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5E5021

Roll No. ________

Total No of Pages: 4

5E5021

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics & Communication Engineering
5EC1A Signal & Systems
Common with EI

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks 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 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 For the system described by the following equations, with the input x(t) and output y(t), determine which of the systems are linear and which are nonlinear.

(a) $\frac{dy(t)}{dt} + 3y(t) = x(t)$ [4]

(b) $\frac{dy(t)}{dt} + 2y(t) = x^2(t)$ [4]

(c) $\frac{d^2y(t)}{dt^2} + 2y(t) = x(t)$ [4]

(d) $\frac{dy(t)}{dt} + 3y(t) + 4 = x(t)$ [4]

OR

Q.1 Show that:-

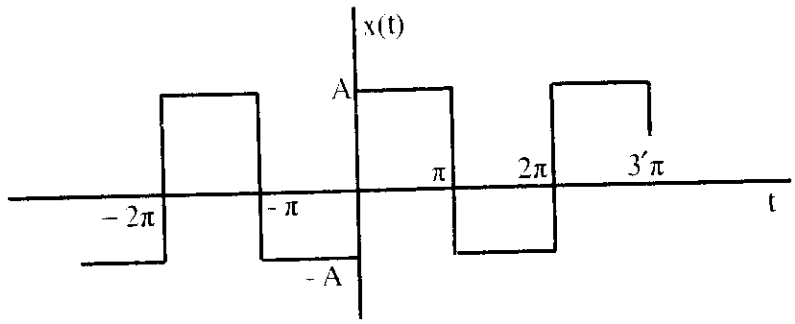
(a) the convolution of an odd and an even function is an odd function. [6]

(b) the convolution of two odd functions is an even function. [5]

(c) the convolution of two even functions is an even function. [5]

UNIT-II

Q.2 (a) Find the trigonometric Fourier series for the square wave shown in fig. and plot the line spectrum. [8]



(b) Describe the properties of continuous time Fourier series. [8]

OR

Q.2 (a) Determine the Fourier series coefficients of the signal x(n) and plot its magnitude and phase spectrum. [8]

$$x(n) = 1 + \sin\left(\frac{2\pi}{N}n\right) + 3\cos\left(\frac{2\pi}{N}n\right) + \cos\left(\frac{4\pi}{N}n + \frac{\pi}{2}\right)$$

(b) Determine the DTFS coefficients of the signal x(n), [8]

$$x(n) = 2 + 2\cos\frac{\pi}{4}n + \cos\frac{\pi}{2}n + \frac{1}{2}\cos\frac{3\pi}{4}n$$

UNIT-III

Q.3 (a) Find the Fourier Transform of the unit step function [8]

$$x(t) = \begin{cases} 1, & t \geq 0 \\ 0, & t < 0 \end{cases}$$

(b) Find the inverse Fourier Transform of [8]

$$x(jw) = \begin{cases} 2\cos w & , |w| \le \pi \\ 0 & , |w| > \pi \end{cases}$$

OR

Q.3 (a) Describe the properties of DTFT. [8]

(b) Find the DTFT of the signal $x[n]=\{2, 1, \underset{\uparrow}{4}, 1, 2\}$ [8]

UNIT-IV

Q.4 (a) Determine the z – transform of [8]

$$x[n] = -u[-n-1] + \left(\frac{1}{4}\right)^n u(n).$$

Depict the poles, zeros and ROC on the z-plane.

(b) Find the z-transform and the ROC of the discrete sinusoid signal [8]

$$x[n] = [\sin(\Omega n)]u(n)$$

OR

Q.4 (a) Write down the properties of Laplace Transform. [8]

(b) Find the inverse Laplace transform of [8]

$$X(s) = \frac{9s+10}{s(s+2)}$$

UNIT-V

Q.5 (a) Describe the sampling theorem. [8]

(b) The signals [8]

$$x_1(t) = 10\,\mathrm{Cos}(100\,\pi\,t) \text{ and } x_2(t) = 10\,\mathrm{Cos}(50\,\pi\,t)$$

are both sampled with fs = 75 H_2. Show that the two sequences of samples so obtained are identical.

OR

Q.5 (a) A Continuous-time signal consisting of frequency 500 Hz and its third harmonic is sampled at the Nyquist rate of sampling. Find the corresponding discrete time signal [8]

(b) Let $x(n) = \{1, \underset{\uparrow}{2}, 5, -1\}$. Generate - [8]

(i) decimated signal $x(2n)$.

(ii) various interpolated version (zero interpolation and step interpolation) of $x(n/3)$.

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Total No of Pages: 4

5E5022

5E5022

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics & Communication Engineering
5EC2A Linear Integrated Circuits
Common with EI

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks 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 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 is the significance of CMRR & slew rate in practical circuits? Explain with an example. [4]

(b) Why level shifter is required to design an operational amplifier? Explain its circuit. [4]

(c) What is the difference between cascade and cascode amplifier? Explain cascode amplifier in detail. [8]

OR

Q.1 (a) What are the various properties of operational amplifier for using as comparator? Explain briefly. [4]

(b) The 741C op-amp having following parameter is connected as a non-inverting amplifier (as shown in Figure1) with $R_1 = 1k\Omega$ & $R_F = 10k\Omega$:

Open loop gain (A)=200,000, Input Impedance (R_i) = $2M\Omega$

Output Impedance (R_o) = 75Ω, $f_O \cong 5$ Hz.

