Roll No. _____   Total No of Pages: 4

6E3085

B. Tech. VI Sem. (Main & Back) Exam., May/June-2014
Electronics & Comm. Engineering
6EC1 Microwave Engineering II

6E3085

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

Instructions to Candidates:-

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

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. _____NIL_____   2._____NIL_____

UNIT-I

Q.1 (a) Explain the VSWR measurement.   [8]

(b) A slotted line is used to measure VSWR of the load at 2Ghz by double minima method. If the distance between the positions of twice minimum power is 0.5 cm, find the value of VSWR on the line and the magnitude of the voltage reflection coefficient.   [8]

OR

Q.1 (a) Discuss the measurement of scattering parameters of a network.   [8]

(b) The signal power at the input of a device is 10 mw. The signal power at the output of the same device is 0.20 mw. Calculate the insertion loss in dB of this component.   [8]

UNIT-II

Q.2 (a) Describe the strip lines structures, higher order modes, losses and excitation of strip lines. [8]

(b) A microstrip line is constructed of a perfect conductor and a lossless dielectric board. The relative dielectric constant of the fiber glass –epoxy board is 5.23, and the line characteristic impedance is 50 Ω. Calculate this line inductance and this line capacitance. [8]

OR

Q.2 (a) Write down the comparison between slot line, micro strip line, integrated Fin line and Non-radiative guide. [8]

(b) A lossless parallel strip line has a conducting strip width w. The substrate dielectric separating the two conducting strips has a relative dielectric constant $\in_{rd}$ of 6 (beryllia) and a thickness d of 4 mm. Calculate -

(i) The required width W of the conducting strip in order to have a characteristic impedance of 50 Ω.

(ii) The strip –line capacitance

(iii) The strip-line inductance

(iv) The phase velocity of the wave in the parallel strip line. [8]

UNIT III

Q.3 (a) Find the S- parameters of the 3db attenuator circuit shown in figure. [8]
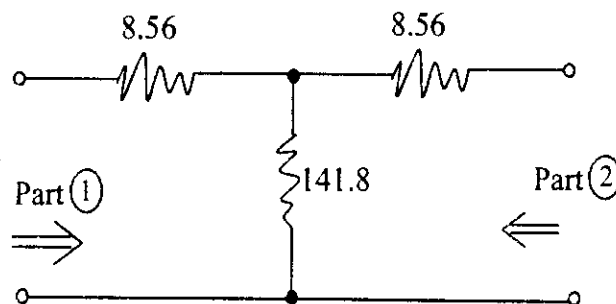
(b) A certain two-port network is measured and the following scattering matrix is obtained

$$[S] = \begin{bmatrix} 0.1 \angle 0° & 0.8 \angle 90° \\ 0.8 \angle 90° & 0.20.1 \angle 0° \end{bmatrix}$$

From this data, determine whether the network is reciprocal or loss less. If a short circuit is placed on port 2, what will be the resulting return loss at port 1?   [8]

OR

Q.3 (a) Derive the expression for Γin for the terminated two-port network shown in figure using signal flow graphs and the decomposition rules.   [8]
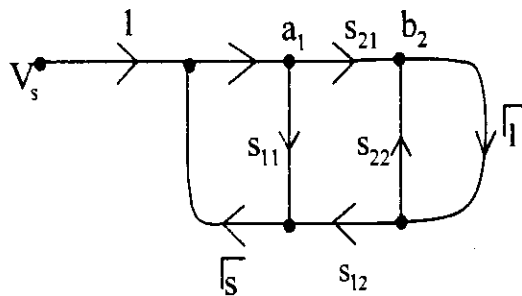
(b) The scattering parameters of a certain two-port network were measured to be $S_{11} = 0.3 + j\,0.7$, $S_{12} = S_{21} = j0.6$, $S_{22}' = 0.3 - j\,0.7$. Find the equivalent impedance parameters for this network, if the characteristic impedance is 50Ω.[8]

UNIT-IV

Q.4 (a) Explain how Gunn diodes are able to exhibit dynamic negative resistance. What are various materials used to make Gunn diodes? Why Si is not suitable for Gunn diodes.   [8]

(b) A certain Silicon microwave transistor has the following parameters:

