier system. 8

OR

- 3 (a) What is out of step blocking ? Explain various operating principles of an outstep blocking relay. 8
- (b) Explain the quadrilateral and elliptical relays. 8

UNIT - IV

- 4 (a) What is Electric Arc ? Also explain its characteristics. 8
- (b) Explain Arc and Interruption theories and various types. 8

OR

- 4 (a) What is Restriking voltage and recovery voltage ? Explain in detail. 8
- (b) Explain miniature circuit breaker (MCB). 8

UNIT - V

- 5 (a) Explain SF6 and vaccum circuit breaker in brief. 8
- (b) What is digital relay ? Explain with the diagram of digital relay. 8

OR

- 5 Write short notes on following :
- (i) Digital overcurrent
- (ii) Transmission line distance protection.

8×2=16

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Roll No. : _____

Total Printed Pages : 3**6E6072**

B.Tech. VI-Sem (Main & Back) Examination, April-May 2018
Electrical Engineering
6EE2A High Voltage Engineering

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. _____ 2. _____

UNIT - I

- 1 (a) Discuss townsend's breakdown mechanism with suitable diagram. 10
- (b) Discuss the application of gases in power system. 6

OR

- 1 (a) Explain suspended solid particle mechanism and cavity breakdown with proper labelled diagram. 10
- (b) List out the application of oil in power apparatus. 6

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UNIT - II

- 2 Differentiate between high DC and AC voltage generation with proper circuit diagram.

16

OR

- 2 (a) Explain the construction and operation of sphere gap.
(b) Briefly discuss the working of Mark's multistage impulse generator.

8

8

UNIT - III

- 3 (a) How will you measure capacitance and dielectric loss using high voltage schering bridge ?

10

- (b) Define Nondestructive Insulation tests.

6

OR

- 3 (a) Define partial discharge and draw its equivalent circuit.

6

- (b) Explain the working of wideband and narrow band PD detection circuits.

10

UNIT - IV

- 4 (a) What are the causes of over voltages ? explain.

8

- (b) Explain the phenomena of attenuation of travelling waves.

8

OR

- 4 Write short note on :

- (a) Open end line and short circuited line.

- (b) Reflection and Refraction at a T junction.

8×2=16

UNIT - V

- 5 Discuss the insulation coordination in detail. Also define volt-time curves and basic impulse insulation levels.

16

OR

- 5 Discuss the construction and operation of ground wires and explain the following parameters :

- (a) Protection angle
- (b) Protection zone
- (c) Counterpoise
- (d) Surge absorber

16

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Roll No. : _____

Total Printed Pages : 4**6E6071**

B. Tech. (Sem. VI) (Main & Back) Examination, April-May 2018
Electrical Engineering
6EE1A Modern Control Theory EE, EX

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) For the state space approach of control system analysis explain modern and conventional concept control theory ?

8

- (b) Describe the linearity concept, also verify $x_1 = (1, 3, 4, 2)$; $x_2 = (3, -5, 2, 2)$, $x_3 = (2, -1, 3, 2)$ are linearly dependent ?

8

OR

- 1 (a) Explain the concept of linear vector space independence by help of suitable example ?

8

- (b) For an electrical system explain statespace equation with example ?

8

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UNIT - II

- 2 (a) Derive Jordan's canonical form for the following transfer function

$$\frac{Y(s)}{U(s)} = \frac{6}{(s+1)^2(s+2)}$$

8

- (b) Find the transfer function when

$$A = \begin{bmatrix} -2 & 1 \\ 0 & -3 \end{bmatrix}; B = \begin{bmatrix} 0 \\ 1 \end{bmatrix} \text{ and } C = [1 \ 1].$$

8

OR

- 2 (a) The transfer function of a system is given as

$$\frac{Y(s)}{U(s)} = \frac{3s^2 + 2s + 7}{s^3 + 5s^2 + 12s + 5}$$

Express in CCF. Draw a state diagram & state matrix.

8

- (b) Explain the phenomena of derivation of transfer function from state model ?

8

UNIT - III

- 3 (a) Explain controllability ?

The state equation of a system are as :

$$\dot{x}_1 = x_1 + x_2 + \mu$$

$$\dot{x}_2 = -x_2 \text{ check it for controllability.}$$

8

- (b) What is Eigen value ?

Find the eigen values of $A = \begin{bmatrix} 0 & 1 \\ -6 & -5 \end{bmatrix}$.

8

OR

- 3 (a) Explain the phenomena of pole placement by help of state feedback.

8

- (b) Explain observability ?
Check observability of the system given

$$\dot{x}_1 = -2x_1 + x_2 + \mu$$

$$\dot{x}_2 = -2x_2 + \mu \text{ and } y = x_1 + x_2.$$

8

UNIT - IV

- 4 (a) Show the relationship between Z & S demerlin relationship ?

8

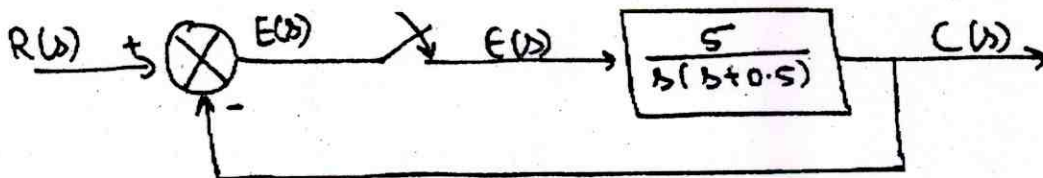
- (b) Determine Z-transform of the function

$$f(s) = \frac{1}{s^2 + 2s + 2} \text{ and assume sampling time } T = 1 \text{ sec.}$$

8

OR

- 4 (a) Determine the pulse transfer function & stability of the sampled data control system shown in fig. for sampling time (a) $T = 0.5$ sec (b) $T = 1$ sec.



8

- (b) Explain sampled data control system by help of example ?

8

UNIT - V

5 (a) Explain digital PID controllers ?

8

(b) The characteristic equation of two system is given below :

(i) $s^4 + 6s^3 + 21s^2 + 36s + 20 = 0$

(ii) $s^5 + 6s^4 + 3s^3 + 2s^2 + s + 1 = 0$

Find whether the system are stable or not using Routh Hurwitz criteria ?

8

OR

5 (a) Write short note on Bilinear transformation ?

8

(b) Explain the stability in z plane ?

8