Supply voltage = ± 15 V, output voltage suing = ± 13V

Find the voltage gain with feed back (A_F), Input Impedance with feed back (R_{iF}), Output Impedance with feed back (R_{oF}) and Total offset voltage (V_{OOT}). [12]

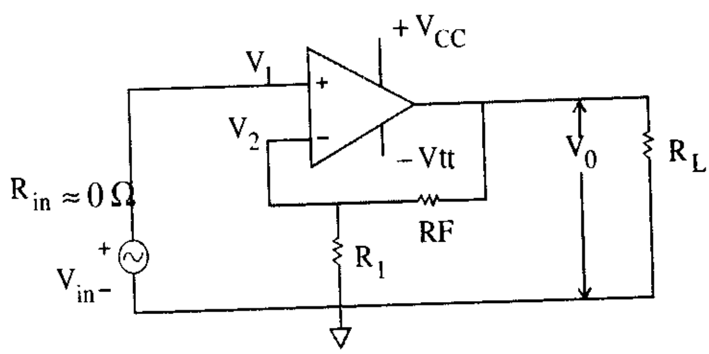


Figure - 1

UNIT-II

Q.2 (a) Why differentiator circuits are not used in design of analog computes for solving differential circuit? [4]

(b) (i) Design a differentiator to differentiate an input signal that varies in frequency range from 10Hz to about 1KHz. [6]

(ii) IF a sine wane of 1V peak at 1000Hz is applied to differentiator of part (i), draw its output wave form. [6]

7th (5)

OR

Q.2 (a) The open loop voltage gain of operational amplifier is A as shown in figure 2. Find out the close loop voltage gain of circuit. [8]

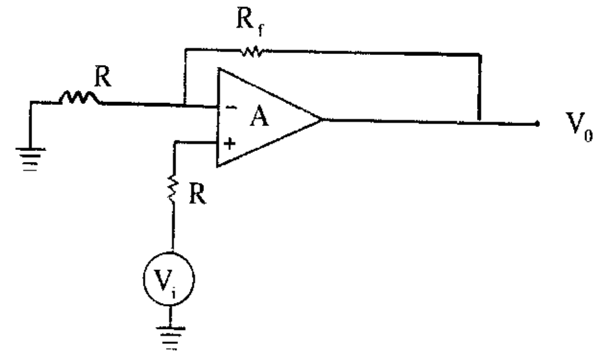


Figure – 2

(b) Find the voltage gain of the circuit as shown in figure 3. [8]

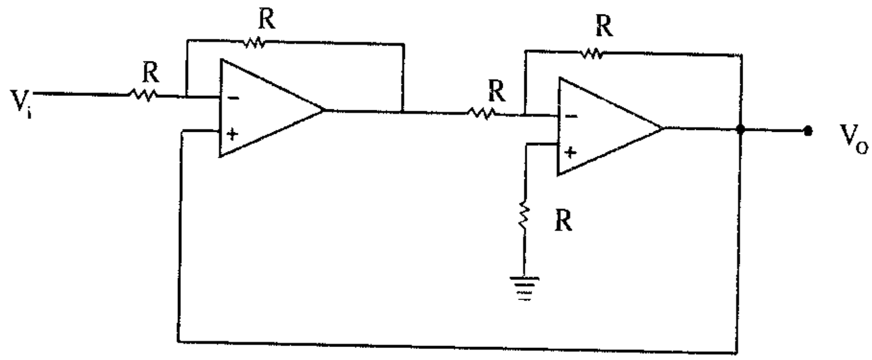


Figure - 3

UNIT-III

Q.3 (a) (i) Design a active second order low pass filter at a high cutoff frequency of $1KH_Z$. [4]

(ii) Also draw the frequency response of network in part (i) [4]

(b) Design the phase shift oscillator using op-amp 741 for $f_o = 200H_Z$. [8]

OR

Q.3 (a) Design the triangular wave generator for $f_0 = 2KH_Z$ using op-amp 741 and output peak to peak voltage of 7V. [8]

(b) Design a $60H_Z$ active no notch filter using op-amp 741. [8]

UNIT-IV

Q.4 (a) Design a regulated power supply of $\pm 5V$ using filters and three terminal voltage regulated I. C. Also mention the value of capacitance for filtering. [8]

(b) What are the various operating modes of 555 IC? Also explain the working principle of free running multi-vibrator. [8]

OR

Q.4 (a) Explain the working and application of four quadrant multiplier. [8]

(b) Write a brief note on Schmitt trigger. Also compare its performance with zero crossing detector. [8]

UNIT-V

Q.5 Write a short note on following (**Any two**) - [8×2=16]

(a) Log and antilog amplifiers

(b) Block diagram and operation of PLL

(c) Frequency synthesizer

(d) Lock range and capture range of PLL.

5E5023

Roll No. ____________ Total No of Pages: 4

5E5023

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics & Communication Engineering
5EC3A Telecommunication Engineering

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

Min. Passing Marks Main: 26

Min. Passing Marks 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 suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

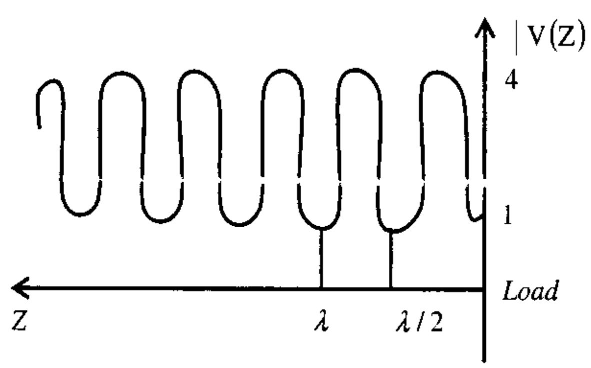
Use of following supporting material is permitted during examination.