Reactance $Xc = 1\Omega$, transit–time cut off frequency $fr = 4$ GHz, maximum electric field $Em = 1.6 \times 10^5$ V/cm, saturation drift velocity $Vs = 4 \times 10^5$ cm/s. Determine the maximum allowable power that the transistor can carry.   [8]

OR

Q.4 (a) Discuss the principle of negative resistance in IMPATT diode. Explain the power output and efficiency of IMPATT.   [8]

(b) In a Ga As Gunn diode, working at a frequency of 8 GHz, the threshold field is 3 KV/m, applied field is 3.5 KV/m, device length is 10×10^{-6} meter and doping constant is 10^{16} electrons /cm3. Calculate the current density and negative electron mobility in the device. [8]

UNIT V

Q.5 (a) List the materials and their characteristics required for an ideal substrate material.[8]

(b) A circular spiral inverter has the following parameters: numbers of turns n=5, Separation S = 100 mils, film width W= 50 mils. Compute the inductance. [8]

OR

Q.5 (a) Describe the MMIC techniques. [8]

(b) Discuss the capacitor film development. [4]

(c) Describe the inducter film formation. [4]

6E3086

6E3086

B. Tech. VI Sem. (Main & Back) Exam. May/June-2014
Electronics & Comm. Engineering
6EC2 Microprocessor and Microcontroller
Common With EX

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 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._____   2._____

UNIT-I

Q.1 (a) Differentiate between memory mapped I/O and peripheral mapped I/O. Explain the timing diagram for data transfer in each case for an instruction.   [4+8=12]

(b) What are tri-state devices and why are they essential in a bus oriented system. [4]

OR

(a) If the memory chip size is 2048×8 bits, how many chips are required to make up 16 k byte memory?

(b) Explain the need to de multiplex the bus $AD_7 - AD_0$.

(c) Specify the crystal frequency required for an 8085 system to operate at 1.1MHz.

(d) What is the memory word size required in an 8085 system.   [4×4=16]

UNIT-II

Q.2 (a) Differentiate between Absolute and Linear decoding with an example for each.[8]

(b) Explain the timing diagram of a 2-byte instruction -   [8]

MVI A, 32H

OR

(a) Explain the process of address decoding and memory addressing by interfacing the decoder with EPROM.   [8]

(b) Explain the RISC and CISC architecture of the processors and discuss their salient features.   [8]

UNIT-III

Q.3 (a) Write a program for creating a delay of 1 ms. Assume system clock frequency of 2 MHz   [8]

(b) Explain the techniques used in dynamic debugging of the programs. Give examples of each.   [6+2=8]

OR

(a) Explain the data transfer during the execution of CALL and RET instruction with examples.   [8]

(b) Write a program to generate square wave with the period of 500 μs. Assume system clock period is 325 ns. Use bit Do to output the square wave.   [8]

UNIT-IV

Q.4 (a) List the major components of the 8279 keyboard / display interface and explain their functions. [8]

(b) Explain the operating modes of 8255 programmable peripheral interface. [8]

OR

(a) List the major components of the 8259 interface controller and explain their functions. [8]

(b) Draw the pin diagram of 8253 programmable interval timer and explain functional block diagram of it. [8]

UNIT-V

Q.5 (a) Draw the pin diagram of 8051 micro controller and explain its functional architecture. [10]

(b) Explain various timers and interrupts and their functions in 8051 micro controller. [6]

OR

(a) Explain the interfacing of LCD display with 8051 micro controller. [8]

(b) Discuss any one real world application of 8051 micro controller. [8]

Roll No. _____

6E3044

Total No of Pages: 3

6E3044

B. Tech. VI Sem. (Main & Back) Exam., May/June-2014
Applied Electronics
6AI3 Industrial Electronics
Common with 6AI EC3, & 6EI3

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 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) Draw and explain the characteristics of MOSFET.   [8]

(b) Explain the two transistor Model of SCR.   [8]

OR

Q.1. (a) Draw & explain the characteristics of IGBT.   [8]

(b) Differentiate between SCR and GTO.   [8]

UNIT-II

Q.2. (a)   A 230V, 50Hz, one Pulse SCR controlled converter is triggered at a firing angle of 40° and the load current extinguishes at an angle of 210°. Find the -

(i)   Average output voltage

(ii)   Average load current   [8]

