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6E6051	Roll No. ________ Total No of Pages: 3

6E6051

B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electronics & Communication Engineering
6EC1A Microwave Engineering-II

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 single - stub tuning and double – stub tuning techniques. [8]

(b) Explain and discuss the L – section matching networks. [8]

OR

Q.1 (a) For quarter wave transformer, show that the characteristic impedance is $Z_O' = \sqrt{Z_0 Z_L}$. [8]

(b) Design a single – section quarter wave matching transformer to match a 10 Ω load to a 50 Ω transmission line at f_0 = 3 GHz. Determine the percent bandwidth for which the SWR = ≤ 1.5 [8]

UNIT-II

Q.2 (a) Explain the working principle of Gunn Diode with the help of neat diagrams. [8]

(b) Explain the construction, operation, equivalent circuit, figure of merit of Varactor Diode. [8]

OR

Q.2 (a) Describe construction and working principle of IMPATT Diode. [8]

(b) Determine conductivity of an n – type GaAs Gunn Diode given electron density $n = 10^{18}$ cm^{-3}, electron density at lower valley $n_l = 10^{10}$ cm^{-3} and upper valley density is $n_u = 10^{8}$ cm^{-3} and temperature T = 300°K, $\mu_l = 8000 \times 10^{-4}$ m, $\mu_u = 180 \times 10^{-4}$ m. [8]

UNIT-III

Q.3 (a) Describe structure, operation and layout of microwave BJT. [8]

(b) Describe the structure, operation principle and fabrication of MESFET. [8]

OR

Q.3 (a) Explain the working principle of microwave JEFT in detail. [8]

(b) A certain GaAs MESFET has the following parameters:-

Channel height = a = 0.1μm

Electron concentration = $N_d = 8 \times 10^{17}$ cm^{-3}

Relative dielectric constant $\varepsilon_r = 13.10$

Calculate pinch off voltage. [8]

UNIT-IV

Q.4 (a) Describe the mechanism of operation and modes of oscillation for reflex klystron. [8]

(b) Explain the resonant modes, operation and mechanism of oscillation of cavity magnetron. [8]

OR

Q.4 (a) Derive the Hull cut off magnetic field & cut off voltage in cylindrical magnetron. [8]

(b) With the aid of sketch describe the operation of forward wave amplifier. [8]

UNIT-V

Q.5 (a) Discuss the basic schematic and mechanism of operation of two cavity klystron. [8]

(b) Draw the basic schematic of helix type TWT tube and explain its operation. [8]

OR

Q.5 (a) Explain CW power pulsed dual mode TWT. [8]

(b) Explain the multi-cavity klystron and its advantages. [8]

6E3085

Roll No. ____________ Total No of Pages: 3

6E3085
B. Tech. VI-Sem. (Old Back) Exam., April/May-2016
Electronics & Communication Engineering
6EC1 (O) Microwave Engineering – II

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. (Mentioned in form No. 205)

1. NIL_______________ 2. NIL_______________

UNIT-I

Q.1 (a) What is double minimum method of VSWR measurement? Explain it for VSWR measurement. [8]

(b) Explain one method of Power Measurement at microwave frequencies. Also compare the Power Measurement Methods according to power level. [8]

OR

Q.1 (a) Calculate the VSWR of a transmission system operating at 200 GHz. TE_{10} Mode is propagating through the waveguide of dimension (6.4×3.2) cm^2. The distance between two successive minima is 1.6mm. [8]

(b) What is Scattering Parameter? Write the general value of S – parameter for a 3 – port network (with two port matched). Also discuss the method of S – parameter measurement. [8]

UNIT-II

Q.2 (a) Draw the field lines in following - [4×3=12]

(i) Parallel strip line

(ii) Shielded strip line

(iii) Micro strip line.

(b) Discuss the dominant and higher order modes in strip line structure. [4]

OR

Q.2 (a) Write the selection criteria of dielectric constant of the substrate in planar transmission line. Also write the name of different substrates used in microwave planar transmission lines, and compare their dielectric constants and loss tangent. [12]

(b) What is non radiative guide? What is condition of non radiation? Write the example of such guide used. [4]

UNIT-III

Q.3 (a) A two port network has S – parameter

$$[S]=\begin{bmatrix} 0.1\angle 0^\circ & 0.5\angle 90^\circ \\ 0.2\angle 90^\circ & 0.5\angle 0^\circ \end{bmatrix}$$

Determine whether the network is loss less. If the output port is open circuit then find the return loss. [10]

(b) Write the conversion expression of ABCD Parameter in S – parameter. [6]

OR

Q.3 (a) What is signal flow graph? Draw the signal flow graph for a network whose Z – parameter are - [8]

$Z_{11} = 0.05$ $Z_{12} = 1.5$

$Z_{21} = 1.5$ and $Z_{22} = 1.0$

(b) State and find the reciprocal condition in terms of S – Parameter for a two port network. [8]

UNIT-IV

Q.4 Draw the construction and explain the operation of - [8×2=16]

(a) IMPATT

(b) TRAPTT

OR

Q.4 (a) Draw the construction of a Gunn diode and discuss its different modes of operation. [8]

(b) What is difference between MASER and LASER? Explain the working of a semi conductor LASER. [8]

UNIT-V

Q.5 Discuss the Method of (any two) - [8+8=16]

(a) Thin film formation

(b) Inductor realization in MICs

(c) Different materials used in MMIC

(d) Difficulties of MICs.

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6E6052

Roll No. ____________ Total No of Pages: 3

6E6052
B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electronics & Communication Engineering
6EC2A Microprocessors

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 Architecture of 8085 microprocessor in detail. [8]

(b) Why are $AD_7 - AD_0$ lines multiplexed? With the help of latching circuit explain how these lines are demultiplexed. [8]

OR

Q.1 (a) Explain the Addressing modes of 8085 microprocessor with the help of suitable examples. [8]

(b) Explain memory mapped I/O Interfacing Technique. [8]

UNIT-II

Q.2 (a) What are the Basic machine cycle in 8085 microprocessor? Explain the op – code fetch machine cycle using timing diagram. [10]

(b) Write a program to find 2's compliment of a number. [6]

OR

Q.2 (a) Explain different types of 8 – bit instructions of 8085 microprocessor, giving also suitable examples. [8]

(b) Explain the term Machine Cycle, T – Sate and Instruction Cycle. [8]

UNIT-III

Q.3 (a) Explain the different types of 16 – bit Instructions of 8085 microprocessor, giving also suitable examples. [8]

(b) Pack the two unpacked BCD number stored in memory location 2000 H and 2001 H and store the result in 2500 H. Assume that last digit is stored in 2001 H. [8]

OR

Q.3 (a) Write a program to shift 8 – bit data for 4 – bit right side without carry. Assume that data is in Register C. [8]

(b) Explain different types of Instructions related to counter and Time delay with examples. [8]

UNIT-IV

Q.4 (a) Distinguish between software and Hardware Interrupts. Draw the diagram of interrupt structure of 8085 MPU. [10]

(b) Explain the instructions SIM and RIM and illustrate how to use them for 8085 interrupts. [6]

OR

Q.4 (a) What do you mean by Vectored and Non Vectored Interrupts? Also differentiate between maskable and non maskable interrupts. [12]

(b) Write Instruction to mask RST 7.5 and RST 6.5 interrupt simultaneously. [4]

UNIT-V

Q.5 (a) Draw the Interfacing diagram of 8257 DMA and explain its operations. [8]

(b) Explain 8255 PPI with the help of a Block diagram. [8]

OR

Q.5 (a) Explain different types of modes of 8254 PIT with diagram. [8]

(b) Explain the different types of modes of 8259 PIC with diagram. [8]