1. NIL 2. NIL

UNIT-I

Q.1 (a) Voltage standing wave pattern in a lossless transmission line with characteristics importance impedance 50Ω and a resistive load is shown in figure.

Calculate the value of load resistance and reflection coefficient. [8]



(b) What is the meaning of standing wave patterns? Explain it for lossless transmission line and for transmission line with attenuation. [8]

OR

Q.1 (a) Explain the characteristics of transmission line at Radio frequencies and calculate the characteristic impedance. [8]

(b) A 20 km long transmission line operating at 500MHz has following primary constants R=0.5Ω/m, L=250nH/m, C=100Pf/m, G=10^{-6}S/m. All constants are assumed to be independent of frequency.

Calculate characteristic impedance, attenuation coefficient (α) and phase coefficient (β) for the line. [8]

UNIT-II

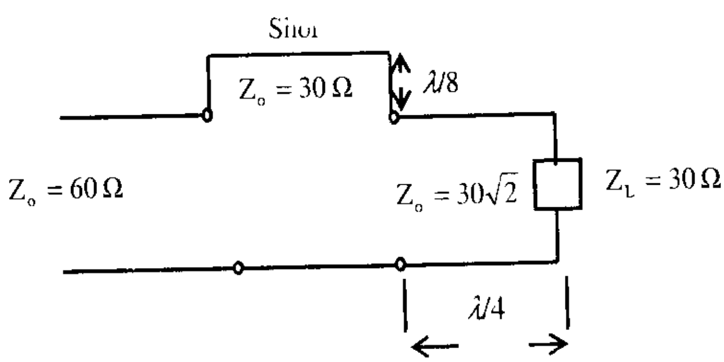
Q.2 (a) What do you mean by matching of transmission line? Explain the method of single and double stub matching with neat diagram. [9]

(b) An open wire R.F. transmission line (loss free) has a Z_0 = 600Ω, is connected to resistive load of 100Ω. Find the position and length of short circuited stub, if frequency is 150 MHz. [7]

OR

Q.2 (a) Draw a block diagram of a setup for measurement of attenuation and insertion loss of transmission line and explain firefly. [10]

(b) In the circuit shows all the transmission line section are lossless. Calculate the VSWR for the 60Ω line [6]



UNIT-III

Q.3 (a) Draw a 'T' and 'π' section of a prototype high pass filter and explain the parameters 'α' and 'β'. [10]

(b) Design a 'T' and 'π' section constant 'K' high pass filter having cut off frequency of 10KHz with impedance $R_0 = 500\Omega$. Find the - [6]

(i) Characteristics impedance and phase constant at 20KHz

(ii) Attenuation at 5KHz

OR

Q.3 (a) Explain a symmetrical lattice attenuator. Write its design equations in terms of characteristics impedance and attenuation factor. [8]

(b) Calculate the elements value of a π-type attenuator to be inserted between 500Ω impedance for an attenuation of 50dB. [8]

UNIT-IV

Q.4 (a) What are the main sources of "NEXT" and "FEXT" in telephone systems? How they are controlled? Explain in detail. [8]

(b) Explain the working of two wire and four wire repeaters and compare both of them. [8]

OR

Q.4 (a) Determine -

(i) Lost traffic and

(ii) Grade of service provided by five switches arranged in full availability group when traffic offered in 0.9 traffic units. [8]

(b) With the help of neat diagram explain the working of echo cancellers. [8]

ISC

UNIT-V

Q.5 Write short notes on **any two** - [8×2=16]

(a) STS and TST switching

(b) EPABX and SPC Digital telephone exchange.

(c) Signaling in telephone systems.

5E5024

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Total No of Pages: 4

5E5024

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics & Communication Engineering
5EC4A Analog Communication

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks 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 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) In a radio receiver an RF amplifier and a mixer are connected in cascade as shown in fig.-1. The amplifier has a noise figure of 10dB and power gain of 15dB. The noise figure of the mixer is 20db. Calculate the overall noise figure reffered to the input. [8]

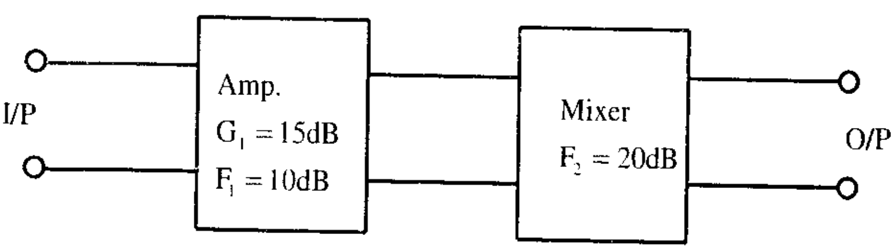


Figure - 1

(b) How reactive circuits affect the noise in communication circuits? A parallel tuned circuit has resonant frequency 10 MHz and quality factor Q=20. If the value of capacitance is 10PF then calculate the noise voltage across it. Assume the ambient temperature 17°C. [4+4=8]

OR

Q.1 (a) What are the external sources of noise? Compare these sources with internal noise sources in respect of their voltage level, bandwidth and coupling in communication system. [8]

(b) A radio receiver with equivalent noise bandwidth of 10kHz has a noise figure of 20dB. It input SNR to receiver is 40 dB then (i) determine the output SNR (ii) what is equivalent noise temperature if ambient temperature is 27°C. [8]

UNIT-II

Q.2 (a) The input to an envelope detector is a single tone AM signal $X_{AM}(t)=A(1+maCosW_mt)\ CosW_ct$.