Q.2. (b)   Explain the single phase asymmetrical convertor with suitable waveforms. Determine the average output voltage formula.   [8]

OR

Q.2. (a)   Explain the 180° mode of voltage source inverter.   [8]

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

UNIT-III

Q.3. (a)   A DC Chopper has a resistive load of 20Ω and input voltage V_s = 220V. When the chopper is on, its voltage drop is 1.5V and chopping frequency is 10 kHz. If duty cycle is 80% determine the average output voltage, rms output voltage and chopper on time.   [8]

(b)   Explain the step up chopper.   [8]

OR

Q.3. (a)   Explain the block diagram of switch mode power supply.   [8]

(b)   Explain the online UPS.   [8]

UNIT-IV

Q.4. (a) A separately excited DC Motor operating from a single phase half controlled bridge converter at a speed of 1400 r.p.m. has input of 330 sin 314t and back e.m.f. of 80V. α=30° in every half cycle at armature resistance Ra = 4Ω. Calculate average armature current and motor torque. [8]

(b) Explain the stator voltage control methods for three phase squirrel cage induction motor. [8]

OR

Q.4. (a) Explain variable frequency control methods for three phase squirrel cage induction motor. [8]

(b) Explain the speed control of DC motors using choppers. [8]

UNIT-V

Q.5. (a) Explain the induction heating and its advantages & disadvantages. [8]

(b) Describe the driver circuits for stepper motors. [8]

OR

Q.5. (a) Explain the hybrid stepper motor. [8]

(b) Differentiate between Variable Reluctance and Permanent Magnet stepper motor.

[8]

6E3089

6E3089

B. Tech. VI Sem. (Main & Back) Exam., May/June-2014
Electronics & Comm. Engg.
6EC4 Digital Communication
Common with AI

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

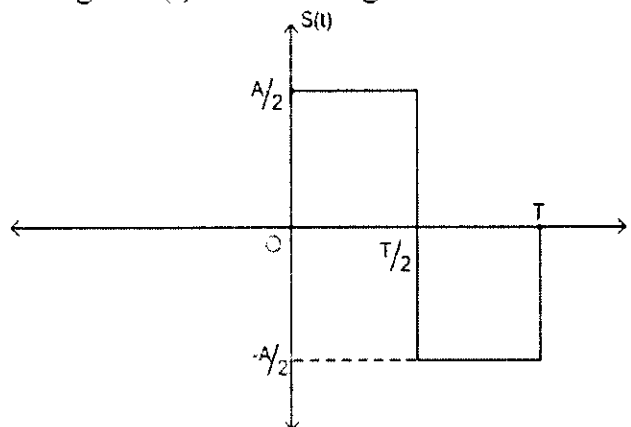*Units of quantities used/ calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1._____Nil_____   2._____Nil_____

UNIT-I

Q.1 (a) Describe Matched Filter and its significance.   [8]

(b) Consider the signal s(t) shown in fig.

(i) Determine the impulse response of filter matched to this signal and sketch it as a function of time.

(ii) Plot the matched filter output as a function of time.

(iii) What is the peak value of the output?   [8]

OR

Q.1 (a) Explain PCM with block diagrams of transmitter and receiver and find out the error probability in PCM 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?

(ii) Determine the output signal-to-quantization noise ratio when a full-load sinusoidal modulating wave of frequency 1 MHz is applied to the input. [8]

UNIT-II

Q.2 (a) Describe various signaling formats with suitable examples. [8]

(b) Sketch the transmitted sequence of pulses for data stream 1110010100 for the following line codes:-

(i) Unipolar NRZ

(ii) Polar Plot

(iii) Bipolar RZ

(iv) Split phase Manchester [8]

OR

Q.2 (a) Explain the Nyquist Criterion for Distortionless Baseband Binary transmission. How can we overcome the practical difficulties encountered with ideal nyquist channel? [12]

(b) A communication channel of bandwidth 75 KHz is required to transmit binary data at a rate 0.1 Mbps using raised cosine pulses. Determine roll-off factor α. [4]

UNIT-III

Q.3 (a) Sketch the waveforms for the inphase and quadrature components of MSK signal in response to the input binary sequence 110100010. [8]

(b) Sketch the MSK waveforms itself for the binary sequence specified in part (a). [8]