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6E3086

Roll No. ___________ Total No of Pages: 3

6E3086
B.Tech. VI-Sem. (Back) Exam.,April/May-2016
Electrical & Electronics Engineering
6EX2 (O) Microprocessor and Microcontroller
Common with EC

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 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) Draw the block diagram of 8085 microprocessor. What is the requirement of address bus? [10]

(b) Why AD_0- AD_7 lines are multiplexed. [6]

OR

Q.1 (a) Write short note on Input/ Output devices. What is the use of ALE signal? [8]

(b) Explain the working of Latches & memories with example. [8]

UNIT-II

Q.2 (a) Discuss Addressing mode with suitable example. [8]

(b) Write a program to subtract two 8 bit numbers. [8]

OR

Q.2 (a) Discuss RISC and CISC architecture? [8]

(b) Explain the contents of accumulator to run SIM instruction. [8]

UNIT-III

Q.3 (a) Compare instruction JMP 2000H & PCHL. [6]

(b) What do you mean by programming & debugging? [10]

OR

Q.3 Explain the formats of 8 bit & 16 bit instructions. Give suitable example in support of your answer. [16]

UNIT-IV

Q.4 (a) Explain the bit sec/reset mode of 8255. [8]

(b) What are the performance parameters of DAC? [8]

OR

Q.4 (a) Generate triangular wave using DAC 0808. [8]

(b) What is the difference between A/D and D/A converters? [8]

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UNIT-V

Q.5 (a) Give pin details and interfacing of 8051 microcontroller. [10]

(b) Discuss general features of 8051. [6]

OR

Q.5 Write short note on - [8×2=16]

(a) Timers & Interrupts.

(b) Memory & Instruction.

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6E6053

Roll No. ___________ Total No of Pages: 3

6E6053

B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electronics & Communication Engineering
6EC3A Industrial Electronics
Common with AI, EC, EI

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 reverse recovery characteristics of power diode and derive expression of reverse recovery time. [8]

(b) Latching current for an SCR, inserted in between a dc voltage source of 200V and the load is 100mA. Compute the minimum width of gate pulse current required to turn on SCR in case of load consist of - [8]

(i) $R = 20\Omega$ in series with $L = 0.2H$

(ii) $R = 20\Omega$ in series with $L = 2.0H$

OR

Q.1 (a) Draw the basic structure of IGBT and explain its working. [8]

(b) Define the following terms - [8]

(i) Critical rate of rise of voltage.

(ii) Finger voltage.

UNIT-II

Q.2 (a) A single phase bridge converter is connected to **RLE** Load. For continuous load current draw the source voltage, output voltage, load current, source current as a function of time. [10]

(b) Explain the working of single phase half wave circuit with RL Load and freewheeling diode. [6]

OR

Q.2 (a) Explain in detail three phase converters. [8]

(b) Describe voltage control technique in inverter. [8]

UNIT-III

Q.3 (a) What is class C chopper? Explain the basic operating principle of class C chopper with circuit diagram. [6]

(b) A step up chopper has input voltage 220V & output voltage 660V. If the non conducting time of thyristor chopper is 100us, compute the pulse width. [10]

OR

Q.3 (a) Explain the circuit diagram of switch mode power supply. [10]

(b) Differentiate between step up & step down chopper. [6]

UNIT-IV

Q.4 (a) Define the term DC motor. How can we control the speed of 2-phase induction motors? [8]

(b) Explain chopper control in DC series motor. [8]

OR

Q.4 (a) Explain circuit diagram, quadrant diagram and waveforms of single phase half wave converter drives. [8]

(b) A Three phase 400V, 15kw, 1440 rpm, 50 Hz star connected induction motor leakage impedance of $0.4 + J\ 1.6\Omega$ stator impedance and rotational losses are assumed negligible. If this motor is energized from 120 Hz 400V, 3-phase source then calculate - [8]

(i) Motor speed at rated load

(ii) The slip at which maximum Torque occurs.

UNIT-V

Q.5 Write short note on the following -

(a) Permanent magnet stepper motor. [8]

(b) Induction heating control. [8]

OR

Q.5 Write short note on the following -

(a) Variable reluctance stepper motor. [8]

(b) Hybrid stepper motor. [8]

6E6054

Roll No. ___________ Total No of Pages: 4

6E6054
B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electronics & Communication Engineering
6EC4A Digital Communication

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 quantization error and derive an expression for maximum signal to noise ratio in PCM system that uses linear quantization. [8]

(b) A television signal having a bandwidth of 4.2 MHz is transmitted using a binary PCM system. Given that the number of quantization level is 512, determine- [8]

(i) Code Word Length

(ii) Transmission Bandwidth

(iii) Final Bit Rate

(iv) Output Signal to Quantization Noise Ratio

OR

Q.1 (a) What are the drawbacks of Delta Modulation and how it is removed in ADM? [8]

(b) In a DM system, the voice signal is sampled at a rate of 64,000 samples/ second. The maximum signal amplitude $A_{max} = 1$

(i) Determine minimum value of step size to avoide slope overload [2]

(ii) Determine quantization noise power if voice signal bandwidth is 3.5 kHz.[3]

(iii) Assuming voice signal to be a sine wave, determine S_0 and the SNR [3]

UNIT-II

Q.2 (a) Explain Inter – Symbol Interference (ISI) in detail. [8]

(b) Given that the bit sequence given below is to be transmitted - [4×2=8]

Bit sequence = 10110010

Draw the resulting waveform, if the sequence is transmitted using -

(i) Unipolor RZ & NRZ

(ii) Bipolor RZ & NRZ

(iii) Polor RZ & NRZ

(iv) AMI & M – array when M = 4

OR

Q.2 (a) Explain the Nyquist criterion for distortion less baseband binary transmission. [8]

(b) Explain the following formats with equation (assume suitable data for diagram). [4×2=8]

(i) Unipolor RZ & NRZ

(ii) Bipolor RZ & NRZ

(iii) Manchaster format

(iv) Polor Quaternary NRZ format

UNIT-III

Q.3 (a) Explain MSK transmitter and receiver. What are the advantages of MSK as compared to QPSK? [10]

(b) In a digital continuous time communication system, the bit rate of NRZ data stream is 1Mbps and carrier frequency of transmission is 100 MHz. Find the symbol rate of transmission and bandwidth requirement of the channel in following cases of different techniques used : [3×2=6]

(a) BPSK system

(b) QPSK system

(c) 16 ary PSK system

OR

Q.3 (a) Explain M – ary and PSK in Detail. [12]

(b) For the following data stream, show the phase states of carrier and draw QPSK Signal Data stream = 10110001 [4]

UNIT-IV

Q.4 (a) Explain entropy and prove the following: [8]

$0 \leq H(X) \leq \log_2 m$, where m is the size of the alphabet in X

(b) Given a telegraph source having two symbols, dot and dash. The dot duration is 0.2 second. The dash duration is three times the dot duration. The probability of the dots occurring is twice that of the dash and the time between symbols is 0.2 second.