(i) Show that if the detector output is to follow the envelope then it must fulfill the following condition at any instant to $\frac{1}{RC} \geq W_m\left(\frac{M_a \sin w_m t_o}{1+M_a \operatorname{Cos} w_m t_o}\right)$. How this coalition will modify for all time? [8]

(b) What is vestigial sideband modulation? Explain its circuit for demodulation. Also write the specific use of it. [3+3=6]

(c) Draw frequency spectrum of DSB-SC. [2]

OR

Q.2 (a) A carrier signal $X_C(f)=1.0\sin W_Ct$ is fed in series to a modulating signal of amplitude 0.5 volt across a square law modulator having characteristic -

$i=10+KV_i+K^1V_i^2$ mA

with $K = 2mA/V$ $\quad K^1 = 0.2mA/V^2$

Then calculate the depth of modulation. [8]

(b) Draw the frequency spectrum of AM-DSB, SSB and vestigial side band modulation. Compare their modulation efficiency. [8]

UNIT-III

Q.3 (a) What is the difference between direct and indirect method of FM Generation? Explain each method and compare them in respect of circuit complexity and performance. [8]

(b) A signal is given by -

$s(f) = \text{Cos}W_c t + 0.2\ WSW_m t\ \text{Sin}W_c t$

(i) Prove that it is combination of AM-FM signal.

(ii) Draw the phasor diagram at any two instant. [3+3=6]

(c) Explain the different between narrow band and wide band FM. Also write their specific application. [2]

OR

Q.3 (a) Define the sensitivity factor in FM and PM. Calculate the resulting bandwidth if -

(i) FM Sensitivity $K_f = 10^4$Hz/volt

(i) FM Sensitivity $K_p = 100\pi$ radian/volt

Assume the carrier frequency = 100MHz. [2+3+3=8]

(b) What is thumb rule for bandwidth calculation in FM? When it can be used? Find the fraction of signal power that is included in the bandwidth given by thumb rule when moderation index is $M_f = 1$ and $M_f = 10$ [2+2+2+2=8]

UNIT-IV

Q.4 Find the expression of SNR in FM. How it is modified with pre-emphasis and de-emphasis? [16]

OR

Q.4 (a) Find the SNR in coherent detection used in SSB receiver. Also find its figure of merit. [8+2=10]

(b) Explain the threshold effect used in AM and FM. [6]

UNIT-V

Q.5 (a) Compare the performance of a coded and uncoded communication system. [8]

(b) Explain the noise performance of PPM and PWM. [8]

OR

Q.5 Write short note on **any two**: [8+8=16]

(a) Natural Sampling

(b) Noise in PAM

(c) Demodulation of PPM.

Roll No. ____________

Total No of Pages: 4

5E5025

5E5025

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics & Communication Engineering
5EC5A Microwave Engineering - I

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks 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 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) Derive the field components of 7M waves in rectangular waveguide. [10]

(b) A rectangular waveguide measures 3×4.5 cm internally & has a 10GHz signal propagated in it. Calculate the cut off wavelength, the guide wavelength & the characteristic impedance for the TE_{10} mode. [6]

OR

Q.1 (a) Discuss & give the relations of following parameters for microchip lines - [6]

(i) losses

(ii) characteristic impedance

(b) Explain parallel coupled striplines with all its design parameters [6]

(c) A certain microstrip line has following parameters - [4]

$\varepsilon_r = 2.23$ $w = 10mm$

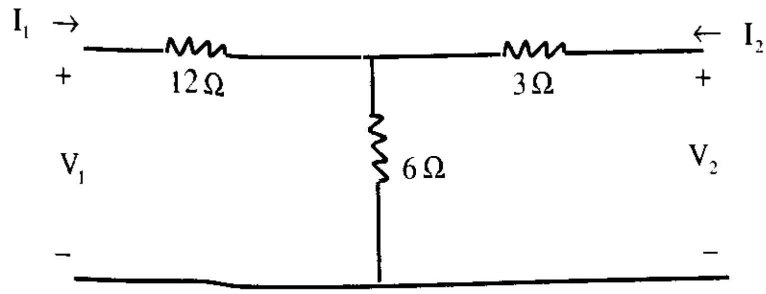
$h = 10mm$

$t = 2mm$

Calculate the characteristic impedance Z_0 of the line.