OR

Q.3 (a) Using the Gram-Schmidt orthogonalization procedure. find a set of orthonormal basis functions to represent the three signals $s_1(t)$, $s_2(t)$ and $s_3(t)$ shown in figure below. [8]
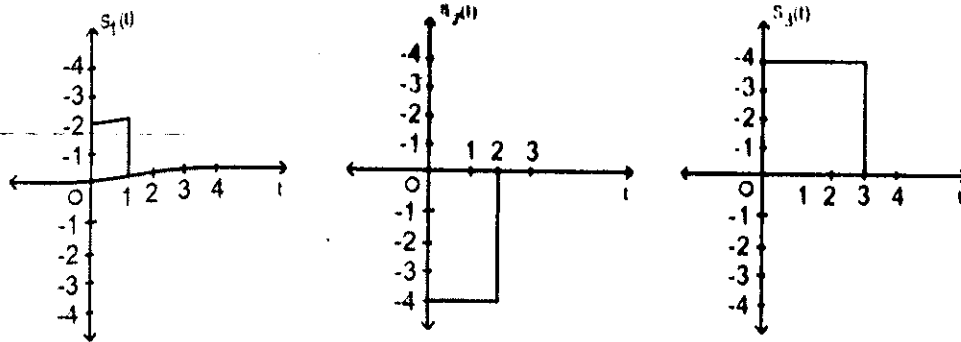
(b) Express each of these signals in terms of the set of basis functions found in Part (a). Construct the corresponding signal space diagram. [8]

UNIT-IV

Q.4 (a) Verify the following expression:-

$0 < H(X) < \log_2 m$
Where. m is the size of alphabet of X. [8]

(b) A discrete memory less source X has four symbols x_1. X_2. X_3 and x_4 with probabilities $P(x_1) = 0.4$. $P(x_2) = 0.3$. $P(x_3) = 0.2$. $P(x_4) = 0.1$.

(i) Calculate H(X).

(ii) Find the amount of information contained in messages $X_1 X_2 X_1 X_3$ and $X_4 X_3 X_3 X_2$ and compare with H(X) obtained in part (i). [8]

OR

Q.4 (a) A discrete memory less source X has four symbols X_1. X_2. X_3 and X_4 with probabilities $P(x_1) = 1/2$. $P(x_2) = 1/4$. $P(x_3) = P(x_4) = 1/8$. Construct a Shanon-Faano Code for X: Show that this code has the optimum property that $n_1 = 1(x_1)$ and that code efficiency is 100%. [8]

(b) Consider an AWGN channel with 4 KHz bandwidth and noise power spectral density $\eta/2 = 10^2$ W/Hz. The signal power required at the receiver is 0.1 mW. Calculate the capacity of this channel. [8]

UNIT-V

Q.5 (a) Consider the rate r =1/2. Constraint length K   2 convolutional encoder of the figure given below. The code is systematic. Fine the encoder output produced by message sequence 10111....   [8]

Modula - 2 adder

Input

f lip - *f*lop

output
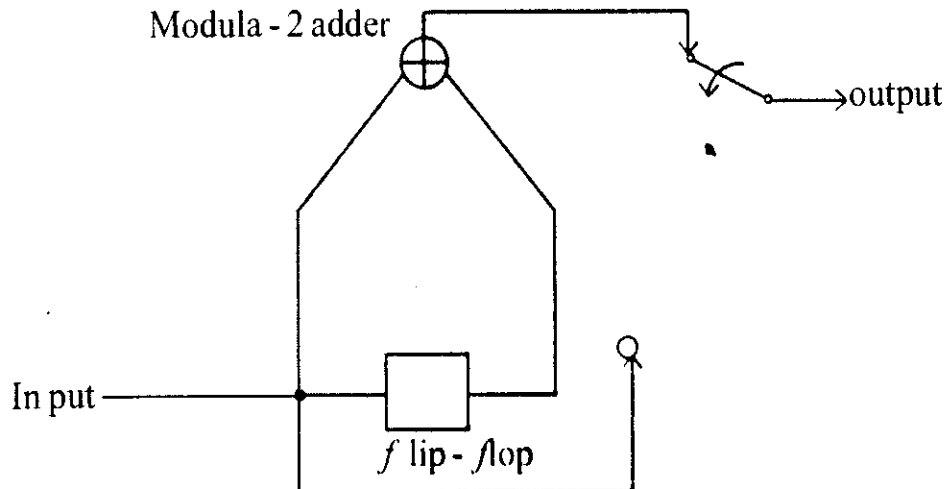
(b) Sketch the code tree for a convolutional encoder of rate r = 1/2. Constraint length K=2 given below:-