Calculate the information rate of telegraph source. [8]

OR

Q.4 (a) A discrete memory less source (DMS) X has four symbols x_1 x_2 x_3 x_4 with probabilities P (x_1) = 0.4, P (x_2) = 0.3, P (x_3) = 0.2 and P (x_4) = 0.1

(i) Calculate H (X) [4]

(ii) Find the amount of information contained in the message x_1 x_2 x_1 x_3 and x_4 x_3 x_2 x_3 [4]

(b) Explain channel capacity and prove $C = B\log_2\left(1+\frac{S}{N}\right)$ [8]

UNIT-V

Q.5 Write short notes on: (Any Four) [4×4=16]

(a) Hamming code

(b) Signal parity bit code

(c) Linear block code

(d) Cyclic code

(e) Convolutional code

OR

Q.5 A DMS has seven symbols x_1 x_2 x_3 x_4 x_5 x_6 x_7 with probabilities P (x_1) = 0.05, P (x_2) = 0.05, P (x_3) = 0.1, P (x_4) = 0.15, P (x_5) = 0.3, P (x_6) = 0.2 and P (x_7) = 0.15. [2×8=16]

(a) Construct a Shannon fano code for X, and calculate the efficiency of code

(b) Repeat for the Huffman code and compare the result

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6E6055

6E6055
B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electronics & Communication Engineering
6EC5A Control Systems

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.*

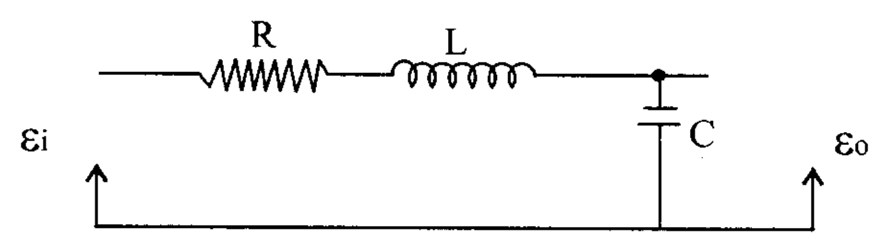
Units of quantities used/ calculated must be stated clearly.

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

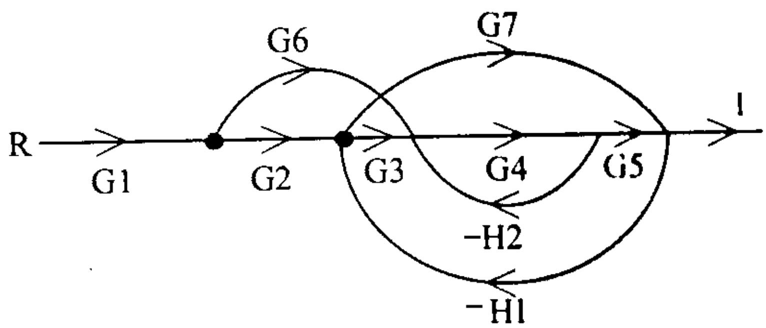
1. NIL 2. NIL

UNIT-I

Q.1 (a) Determine the transfer function of the following electrical network. [8]



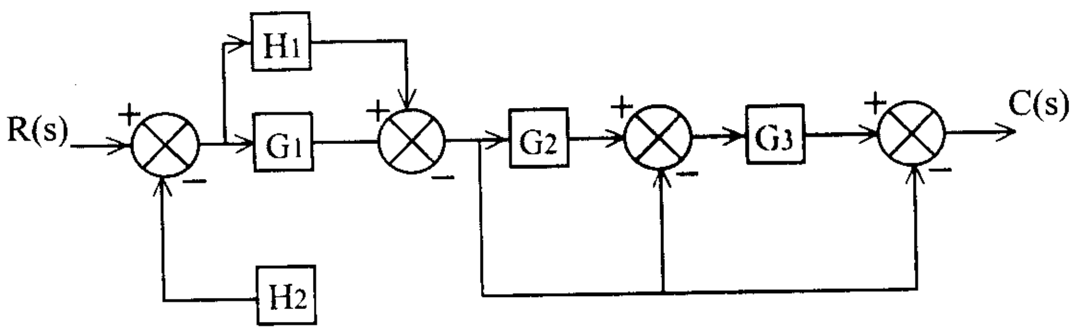
(b) Find the transfer function of the system whose single flow graph is below. [8]



OR

Q.1 (a) What is closed loop transfer function of a system with positive feedback? Explain, what is the effect on stability? [8]

(b) Simplify the block diagram shown in fig. [8]



UNIT-II

Q.2 (a) A unity feedback control system has $G(S) = \dfrac{1}{S(S+2)}$. The input to the system is given by $\Upsilon(t) = 2t + 3t + 3t^3$. Determine the general error coefficient and steady state error.

Explain force – voltage & force – current analogy with complete details. [8]

(b) Determine the stability of system

$$S^6 + S^5 + 5S^4 + 3S^3 + 2S^2 - 4S - 8 = 0$$ [8]

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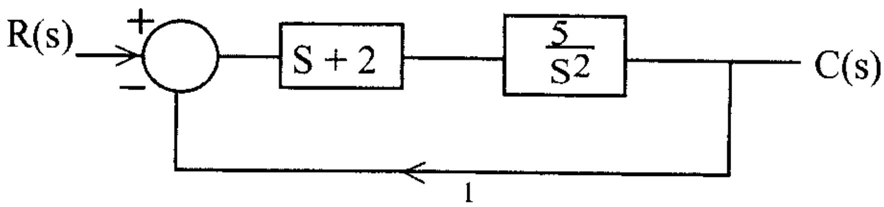
OR

Q.2 (a) Consider the system having open loop transfer function $G(S) = \frac{1}{S(S+1)}$.

Calculate rise time, peak time, peak overshoot and settling time. [8]

(b) What is time response of the system when it is exited by unit step I/P? [8]



UNIT-III

Q.3 (a) The open loop transfer function of a unity feedback control system is given below.

$$G(S) = \frac{(S+0.25)}{S^2\ (S+1)\ (S+0.5)}$$

Determine closed loop stability and nyquist criteria. [8]

(b) Find out time response of second order sysem for step input and also all parameters. [8]

OR

Q.3 (a) Discuss stability of a system by root locus techniques.

$$G(S) = \frac{K}{S^2\ (S+2)\ (S+5)},\ H(S)=1$$ [8]

(b) Explain the salient features of root locus plot. [8]

UNIT-IV

Q.4 (a) The open loop transfer function of a feed back control system is

$$G(S)\ H(S) = \frac{K}{S\ (1+5S)\ (1+.25S)}$$

Draw Bode – plot & find K for gain margin 20dB [8]

(b) Determine following terms:

(i) Phase crossover frequency [2]

(ii) Phase margin [2]

(iii) Gain cross over frequency [2]

(iv) Gain margin [2]

OR

Q.4 (a) Sketch Bode – plot for -

$$G(S) = \frac{1000}{(1+.2S)\ (1+.002S)} \quad [8]$$

(b) Consider -

$$G(S) = \frac{K}{S(S1+1)}$$

Determine values of K & T with Mp = 25% and W_r = 8 rad / second. [8]

UNIT-V

Q.5 Compare lag, lead and lead – leg compensating network in detail. [16]

OR

Q.5 (a) What is controller? Explain PID controller with effect of P, I, D individually. [8]

(b) Obtain state model for the transfer function

$$\frac{Y(S)}{U(S)} = \frac{6(S+3)\ (S+2.5)}{(S+2)\ (S^2+4S+5)} \quad [8]$$

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6E6058	Roll No. ____________ Total No of Pages: 3

6E6058

B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electronics & Communication Engineering
6EC6.3A Optical Fiber Communication

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 relative refractive index difference for an optical fiber and show how it may be related to the numerical aperture. [8]

(b) An optical fiber has a numerical aperture of 0.20 and cladding refractive index of 1.59. Determine - [8]

(i) The acceptance angle of the fiber in water which has refractive index of 1.33

(ii) The critical angle at core cladding interface

OR

Q.1 (a) Use the ray equation in the paraxial approximation to prove that intermodal dispersion is zero for a graded index fiber with a quadratic index profile. [8]

(b) The photo elastic coefficient and the refractive index for silica are 0.286 and 1.46 respectively. Silica has an isothermal compressibility of 7×10^{-11} m^2N^{-1} and an estimated fictive temperature of 1400 k. Determine the theoretical attenuation in decibels per kilometer due to the fundamental Rayleigh scattering in silica at optical wavelengths of 0.85 and 1.55μm. Boltzmann's is 1.381×10^{-23} JK^{-1}. [8]