UNIT-II

Q.2 (a) Find the impedance parameters for the two part network shown in figure- [8]



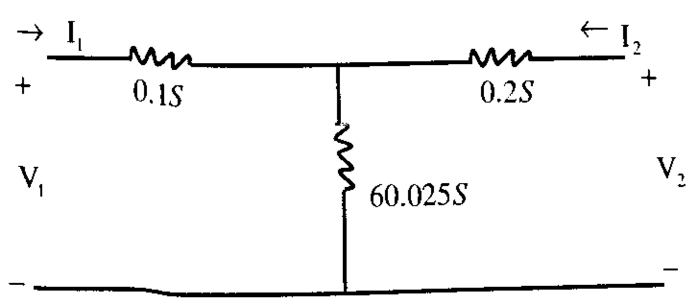
(b) Discuss the following- [8]

(i) Reciprocal Networks

(ii) Lossless Networks

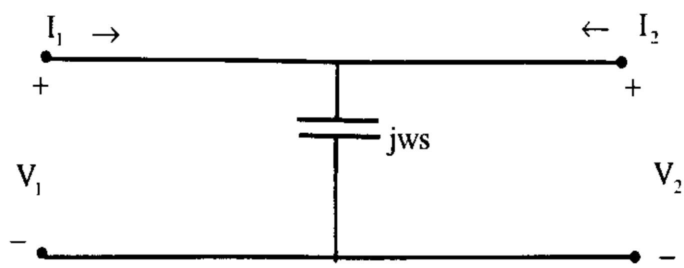
OR

Q.2 (a) Find the admittance parameters for the two part network shown in fig.- [10]



Is this circuit reciprocal & symmetrical?

(b) Determine the transmission parameters of the network shown in figure. [6]



UNIT-III

Q.3 (a) Explain the working of directional coupler & following turns regarding directional coupler - [8]

(i) Coupling factor

(ii) Directivity

(iii) Insertion loss.

(b) A 10mw single is applied to a 20dB directional coupler. Determine the power available at the coupled port. [8]

OR

Q.3 (a) Discuss the turn magic tee? Derive the scattering matrix for magic tee. [12]

(b) Why it is called as magic tee. Prove that all of its ports are matched. [4]

UNIT-IV

Q.4 (a) Describe a procedure for VSWR measurement using microwave bench setup. What is "double minima method"? [10]

(b) In an experiment of measuring frequency using a transfer oscillator the frequencies of null beat condition are obtained to be 238 MHz & 245MHz. What will be the unknown frequency? [6]

OR

Q.4 Write short notes on- [8×2=16]

(a) Calorimeter Wattmeter measurement

(b) Network Analyzer measurement

UNIT-V

Q.5 (a) List down the steps of MOSFET fabrication with suitable diagrams. [8]

(b) Give advantages & disadvantages of MMIC. [8]

OR

Q.5 (a) Discuss hybrid technology (photolithographic process & deposited lumped components), with example. [8]

(b) Write short note on thin film formation. [8]

Roll No. ____________ Total No of Pages: 2

5E5026

5E5026

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics & Communication Engineering
5EC6.1A Biomedical Instrumentation

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks 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 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 Give the brief anatomy & physiology of following human body subsystems. Also discuss the engineering analogous and variable of prime importance for:

(a) Respiratory system [8]

(b) Neural system [8]

OR

Q.1 (a) Give the classification of electrodes used for bio-medical applications. [8]

(b) Explain the selection criteria for transducers and electrodes used in biomedical field. [8]

UNIT-II

Q.2 (a) Draw a well labeled diagram of Action Potential Waveform. Explain the process of Repolarization & Depolarization of cells. [8]

(b) Write short notes on:-
   (i) EMG Biopotential [4]
   (ii) ERG Biopotential [4]

OR

Q.2 (a) What is a phonocardiograph? Explain various techniques for measuring heart sounds. [8]

(b) Explain all the indirect methods of blood pressure measurement. [8]

UNIT-III

Q.3 (a) Describe the operation of blood cell counter based on dark field method. [8]

(b) Describe the colorimetric method of determining chemical concentration. [8]

OR

Q.3 (a) Describe the principle of visualizing body organs by radioisotope methods. [10]

(b) What is GSR? How it is measured? [6]

UNIT-IV

Q.4 (a) Discuss the element of Intensive Care Monitoring in hospitals. [10]

(b) What are defibrillators? How they are classified? [6]

OR

Q.4 (a) Describe the various methods of accident prevention in hospitals. [10]

(b) Give the application of Lasers in biomedical instrumentation. [6]

UNIT-V

Q.5 (a) What are the various abnormalities observed in ECG patterns? How they are classified? [8]

(b) What is Ischemia? Explain the electrocardiographic patterns obtained in ischemia. [8]

OR

Q.5 (a) Give the application of Remote data recoding and management in biomedical instrumentation. [8]

(b) Explain the clinical Application of EEG. [8]

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5E5027

5E5027

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics & Communication Engineering
5EC6.2 A Advanced Data Structures

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks 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 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 are templates? Explain function and class templates with a suitable example. [8]

(b) Show how to implement a dictionary operations INSERT and DELETE using singly link list. What are the running time of the procedures? [8]

OR

Q.1 (a) Implement a doubly link list in C++ programming language. [8]

(b) What is complexity? Explain space complexity and time complexity in brief. [8]

UNIT-II

Q.2 (a) Explain how to find the minimum key stored in a B – tree. Also explain the basic property of B – tree. [10]

(b) What are the necessary conditions for binary searching? Explain with an algorithm. [6]

OR

Q.2 (a) What are the properties of a red–black tree? What is the largest possible number of internal nodes in red–black tree with black height K? What is the smallest possible number? [10]

(b) What is AVL? Explain in detail. [6]

UNIT-III

Q.3 (a) What is difference between directed graph and undirected graph? Explain with diagram. [8]

(b) Explain spanning trees in detail. [8]

OR

Q.3 (a) What do you mean by hash values? Explain collision resolution by chaining. [8]

(b) Differentiate linear probing and quadratic probing. [8]

UNIT-IV

Q.4 Explain Garbage Collection Algorithms for equal sized blocks in detail. Also explain the managing of Equal sized block. [16]

OR

Q.4 (a) Describe Buddy systems in detail. [10]

(b) Explain storage allocation for mired sized objects. [6]

UNIT-V

Q.5 Write short note on (any two) [8×2=16]

(a) Greedy Algorithm

(b) Divide and Conquer method.