11

a
00

b
10

01

Transition from 'a' to 'b' when input message bit is '1' and output is '11'
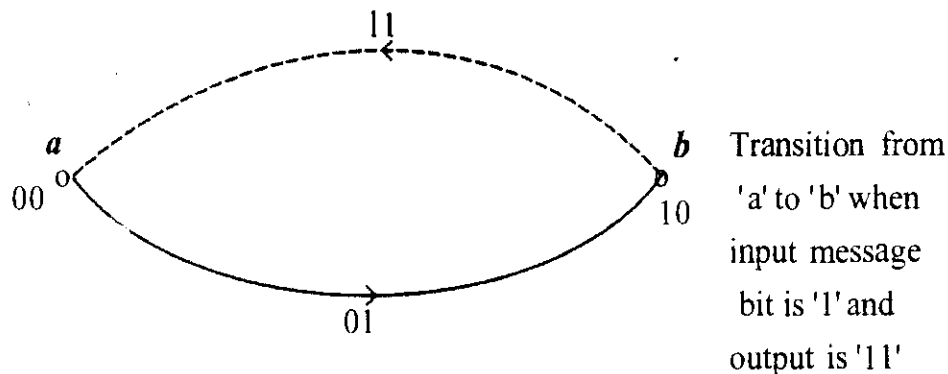
OR

Q.5 (a) For the (7.4) Hamming code. The parity check H is given by

$$H = \begin{bmatrix} 1 & 0 & 1 & 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$

(i) Construct the Generator matrix.

(ii) Find the code word that begins with 1010.

(iii) If the received codeword Y is 0111100, then decode this received codeword.   [8]

(b) Find the generator matrix corresponding to G(p) =p3+p2+1 for a (7.4) cyclic code and find out the code vectors.   [8]

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6E3090

6E3090

B. Tech. VI Sem. (Main & Back) Exam. May/June-2014
Electronics & Communication Engineering
6EC5 Control Systems
Common with AI

Time: 3 Hours   **Maximum Marks: 80**
                                                    Min. Passing Marks: 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._____   2._____

UNIT-I

Q.1. (a) Obtain the overall transfer function for a system represented by the block diagram.   [6]
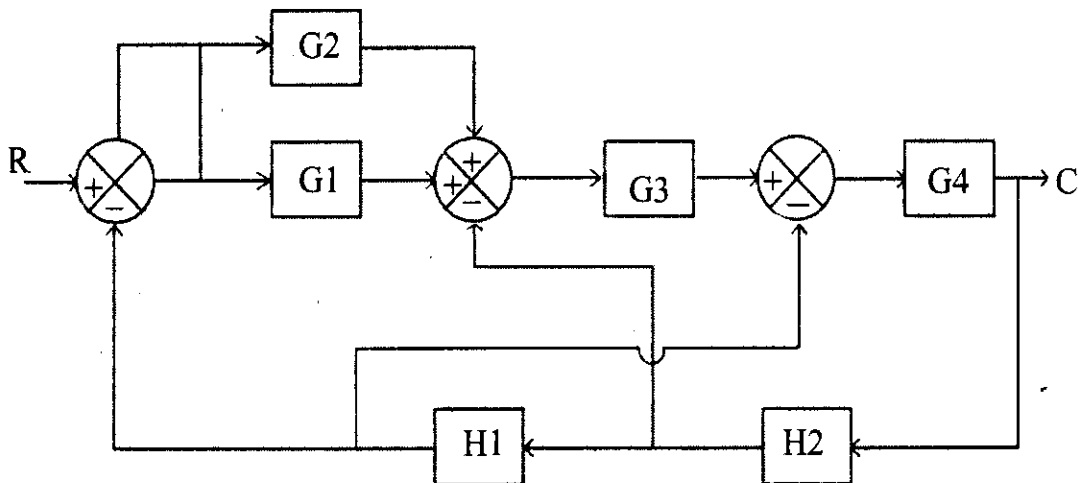

flg.1(a)

Q.1. (b) Fig. 1(b) shows a positional control system for controlling the position of a shaft. The potentiometer error detector measures the deviation of the output shaft w.r.t. reference position O_r. The error is amplified by mean of an amplifier, the output of which is fed to an armature controlled dc motor. The motor shaft is coupled to the load shaft through a gear. The system parameters are as follows;

Error detector gain $K_e = 2$ V/rad,

Amplifier gain $K_A = 10$V/V, $Ra = 0.2$ Ohm, La=negligible,

Motor Torque constant $K_T = 10^{-4}$ V/ (red/sec.).