UNIT-II

Q.2 (a) What is meant by population inversion, optical feedback and threshold level in laser diode? [8]

(b) The longitudinal modes of a gallium arsenide injection laser emitting at a wavelength of 0.87 μm are separated in frequency by 278 GHz. Determine the length of the optical cavity and the number of longitudinal modes emitted. The refractive index of GaAs is 3.6. [8]

OR

Q.2 (a) Outline the advantages and disadvantages of the LED in comparison with the injection laser for use as a source in optical fiber communication. [8]

(b) What techniques are used to create high intensive light pulse from laser diode?[8]

UNIT-III

Q.3 (a) Explain the structure and the working of APD with the help of suitable diagram. Write advantages and disadvantages of APD over PIN diode. [8]

(b) An InGaAs pin photodiode has the following parameters at a wavelength of 1300 nm:

I 2 = 4nA, η = 0.92, R_L = 1000Ω and the surface leakage current is negligible. The incident optical power is 300nW (-35 dBm), and the receiver bandwidth is 20 MHz. Find the various noise terms of the receiver. [8]

OR

Q.3 What techniques are used to join two fibers? Explain in brief. Give the principal requirements of a good connector design. [16]

UNIT-IV

Q.4 (a) Write short note on OTDR. [8]

(b) Explain the time domain intermodal and frequency domain intermodal dispersion measurement with the help of experimental set up diagram. [8]

OR

Q.4 (a) Explain "near field scanning technique" for the measurement of mode field diameter (MFD), with the suitable diagram. [8]

(b) Pulse dispersion measurements are taken over 1.2 km length of partially graded multimode fiber. The 2 db widths of the optical pulses are 300 ps, and the corresponding 3db widths for the output pulses are found to be 12.5 ns. Assuming the pulse shapes and fiber impulse response is Gaussian, Calculate: [8]

(i) The 3db pulse broadening for the fiber in ns/km.

(ii) The fiber bandwidth length product.

UNIT-V

Q.5 (a) Give the major reasons which have led to the development of optical amplifiers, outlining the attributes and application areas for these devices.

Describe the two main SOA types and indicate their distinguishing features. [8]

(b) Outline five different optical amplifier configurations to achieve wideband optical amplification. Which is preferred practically and why? [8]

OR

Q.5 (a) Explain WDM in optical fiber. [8]

(b) Write short note on applications of optical fiber. [8]

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6E3093
B. Tech. VI-Sem. (Old Back) Exam., April/May-2016
Electronics & Communication
6EC6.3 (O) Optimization Techniques

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. (Mentioned in form No.205)

1. NIL ______ 2. NIL ______

UNIT-I

Q.1 (a) Write in brief on historical development of optimization and mention a few applications of optimization [8]

(b) A coal grassfire can use three grades of coal to produce quality K and M of producer gas. There are two processes (i.e. old and new) available to use the blended coal. For each production run the old process uses 10, 14 and 4 units of coal A, B and C to produce 12 units of K and 10 units of M. The new process uses 6, 18 and 8 units of coal A, B and C to produce 10 units of quality K and 14 units of M. Due to prior commitments, the gassifire plant must produce at least 1800 and 1600 units of K and M respectively for the next month. It has available

2000, 2500 and 1500 units of coal A, B and C respectively. For each unit of K, a revenue of `.3000 and for each unit of M, `4000 are received. Formulate this as LP problem so as to maximize the revenue. (Do not solve) [8]

OR

Q.1 (a) Write in detail on classification of optimization problems, giving examples. [8]

(b) A closed cylindrical tank is to be designed to carry at least 5 m^3 of chemicals. Metal for the top and side costs ₹ 200 per m^2 but heavier metal of the base costs ₹ 800 per m^2. Also the height of the tank cannot be more than twice its diameter. Formulate the problem as a mathematical programming problem to minimize the total cost incurred. (Do not solve it). Identify the decision variables and classify the problem formulated. [8]

UNIT-II

Q.2 (a) Solve the following LPP using simplex method. [8]

Max $Z = x_1 + 2x_2 + 3x_3$

S.T. $x_1 + 2x_2 + 3x_3 \leq 10$

$x_1 + x_2 \leq 5$

$x_1 \leq 1, \quad x_1, x_2 \geq 0$

Find the alternate optimal solution if it exists.

(b) Solve the following LPP using revised simplex method. [8]

Max. $Z = x_1 + 2x_2$

S.T. $x_1 + x_2 \leq 3$

$x_1 + 2x_2 \leq 5$

$3x_1 + x_2 \leq 6, \quad x_1, x_2 \geq 0$

Q.

OR

Q.2 (a) Solve the dual of the following LPP by simplex method, and from the solution of dual find opt. solution of the primal. [8]

Max. $Z = 4x_1 + 3x_2$

S.T. $x_1 \leq 6, \quad x_2 \leq 8,$

$x_1 + x_2 \leq 7, \quad 3x_1 + x_2 \leq 15,$

$x_2 \geq -1, \quad x_1, \ x_2 \geq 0.$

(b) Solve the following LPP using Big-M method. [8]

Minimize $Z = -x_1 + x_2 + x_3$

S.T. $-2x_1 + x_2 + x_3 \geq 2$

$x_1 - 2x_2 + 2x_3 = 2$

$x_1, x_2, x_3 \geq 0$

Using sensitivity analysis, find how much C_2 (The coefficient of x_2 in objective function) can vary for the solution to remain optimal.

UNIT-III

Q.3 (a) Four villages D_1, D_2, D_3, D_4 are affected due to floods and food grain is to be dropped by three air craft's S_1, S_2, S_3, in these villages.

ai = number of trips Si can make in one day

bj = number of trips required to Dj in one day, and

the amount of food grain that Si can carry to Dj in one trip are given in adjoining table.

Solve the TP problem to find the number of trips that Si can make to Dj so that the total quantity of food grain dropped in a day is maximum (use VAM) [8]

	D_1	D_2	D_3	D_4	ai
S_1	10	8	6	3	60
S_2	8	10	5	3	40
S_3	2	5	9	10	50
bj	30	50	60	40	

(b) Find the minimum cost of transportation for adjoining TP where the transportation cost per unit, requirement (bj) at destination Dj and availability (ai) at source Si are given. Interpret the result obtained. [8]

	D_1	D_2	D_3	D_4	ai
S_1	1	2	1	4	30
S_2	3	3	2	1	50
S_3	4	2	5	9	20
bj	20	40	30	10	100

x/2

OR

Q.3 (a) A company has four territories 1, 2, 3 and 4 to be assigned to four salesman A, B, C and D to promote their product. Based upon their capability the company estimates the profit earned in thousands per day on assigning a territory to each salesman is given in adjoining matrix. Find the assignment using Hungarian method to have maximum profit. [8]

	1	2	3	4
A	16	10	14	11
B	14	11	15	15
C	15	15	13	12
D	13	12	14	15

(b) Using Hungarian method, solve the adjoining problem of assigning tasks A, B, C, D to persons 1, 2, 3, 4 to minimize the total man hours taken to finish the tasks. Estimate of time in hours each person would take to perform each task is given in the table. [8]

	1	2	3	4
A	8	26	17	11
B	13	28	4	26
C	38	19	18	15
D	19	26	24	10

UNIT-IV

Q.4 Minimize $f(x_1, x_2) = 2x_1^2 + 2x_1x_2 + x_2^2 + x_1 - x_2$

starting from $X_0 = (0, 0)$ using,

(a) the method of steepest descent (complete only two iterations of the method). [8]

(b) the univariate method (complete only one cycle of movements parallel to axes). [8]

OR

Q.4 (a) Using Zoutenditk's method, find the minimum of [8]

$f(x) = f(x_1, x_2) = x_1^2 + x_2^2 - 2x_1 - 3x_2 + 3,$

subject to $x_1 + 2x_2 - 4 \le 0$ with starting point $X_0 = (0, 0)$.