(c) Insertion and Merge short.

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Roll No. ____________

Total No of Pages: 2

5E5035

5E5035

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics Instrumentation & Control Engineering
5EI5A Microprocessors

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks 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 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 with a neat diagram the 8085 microprocessor Bus structure. [10]

(b) Explain, why are the program counter and the stack pointer 16 bits registers. [6]

OR

Q.1 (a) With a neat diagram, explain the architecture, data flow and instruction execution in 8085 microprocessor. [10]

(b) Explain with an example how many memory locations can be addressed by a microprocessor 8085 with 14 address lines. [6]

UNIT-II

Q.2 (a) Explain with timing diagram the memory read operation in 8085 microprocessor. [8]

(b) What is the use of branching instruction? Explain with an example. [8]

OR

Q.2 (a) Define stock related instructions. [8]

(b) Compare CALL and PUSH instructions and their functions. [8]

UNIT-III

Q.3 (a) List the four instructions and their functions, which control the interrupt structure of the 8085 microprocessor. [8]

(b) Write short notes on :-

(i) Serial I/O [4]

(ii) Data communication [4]

OR

Q.3 By drawing diagram explain the following as regards to 8085 microprocessor -

(a) Vectored Interrupts [8]

(b) Direct Memory Access [8]

UNIT-IV

Q.4 (a) Explain the operating modes of 8255 programmable peripheral interface. [8]

(b) Describe the 8254 programmable interval timer. [8]

OR

Q.4 (a) Discuss the 8259 programmable interrupt controller. [8]

(b) With a neat diagram explain Direct Memory Access. [8]

UNIT-V

Q.5 (a) Show the pin configuration and function of signals of 8086 microprocessor. [8]

(b) Show the memory organization and interfacing with 8086 microprocessor. Explain how the memory is accessed. [8]

OR

Q.5 Draw and explain the architecture of 8086 microprocessor. [16]

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5E5034

5E5034

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics Instrumentation & Control Engineering
5EI4A Electronic Measurement & Instrumentation

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

Min. Passing Marks Main: 26

Min. Passing Marks 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 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 in detail the working principle of sine wave generators. [8]

(b) Explain the phenomena of Heterodyne wave analyzer by help of suitable diagram. [8]

OR

Q.1 (a) Describe a Harmonic distortion analyzer in detail. Also explain its advantage & uses. [8]

(b) Explain sweep frequency generators in the scenario of signal generations. [8]

UNIT-II

Q.2 By help of suitable diagram and example state working of A/D & D/A converters. [16]

OR

Q.2 (a) Explain sampling theory & state its application in current, voltage type energy measurement. [8]

(b) Explain the Concept of Data Acquisition system by help of suitable example. [8]

UNIT-III

Q.3 Explain Q meter. Also explain working of Q meter of series resonant type & its method to measure it [16]

OR

Q.3 Explain construction and working principle of Digital Storage Oscilloscope & power scope. [16]

UNIT-IV

Q.4 Explain time measurement techniques, time standards, measurement of time interval between events & order of events. [16]

OR

Q.4 (a) Explain high & low frequency measurement techniques. [8]

(b) Explain Gating Error & Time Base Error in detail. [8]

UNIT-V

Q.5 (a) Describe the methods of process instrument calibration & type & procedure of maintenance. [8]

(b) Explain in detail the concept of software tools for calibration & maintenance. [8]

OR

Q.5 Write short notes on: [8×2=16]

(a) Digital telemetry schemes

(b) Radio telemetry

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5E5033

5E5033

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics Instrumentation and Control Engineering
5EI3A Control System-II

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks 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 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) Obtain the state space representation of the system described by: - [8]

$$y(k+3) + 2y(k+2) + 3y(k+1) + 2y(k) = 5u(k+2) + 3u(k+1) + u(k)$$

(b) Find the state space representation for the discrete time system: - [8]

$$y(k+3) + 6y(k+2) + 11y(k+1) + 8y(k) = 10u(k)$$

OR

Q.1 Diagonalize the given matrix: - [16]

$$x(k+1) = \begin{bmatrix} 2 & 1 & -1 \\ 1 & 2 & -1 \\ -1 & -1 & 2 \end{bmatrix} x(k)$$

UNIT-II

Q.2 Pulse transfer function of a system is given by: - [8 × 2 = 16]

$$\frac{y(z)}{u(z)} = \frac{3z}{(z+1)^2\,(2z+1)}$$

Obtain the state model realizations in: -

(a) Jordan form.

(b) Observable canonical form (OCF)

OR

Q.2 A discrete time system is described by the difference equation: - [8 × 2 = 16]

$$y(k+3) + 5y(k+2) + 7y(k+1) + 3y(k) = r(k+1) + 2r(k)$$

Obtain the state model of the system in: -

(a) Controllable canonical form.

(b) Jordan canonical form.

Also draw the state diagram for each canonical form.

UNIT-III

Q.3 A linear system is described by the state equation: - [16]

$$x(k+1) = \begin{bmatrix} 0 & 1 & 0 \\ 0 & -1 & 1 \\ 0 & 0 & -2 \end{bmatrix} x(k) + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u(k)$$

and $\quad y(k) = [1 \;\; 0 \;\; 0]\, x(k)$

Determine the control law $U = V - Kx(k)$, that places the closed loop poles at $z = -1 \pm y1$ and $z = -0.2$.