Equivalents moment of inertia referred to motor side $J_m = 10^{-4}$ Kg-m^2

Equivalent co-efficient of viscous friction referred to motor side $f_m = 10^{-4}$ Nm/(rad/sec)

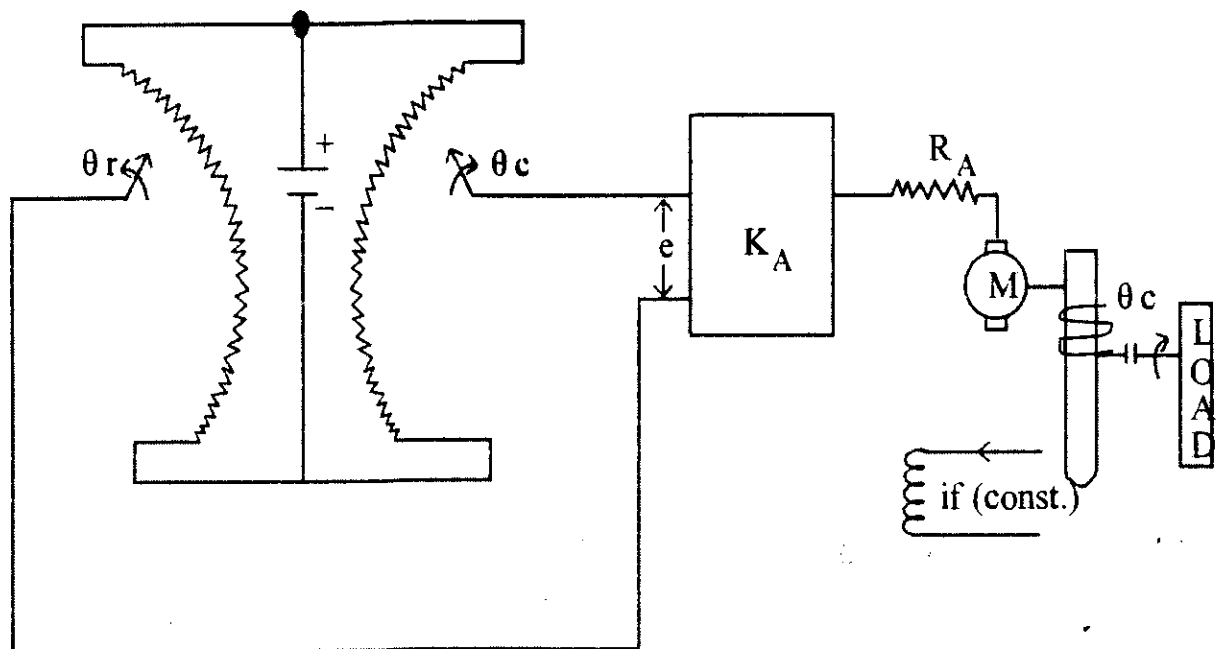Draw the block diagram and determine the overall transfer function relating the output & input. [10]

fig.1(b)