(b) By using exterior penalty method - [8]

Minimize $x_1^2 + x_2^2 = f(x_1, x_2)$

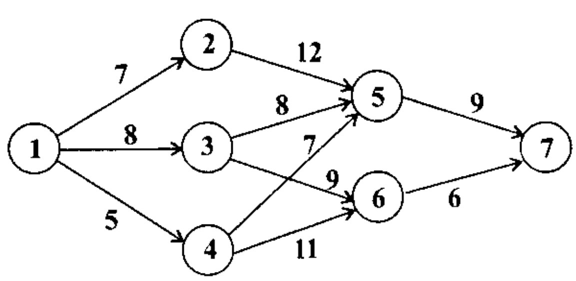
S.T. $5 - x_1 - x_2 \le 0,$

$x_2 - x_1 \le 0,$

and find the solutions corresponding to r = 1, 10, ∞ (r being the penalty parameter).

UNIT-V

Q.5 (a) State Belman's principle of optimality and using it solve the adjoining TSP problem to find the shortest route from city 1 to city 7. [8]



(b) Use dynamic programming to find three non-negative real numbers such that sum of squares of these is minimum with the restriction that their sum is not less than 30. [8]

OR

Q.5 (a) A vessel with capacity 4 units of weight is to be loaded with three items. Details are given in the adjoining table. Using dynamic programming, find how many units of each item should be loaded without exceeding the weight constraint 4 to have the maximum value of the loaded items. [8]

Item	wt/unit	value/unit
1	1	20
2	3	90
3	2	70

(b) Use dynamic programming to solve the following LPP [8]

Max $Z = 6x_1 + 5x_2$

S.T. $x_1 \le 2$

$x_2 \le 6$

$6x_1 + 2x_2 \le 18$

$x_1, x_2 \ge 0.$

6E6061	Roll No. __________ Total No of Pages: 4

6E6061

B. Tech. VI-Sem. (Main & Back) Exam., April/May-2016
Electronic Instrumentation & Control Engineering
6EI1A Process Control System

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 Explain the following

(a) Process degree of freedom with a suitable example. [8]

(b) Batch and continuous process. [8]

OR

Q.1 (a) derive the transfer function H(s) / Q(s) for the liquid level system shown in fig.1(a). [H and Q are the derivation variables in h and q, respectively] [8]

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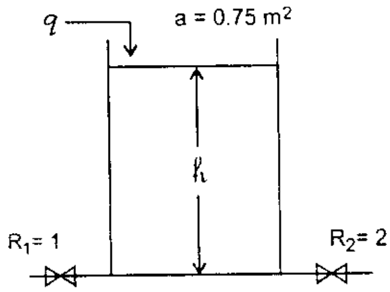

Fig. – 1(a)

(b) There are N storage tanks of volume V arranged so that when water is fed into first tank, equal volume of liquid overflows from the first tank to the second tank and so on. Each tank initially contains zero concentration of component A and equipped with a perfect stirer. At time zero, a stream of concentration 'Co' of component A is fed into first tank at q volumetric flow rate q. Find the resulting concentration in each tank as a function of time. [8]

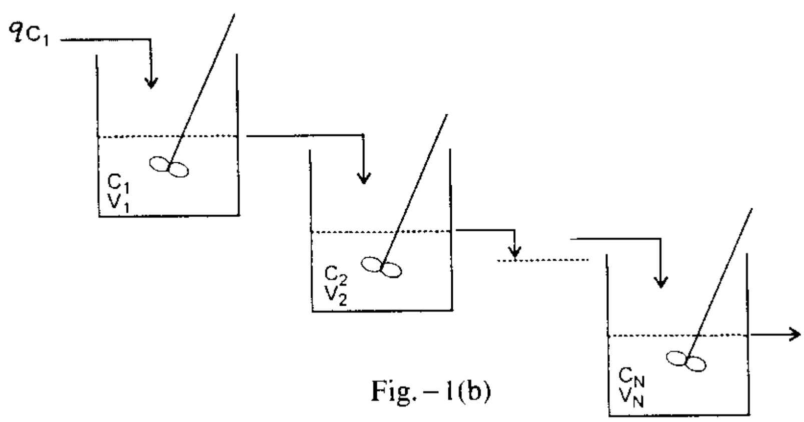

Fig. – 1(b)

UNIT-II

Q.2 (a) A tank system having a time constant of 0.5min. and a resistance of $0.25 \text{min}/\text{m}^2$ is operating at steady state with an inlet flow of $2\text{m}^3/\text{min}$. The flow is suddenly increased to $3\text{m}^3/\text{min}$. Plot the response of the tank level (assume area of cross section $A = 2\text{m}^2$) [8]

(b) Explain the response of thermometer bulb. [8]

OR

Q.2 A step change of magnitude 5 is introduced into a system having the transfer function

$$\frac{Y(s)}{X(s)} = \frac{8}{s^2 + 1.6s + 4}$$ Determine

(a) Percentage peak over shoot
(b) Ultimate value of Y (t)
(c) Maximum value of y (t)
(d) Period of oscillation
(e) Rise time

[(4×3=12)+(1×4=4)=16]

UNIT-III

Q.3 (a) Consider the proportional mode level control system shown below. The valve A is linear with a flow factor of $10m^3$ /hr percent controller output. The controller output is nominally 50% with a proportional gain Kp =10%. A load change occurs when flow through valve B changes from $500m^3$/ hr to $600m^3$/ hr. Calculate the new controller output and offset error. [8]

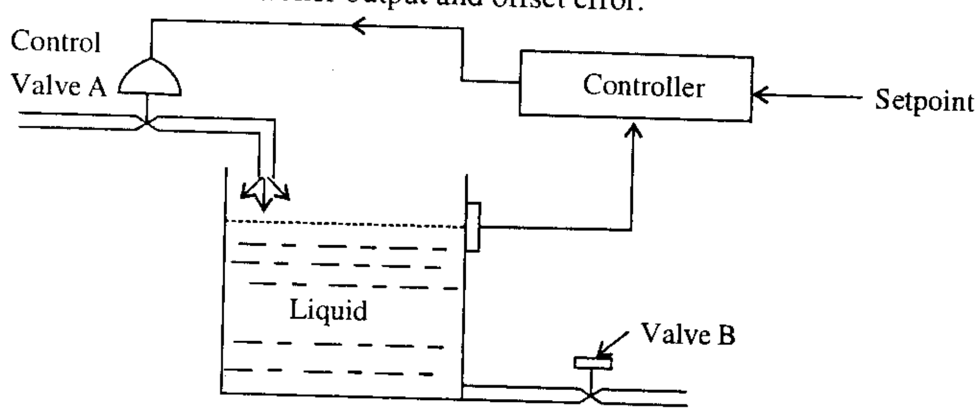

Fig. – 3(a)

(b) A PI – controller indicates an output of 12mA when the error is zero. The set point is suddenly increased to 14mA and the controller output is recorded and is given below.

Time t, sec.	0	10	20	30
Output mA	14	16	18	20

Find K_P and T_I

[8]

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OR

Q.3 Explain all the tuning methods of controllers in detail. [16]

UNIT-IV

Q.4 Explain the following performance index.