OR

Q.3 A discrete time system is represented by: - [16]

$$x(k+1) = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix} x(k) + \begin{bmatrix} 0.5 \\ 1 \end{bmatrix} r(k)$$

where T is the sampling period. Determine a state feedback control law

u = - K x (k), that makes the system response deadbeat to an arbitrary initial condition. Also, verify the result by Ackermann's formula.

UNIT-IV

Q.4 Design a combined compensator of a regulator containing a controller and an estimator for process given by: - [16]

$$G(z) = \frac{4}{(z+0.5)^2}$$

The design specifications of the controller and observer is that both are critically damped with Wn = 0.5 rad/sec, and T = 1sec.

OR

Q.4 Consider a plant defined by the following state variable model: - [16]

x(k + 1) = F x (k) + G u(k), and y(k) = C x(k) + D u(k), where -

$$F = \begin{bmatrix} 0.5 & 1 & 0 \\ -1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}; \qquad G = \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}$$

C = [1 0 0] ; D = [0]

Design an observer which places the observer poles at $-0.5 \pm j1$ and at -1.

UNIT-V

Q.5 (a) Find G (z) if [8]

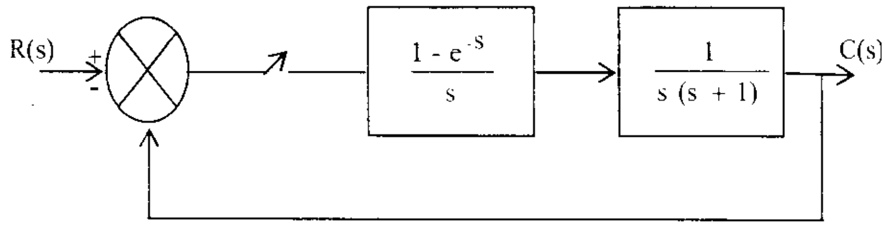
$$G(s) = \frac{s\,(2s+3)}{(s+1)^2\,(s+2)}$$

(b) Find the Z Transform of the signal. [8]

$f(k) = (k+1)\,a^k;\ k \geq 0$

OR

Q.5 For the following system, find the expression for the impulse response and step response: - [16]



Tabe T = 1 sec.

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5E5038

5E5038
B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics Instrumentation & Control Engineering
5EI6.3A Digital Communication

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

Min. Passing Marks Main: 26

Min. Passing Marks 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 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 PCM with block diagram and find out the error probability in PCM system. [8]

(b) What is meant by slope – overload distortion in a Delta Modulation system? How can it be avoided? [8]

OR

Q.1 (a) By the help of block diagrams of the transmitter and receiver and with the help of relevant wave forms, explain the working of a Delta Modulation system. [8]

(b) A PCM system uses a uniform quantizer followed by a 7-bit binary encoder. The bit rate of the system is equal to 50×10^6 b/sec.

(i) What is the maximum message bandwidth for which the system operates satisfactorily? [4]

(ii) Determines the output signal–to–quantization noise ratio when a full load sinusoidal modulating wave of frequency $1MH_Z$ is applied to the input [4]

UNIT-II

Q.2 (a) Describe and explain with the neat diagram detection of matched filter and its significance. [8]

(b) A communication channel of bandwidth 75 KH_Z is required to transmit binary data at a rate 0.1 mbps using raised cosine pulses. Determine Roll-off factor α. [8]

OR

Q.2 (a) Explain various signaling formats with neat diagram and suitable examples. [8]

(b) Explain the Nyquist criterion for directionless Baseband binary transmission. How can we overcome the practical difficulties encountered with ideal Nyquist channel? [8]

UNIT-III

Q.3 (a) Compare BPSK and QPSK with reference to bandwidth requirement, data rate and probability of error with the help of diagram. [8]

(b) A computer is generating binary words, each consisting of 16 bits, at the rate of 1500 words per second.

(i) Find the bandwidth required to transmit its output as a binary PAM signal.

(ii) Find the value of M & M-ary signal on a channel whose bandwidth is limited to 30 KH_Z. [8]

OR

Q.3 (a) Draw the signal space diagram and show the signal constellation for an MSK signal. [8]

(b) What is GMSK? Sketch and compare the power spectra of an signal and a GMSK signal. [8]

UNIT-IV

Q.4 (a) state and explain the Shannon's theorem and bound. Also give its application. [8]

(b) Consider an AWGN channel with $4KH_Z$ bandwidth and noise power spectral density $\eta/z = 10^{-12}$ w/H_Z. The signal power required at the receiver is 0.1 mW. Calculate the capacity of this channel. [8]

OR

Q.4 (a) Consider a binary memory less source X with the symbols X_1 and X_2. Show that H(X) is maximum when both X_1 and X_2 are equiprobable. [8]

(b) What is Entropy? Explain and also describe information rate. [8]

UNIT-V

Q.5 (a) What are the two broad techniques adopted for error control in digital communication? Explain. [8]

(b) What is a Hamming code? What are its properties and applications? [8]

OR

Q.5 (a) For a (7, 4) cyclic linear block code show that there are two generator polynomials possible. [8]

(b) Write short note on convolutional codes and its application in communication engineering. [8]

5E6205

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Total No of Pages: 2

5E6205

B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Production & Industrial Engineering
5PI5A Sociology and Economics for Engineers
Common with ME and AE

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks 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 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 Describe the main types of social structure. [16]

OR

Q.1 'Caste, class, power and gender determine the social stratification'. Discuss. [16]

UNIT-II

Q.2 Write short note on:-

(a) elements of village community. [8]

(b) features of urban community. [8]

OR

Q.2 Discuss the structure of Agrarian society. [16]

UNIT-III

Q.3 Discuss the concept of elastic and inelastic demand. What are the factors that affect elasticity of demand? [12+4]

OR

Q.3 Write short note on direct and indirect taxes. [16]

UNIT-IV

Q.4 Discuss the meaning and structure of capital market. [16]

OR

Q.4 Inflation is an excess of demand of anything over the supply of everything. Discuss the statement and the factors that result in inflation. [16]

UNIT-V

Q.5 Urbanization is an important part of economic development. Discuss. [16]

OR

Q.5 Discuss the challenges and policy issues of external sector in India. [16]

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5E3115

5E3115

B. Tech V Sem. (Back) Exam. Nov-Dec. 2015
Electronics & Instrumentation Control Engineering
5EI3 (O) Modern Control System

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

Min. Passing Marks 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 suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

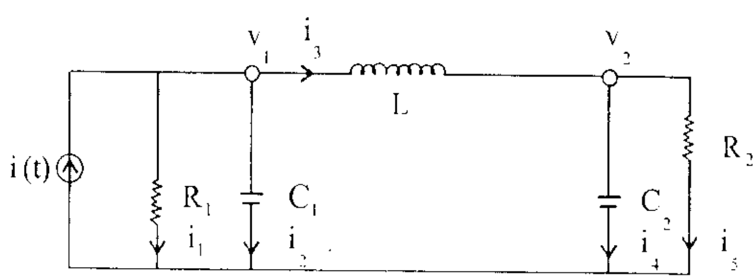
Use of following supporting material is permitted during examination.

1. NIL 2. NIL

UNIT-I

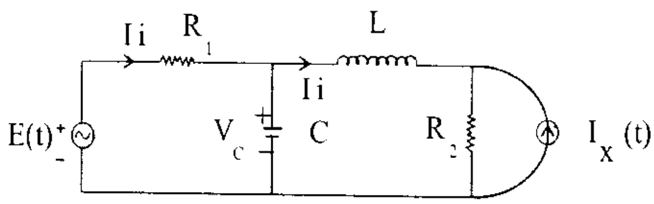
Q.1 (a) Define state, state vector and state space with suitable example. [8]

(b) Derive the state model for the network shown below taking v_1, v_2 and i_3 as state variable. [8]



OR

Q.1 (a) Considering V_C and I_i as the state variables and I_X as the output variables in the circuit shown below, obtain the state model. [8]



(b) Differentiate conventional control system and modern control system with suitable examples. [8]

UNIT-II

Q.2 (a) The transfer function of a system is given by - [8]

$$\frac{Y(S)}{U(S)} = \frac{S+2}{(S+3)(S+4)(S+5)}$$

For the state space description of the above system in the form

$$\dot{X} = AX + B\mu; \quad y = CX + D\mu,$$

determine A, B, C and D such that A is in diagonal form.

(b) Find the state model of following transfer function - [8]

$$\frac{y(S)}{u(S)} = \frac{6(S+3)(S+2.5)}{(S+2)(S^2+4S+5)}$$

OR

Q.2 (a) Consider a single input single output system whose state variable description is given by [8]

$$\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} 0 & 4 \\ -36 & -9 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} \mu$$

$$Y = [7 \quad 4] \begin{bmatrix} X_1 \\ X_2 \end{bmatrix}$$

Determine the transfer function.

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

$$A = \begin{bmatrix} 0 & 2 & 0 \\ 0 & 0 & 2 \\ 0 & -6 & -8 \end{bmatrix}; \quad B = \begin{bmatrix} 0 \\ 0 \\ 2 \end{bmatrix}; \quad C = \begin{bmatrix} 8 & 0 & 2 \end{bmatrix}; \quad D = 0$$

Find the transfer function.

UNIT-III

Q.3 (a) Determine the controllability and observability of the described system given by:- [8]

$$\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ -3 & -2 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} \mu$$

$$Y = [1 \quad 0] \begin{bmatrix} X_1 \\ X_2 \end{bmatrix}$$

(b) Define Eigen values and Eigen vectors with its importance and applications in control systems. [8]

OR

Q.3 For a generalized system derive the Ackerman's formula for the determination of state feedback gain matrix K. [16]

UNIT-IV

Q.4 (a) Derive the Z – inverse of the following function - [8]

$$\frac{Z\left(1-e^{-at}\right)}{(Z-1)\left(Z-e^{-at}\right)}$$

(b) Explain the block diagram analysis of sampled data systems. [8]

OR

Q.4 (a) By using Routh – criterion, show that the system having following characteristic equation is stable or not - [8]

$$S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$$

(b) Find the Z – transform:

(i) $F(s) = \dfrac{4}{s^2 (s+2)}$ [4]

(ii) $F(s) = \dfrac{10}{s \ (s^2 + s + 2)}$ [4]

UNIT-V

Q.5 Write short notes on the following: -

(a) Position servo system [8]

(b) Design on the Z – plane [8]

OR

Q.5 Write short notes on the following: -

(a) Design on the W – plane [8]

(b) Digital PID controller [8]