(a) IAE

(b) ISE

(c) ISTE

(d) ITAE. [4×4=16]

OR

Q.4 Explain the following

(a) Flapper Nozzle System [8]

(b) Comparison of electrical, pneumatic and hydraulic actuators. [8]

UNIT-V

Q.5 Explain

(a) Feed forward optimization of a steam heater [8]

(b) The application of cascade control for a batch type fluid bed dryer. [8]

OR

Q.5 (a) Develop the suitable control schematic for a mixing station where GAS "A" and GAS "B" are to be mixed to get GAS "C". The requirement is to get variable volume of GAS "C" but with constant calorific value of 3000Kcals/Nm^3 (Assume calorific value of GAS "A" and GAS "B" as 4000Kcals/Nm^3, and 1000 Kcals/Nm^3 respectively.) [8]

(b) Explain the Boiler – drum control with suitable diagram. [8]

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6E6062

Roll No. ____________ Total No of Pages: 4

6E6062
B. Tech. VI Sem. (Main & Back) Exam., April/May-2016
Electronic Inst. & Control Engineering
6EI2A Fiber Optics & Instrumentation

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) Discuss absorption losses in optical fibers, comparing and contrasting the intrinsic and extrinsic absorption mechanisms. A 15km optical fiber link uses fiber with a loss of 1.5dB km^{-1}. The fiber is jointed every kilometer with connectors, which given an attenuation of 0.8 dB each. Determine the minimum mean optical power that must be launched into the fiber in order to maintain a mean power level of 0.3μW at the detector. [4+4=8]

(b) What are the materials required for manufacturing the optical fiber? Describe the Plasma activated chemical vapor deposition (PCVD) method for preparation of optical fiber. [3+5=8]

OR

Q.2 (a) Using simple ray theory, describe the mechanism for the transmission of light within an optical fiber. Briefly discuss with the aid of a suitable diagram what is meant by the acceptance angle for an optical fiber. Show how this is related to the fiber numerical aperture and the refractive indices for the fiber core and cladding. [4+2+2=8]

(b) What is Dispersion? Explain dispersion shifted and dispersion flattened optical fiber cables [2+4+2=8]

UNIT-II

Q.3 (a) Describe the following characteristics of injection LASER; [2×4=8]

(i) Frequency chirp

(ii) Noise

(iii) Reliability

(iv) Threshold current temperature dependence.

(b) Write short notes on Q – switching. [8]

OR

Q.2 (a) A ruby laser contains a crystal length 4cm with a refractive index of 1.78. The peak emission wavelength from the device is 0.55μm. Determine the number of longitudinal modes and their frequency separation. [4+4=8]

(b) Describe the optical characteristics of LED with neat sketch. [8]

UNIT-III

Q.3 (a) GaAs has a bandgap energy of 1.43eV at a 300K. Determine the wavelength above which an intrinsic photo detector fabricated from this material will cease to operate. [8]

(b) What is the difference between splices and connector? Explain different types of splices with neat diagram. [2+6=8]

$\mathscr{2}$ 2-f

OR

Q.3 (a) Explain the structure features and working principle of a PIN photodiode. What is the functional significance of the intrinsic layer inserted in between the P and N layer? [2+2+4=8]

(b) A Four port multimode fiber FBT coupler has 60μW optical power launched into port 1. The measured output power at port 2, 3 and 4 are 0.004, 26.0 and 27.5μW respectively. Determine the excess loss, the Insertion losses between the input and the output ports, the crosstalk and the split ratio for the device. [2+2+2+2=8]

UNIT-IV

Q.4 (a) A 2Km length of multimode fiber is attached to apparatus for spectral loss measurement. The measured output voltage from the photo receiver using the full 2km length is 2.1 volt at a wavelength of 0.85μm. when the fiber is then cut back to leave a 2 m length the output voltage increases to 10.7 volt. Determine the attenuation per kilometer for the fiber at a wavelength of 0.85μm and estimate the accuracy of the result. Also explain the experimental method for measurement of spectral loss. [8]

(b) What is the working principle of optical time domain reflectometry (OTDR)? Explain the process of fault location identification through OTDR infield. [4+4=8]

OR

Q.4 (a) Explain the time domain technique for measurement of dispersion with neat diagram. [8]

(b) Explain the Laser based system for measurement of distance with near diagram. [8]

UNIT-V

Q.5 (a) What is the need of optical amplifiers? Explain Fiber Raman Amplifier (FRA) with neat diagram. [4+4=8]

(b) Write short note on fiber optic Mach – Zehnder Interferometric sensor. [8]

OR

Q.5 (a) Write down the applications of optical fiber instrumentation in daily life. Also gives its advantages and drawbacks with clarifications. [4+4=8]

(b) Write short note on tunable sources and tunable filters. [4+4=8]

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6E6063	Roll No. ____________ Total No of Pages: 3

6E6063
B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electronic Instrumentation and Control Engineering
6EI3A Industrial Measurements

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 theory and working of thermocouples. Discuss the different types of compensations used and methods of measurement of their output voltage. [5+7=12]

(b) What is an x-y recorder? How do you distinguish it from a x-t or a y-t recorder? [4]

OR

Q.1 (a) Explain 2-wire and 3-wire RTD scheme for temperature measurement. [8]

(b) Describe the basic components of a magnetic tape recorder for instrumentation applications using direct recording techniques. [8]

UNIT-II

Q.2 (a) What is meant by thermal conductivity gauges? Explain the working of Pirani vacuum gauge with suitable sketches. [2+6=8]

(b) Explain how dead weight tester is used for the calibration of pressure measuring equipments. [8]

OR

Q.2 (a) Explain the following: [4+4=8]

(i) Working principle of capacitive type pressure transducers.

(ii) Working principle of piezoelectric pressure transducers.

(b) Explain the working principle of McLeod gauge. Mention its advantages and disadvantages. [6+2=8]

UNIT-III

Q.3 (a) Differentiate between the 'Rate meters' and 'Quantity meters.' Explain with examples for each. [4+4=8]

(b) Explain the working principle of turbine flow meters. Discuss its merits, demerits and applications. [6+2=8]

OR

Q.3 (a) Derive an expression for flow rate in the venturimeter. Assume appropriate parameters. [8]

(b) Explain the following - [4+4=8]

(i) Working of vortex flow meters.

(ii) Shunt flow meters.

UNIT-IV

Q.4 (a) Discuss the scheme of level measurement using hydrostatic pressure devices in open vessels and closed vessels. [8]

(b) Explain the working of ultrasonic densitometer with a suitable diagram. [8]

OR

Q.4 (a) Differentiate between working principle of gamma ray liquid level gauge and ultrasonic liquid level gauge with neat sketches. [8]

(b) Explain the impulse wheel method of density measurements. Mention its merits and demerits. [6+2=8]

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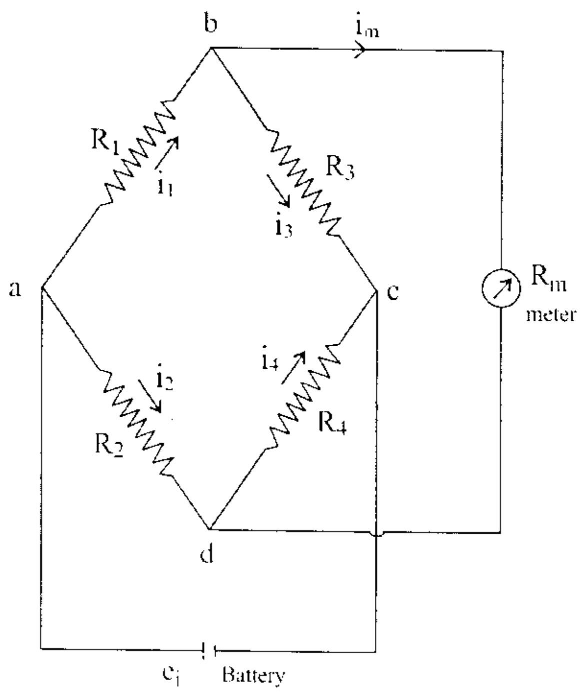
UNIT-V

Q.5 Describe the different methods used for compensation and cancellation the effects of temperature changes which affect the resistance element used in strain gauge bridge. Assume that all four arms of the strain gauge have the same value of resistance. [16]

OR

Q.5 (a) A Wheatstone bridge is shown below with $R_3 = R_4 = 100\Omega$. The galvanometer resistance is 50Ω. The strain gauge is connected in arm 1 and has an unstrained resistance of 120Ω. The value of R_2 is adjusted for balance under zero strain conditions. The gauge factor is 2. Calculate the galvanometer current when a stain of 400um/m is applied. Take the battery voltage as 4V. [8]



(b) What is meant by Rosette gauges? Discuss its applications. [3+5=8]

6E6065

Roll No. ____________ Total No of Pages: 2

6E6065
B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electronic Instrumentation and Control Engineering
6EI5A Microcontroller & Embedded System

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) By drawing necessary diagrams discuss the 8051 microcontroller Hardware & specific features. [10]

(b) Write about internal memory, RAM, ROM and special function registers of 8051. [6]

OR

Q.1 (a) Mention specific usage and working of I/O pins, ports and circuits of 8051. Draw diagrams. [8]

(b) What are various Timer modes of operation? Explain by drawing T MOD & T CON registers. [8]

UNIT-II

Q.2 (a) Write the 8051 assembly code for the following - [4×2=8]

(i) Put the number 6Ah in RAM locations 30 h & 34 h

(ii) Swap contents of registers R_3 & R_2 in register bank 1

(iii) Store the contents of RAM location 20 h at the address contained in RAM location 08 h.

(iv) Copy the contents of external code memory address 0040 h to 1 E.

(b) What are interrupts of 8051? Discuss them by specifying 1E & 1P registers. [8]

OR

Q.2 (a) Write 8051 assembly code for following - [4×2=8]

(i) Set port 0 bits 1, 3, 5 and 7 to 1 and set rest to 0.

(ii) Complement the lower nibble of RAM location 2Ah.

(iii) Move bit 6 of Ro to bit 3 of port 3.

(iv) Clear bit 3 of RAM location 22 h without affecting other bit.

(b) Discuss the Jump & Call of 8051. [8]

UNIT-III

Q.3 Interrupt is a hardware – generated call; explain how? What sequence of events occurs when a microcontroller is interrupted? Write about interrupt Handler subroutines. [16]

OR

Q.3 How is serial data communication done with 8051? Explain Data Transmission and Reception with SCON & PCON registers. [16]

UNIT-IV

Q.4 Discuss D/A and A/D converter interfacing with 8051 microcontrollers. [16]

OR

Q.4 What are various Keyboard configurations? Explain in detail any one type of Keyboard interfacing with microcontrollers. [16]

UNIT-V

Q.5 (a) Write a short note on RTOS for system design. [8]

(b) How are tasks defined & handled in multitasking systems. [8]

OR

Q.5 Write short notes on. **(Any two)** [2×8=16]

(a) Round – Robin scheduling

(b) Full preemptive scheduling

(c) Commercially available RTOS.

6E6066	Roll No. ____________ Total No of Pages: 2

6E6066
B. Tech. VI Sem. (Main & Back) Exam., April/May-2016
Electronic Inst. & Control Engineer
6EI6.1A Control System Components

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.

1. NIL 2. NIL

UNIT-I

Q.1 (a) Explain the specifications of pressure switch with applications. [8]
(b) Explain the working of hermetically sealed relay with suitable diagram. [8]

OR

Q.1 (a) Explain the specifications of flow switch with applications. [8]
(b) Explain the working of electromechanical relay with their merits & demerits. [8]

UNIT-II

Q.2 (a) Explain the following with applications:- [8]
(i) Direction controlled valves
(ii) Time delay valves
(b) Explain the working of filter regulator lubricator with suitable diagram. [8]

OR

Q.2 (a) Explain the following with applications:- [8]
(i) Double rod cylinder
(ii) Rotary cylinder

2 2 9

(b) Explain the working of sequencing pneumatic circuits with merits & demerits. [8]

UNIT-III

Q.3 (a) Explain the DC motor control using pulse width modulation with neat sketch and characteristics. [8]

(b) Discus about the shunt wound compound DC motor. Explain its characteristics, merits & demerits also. [8]

OR

Q.3 (a) Explain the DC motor control using analog drive with applications, merits & demerits. [8]

(b) Explain and draw the torque – speed characteristics of DC motor. Discuss the Brushless DC motors also. [8]

UNIT-IV

Q.4 (a) Explain the working and applications of universal motors. Discuss its merits and demerits also. [8]

(b) Explain the block diagram of the vector control of AC induction motors. Discuss its characteristics, merits and demerits also. [8]

OR

Q.4 Explain the following with suitable diagrams:-

(a) Variable speed control of AC motors [8]

(b) Variable frequency drives. [8]

UNIT-V

Q.5 Write short notes on the following:-

(a) Variable reluctance stepper motors [8]

(b) Ladder diagram programming of PLC. [8]

OR

Q.5 (a) Explain the working and applications of programmable logic controllers and networks. [8]

(b) Explain the techniques of improving torque at higher stepping rates of stepper motor. [8]

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6E6068

Roll No. ____________ Total No of Pages: 3

6E6068

B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016
Electronic Instrumentation and Control Engineering
6EI6.3A Random Variables and Stochastic Processes

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) If A and B are mutually exclusive events, then prove that

$P(A/B) = P(B/A) = 0$ [4]

(b) If $P(A) > P(B)$, show that

$P(A/B) > P(B/A)$ [4]

(c) Explain the following definitions of probability:-

(i) Relative frequency definition [4]

(ii) Classical definition [4]

OR

Q.1 (a) From 6 positive and 8 negative numbers, 4 numbers are chosen randomly (without replacement) and multiplied. Determine the probability that the product is positive. [8]

(b) If P (A) = 0.4, P (B) = 0.7 and P (A $\cap$ B) = 0.3, Find $P(\overline{A} \cap \overline{B})$. [8]

UNIT-II

Q.2 (a) Explain the Rayleigh distribution. Also, calculate its mean and variance. [10]

(b) If X (RV) takes the values from 1, 2, 3,............ 6 with probability 1/6, then determine the mean of random variable X. [6]

OR

Q.2 (a) A continuous random variable X has a pdf

$f(x) = K\,x^2\,e^{-x}; \quad x \geq 0$

Find K, mean and variance. [10]

(b) State the various applications of Poisson distribution. [6]

UNIT-III

Q.3 (a) State and explain the Central Limit theorem. [6]

(b) The joint pdf of a bivariate RV (X, Y) is given by -

$$f_{XY}(x, y) = \begin{cases} \dfrac{kx}{y}; & \begin{matrix} 1 < x < 2 \\ 1 < y < 2 \end{matrix} \\ 0\ ; & \text{otherwise} \end{cases}$$

Where, K is a constant.

(i) Determine K [5]

(ii) Are X and Y independent? [5]

OR

Q.3 Explain the characteristics function. State and prove its various properties. [16]

UNIT-IV

Q.4 (a) What is an auto correlation function? State and prove its various properties. [10]

(b) Explain the SSS and WSS stationary processes. [6]

OR

Q.4 (a) Explain the followings with examples :- [4×3=12]

(i) Discrete random sequence

(ii) Continuous random sequence

(iii) Continuous random process

(iv) Discrete random process

(b) For a WSS random process, the auto correlation function is given by :-

$$R_{XX}(Y) = 25 + \frac{4}{1+6Y^2}$$

Determine mean and variance of process. [4]

UNIT-V

Q.5 When a random process is transmitted through a linear system (LTI), calculate the auto correlation function of output of LTI system. [16]

OR

Q.5 (a) State and explain the various properties of power spectral density. [8]

(b) If auto correlation function of a WSS process is given by

$$R_{XX}(Y) = \left(\frac{A_0^2}{2}\right) \text{COS}\,(W_0 Y)$$

Where, A_0 and W_0 are constants. Calculate the power spectral density (p s d). [8]

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6E3041

Roll No. ___________ Total No of Pages: 3

6E3041

B. Tech. VI-Sem. (Main & Back) Exam., April/May-2016
Applied Electronics
6AI1 Process Control Systems

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.

1. NIL 2. NIL

UNIT-I

Q.1 (a) Set up a system of jacketed tank used to preheat a process stream. On assuming the capacity of the tank wall to be negligible and temperature inside the jacket to be uniformly distributed, determine the response and order of the system. [8]

(b) A thermometer is at room temperature of 25°C. It is suddenly put onto vessel containing boiling water at 100°C. What should be the time constant of the thermometer so that it indicates 99.9°C in 1minute? [8]

OR

Q.1 (a) Set up an interactive system with one element as 'Dead-end system' and also determine the response and order of the system. [8]

(b) Set up a system consisting of a tank, operating slightly above the atmospheric pressure with feed rate fixed by upstream conditions only. Determine the response and order of system, when two systems operating conditions of input and output flows, both are influenced by tank pressure with both flow resistances affecting the overall time constant. [8]

UNIT-II

Q.2 (a) For a 1st order process control system, discuss the effect of measurement lag, when a time delay of $G_M = e^{-Ls}$ has been introduced, where notations have their usual meanings. [4]

(b) The level in a storage tank is controlled by throttling the flow of fluid to the tank. Fluid is pumped from the tank by a constant-displacement pump, and the flow does not depend on tank level. Show that the system will oscillate continuously if an integral controller is used. [6]

(c) Discuss the effect of measurement lag and time delay in level measurement. [6]

OR

Q.2 (a) For a Ist order system in level control system, measuring the level of a tank, using P- controller, derive the expression for controller with step and ramp change made in the load. [4]

(b) Derive the expression for the natural frequency of a float-cage system for level measurement. [6]

(c) For a single capacity process, discuss the effect of PI-control action. [6]

UNIT-III

Q.3 Show why the frequency response of a typical steam heated exchanger is relatively insensitive to the value of the shell-time constant. On neglecting the tube capacity and critical flow through the steam valve for a lumped-capacity model for fluid side, show that the transfer function has the form $Q/\Delta F = K(T_c s + 1)/(T_a s + 1)(T_b s + 1)$ and calculate T_a, T_b and T_c for shell film resistance. [16]

OR

Q.3 (a) Discuss the following in context with flow control systems:- [8]

(i) Control with noisy signal

(ii) Effect of transmission lag

(b) Derive an expression showing that the change in friction loss is expressed as a linear function of change in fluid velocity and change in valve position for a pipeline containing an orifice meter, a control valve and fittings offering localized resistance to flow. [8]

UNIT-IV

Q.4 (a) Draw a block diagram for controlling the column pressure by regulating the flow of water to condenser. Also, derive the transfer function relating condenser pressure and temperature of condenser tubes in Distillation Column dynamics.[10]

(b) A possible disadvantage of bypass control studies is that the reflux temperature may vary because of incorporated or incomplete mixing in the reflux drum. Justify the statement. [6]

OR

Q.4 Explain with suitable schematic diagrams :- [8×2=16]

(a) Pressure control schemes of distillation column.

(b) Internal reflux control.

UNIT-V

Q.5 Write short note on :- [8×2=16]

(a) Laplace domain analysis of cascade control.

(b) Ratio and override control schemes.

OR

Q.5 Discuss in context with optimum controller settings :- [16]

(a) Damped Oscillation method

(b) Reaction Curve method

(c) Continuous Cycling method.

6E3042

Roll No. ___________ Total No of Pages: 2

6E3042

B. Tech. VI-Sem. (Old Back) Exam., April/May-2016
Electronic Instrumentation & Control Engineering
6EI6.1 (O) Elective Computer Architecture

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 in detail the different types of instructions that are supported in a typical processor. [8]

(b) Registers R1 and R2 of a computer contain the decimal value 1200 and 2400 respectively. What is the effective address of the memory operand in each of the following instruction? [8]

(i) ADD

(ii) SUB

OR

Q.1 (a) Register A holds the 8- bit binary number 11011001. Setermine an operand B and the micro operation to be performed on A & B in order to change the value in A to -

(i) 01101011 [4]

(ii) 11110101 [4]

(b) Discuss the various register shift operations. Starting from an initial value of R=11011011, determine the sequence of binary values in R after a logical shift left, followed by a circular shift right, followed by a logical shift left. [8]

UNIT-II

Q.2 (a) What is a stack? Illustrate the use of stack in subroutine processing with suitable program. [8]

(b) Describe different types of addressing modes in details. [8]

OR

Q.2 (a) Explain the execution of an instruction with diagram. [8]

(b) Explain multiple bus organization in detail. [8]

UNIT-III

Q.3 (a) Give the block diagram of the hardware implementation of addition and subtraction of signed number and explain the operations with flowchart. [8]

(b) Explain the representations of floating point numbers in detail. [8]

OR

Q.3 (a) Design the array multiplier that multiplies two 4-bit numbers. [8]

(b) Describe the algorithm for integer division with suitable examples. [8]

UNIT-IV

Q.4 (a) What is the role of address sequencer in micro-programmed control unit? Explain with the help of block diagram and truth table the working of address sequencer for control memory. [16]

OR

Q.4 (a) What are the general attributes of horizontal and vertical micro instructions. [8]

(b) With the help of a neat block diagram discuss the hardware associated with control memory for selecting the next micro instruction address. [8]

UNIT-V

Q.5 (a) What is virtual memory? Explain how the logical address is translated into physical address in the virtual memory system with a diagram. [8]

(b) Describe the organization of a typical RAM chip. [8]

OR

Q.5 (a) Design a parallel priority interrupt hardware for a system with eight interrupt sources. [8]

(b) What is the importance of an I/O interface? Compare features of SCSI and PCI interfaces. [8]

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6E3043

Roll No. ____________ Total No of Pages: 2

6E3043
B. Tech. VI-Sem. (Back) Exam., April/May-2016
Electronic Instrumentation & Control Engineering
6EI2 (O) Analytical & Environmental Instrumentation

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 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 What in absorption spectroscopy? Discuss Atomic Absorption spectroscopic technique in detail. [16]

OR

Q.1 Attempt any two of the following: [16]
- (a) X – ray spectroscopy.
- (b) Photo – acoustic spectroscopy.
- (c) Microwave spectroscopy and its applications.
- (d) The ion sourer of mass spectrometers.

UNIT-II

Q.2 (a) Explain the construction and working of Infrared absorption gas analyzer. [8]
(b) Discuss ultraviolet absorption analyzer and its advantages and applications. [8]

OR

Q.2 Attempt any two of the following:
- (a) Paramagnetic oxygen analyzer. [8]
- (b) Thermal conductivity analyzer. [8]
- (c) Chemiluminescence analyzer. [8]

UNIT-III

Q.3 What in the principle of chromatographic separation. Discuss parts involved in gas chromatography. [16]

OR

Q.3 Discuss types of liquid chromatography, with reference to column and detector septum. [16]

UNIT-IV

Q.4 (a) Discuss major air pollutants, what are harmful effects of these pollutants on living beings. [8]
(b) Explain the construction and working of smoke monitoring system. [8]

OR

Q.4 Write notes on any two of the following:
- (a) Carbon monoxide monitoring system. [8]
- (b) Sculpture dioxide analyzer. [8]
- (c) Hydrocarbon analyzer. [8]

UNIT-V

Q.5 What is pH? Explain principle of pH measurement; discuss Electrodes used for pH measurement. [16]

OR

Q.5 Write notes on any two of the following:
- (a) Ammonia analyzer.
- (b) Silica analyzer.
- (c) Sodium analyzer.
- (d) Dissolved oxygen analyzer.