OR

Q.1. (a) The block diagram representation of a control system is shown below -
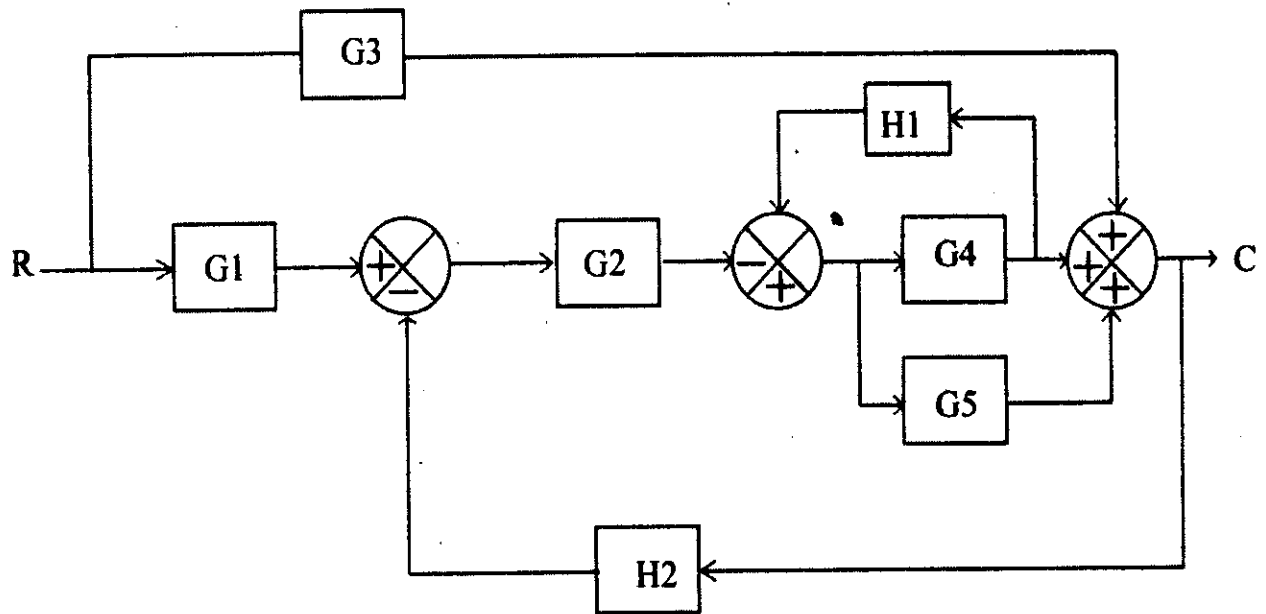

fig .1 (a)

Obtain overall transfer function.   [8]

Q.1. (b) (i) Find the inverce z-transform of -

$$\frac{4z^2 - 2z}{z^3 - 5z^2 + 8z - 4}$$

(ii) Solve the differential equation -

$$x(k+2)-3x(k+1)+2x(k) = 4^k ; \quad x(0)=0, \quad x(1)=1$$ [8]

UNIT-II

Q.2. (a) A unity feedback control system has

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

The input to the system is given by r (t) = 2+3t+2t³. Determine the generalized error coefficients and steady state error. [8]

Q.2. (b) A unity feedback control system is shown in Fig 2(b), By using deviative control, the damping ratio is to be made 0.8. Determine the value of T_d and compare the rise time, peak time and maximum overshoot for the system -

(i) without derivative control, (ii) with derivative control. The input to the system being unity. [8]

R(S) ───→ ⊗ ───→ $\dfrac{16}{S^2 + 1.6\,S}$ ───→ C(S)
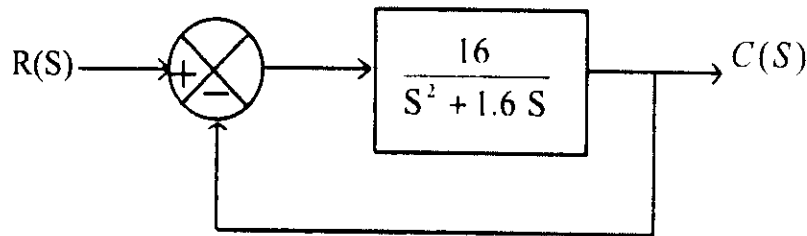
Fig .2(b)

OR

Q.2. (a) A second order control system is represented by a transfer function given below.

$\theta_0(s) = 1$, T (s) = J s²+fs+k

Where θ_0 = proportional output, T = input torque

A step input of 10Nm is applied to the system and test results are given below -

(i) Mp= 6%

(ii) t_p = 1 sec.,

(iii) Steady state value of J, f & k [8]

Q.2. (b) Derive the expression for "Time response of a second order system subjected to unit step input function". [8]

UNIT-III

Q.3. (a) (i) Determine the gain K such that the G.M. 6db. The feedback control system transfer function is given below -

$$G(s) H(s) = \frac{K}{s(s^2 + 2s + 5)}$$

(ii) Determine the value of phase margin for the value of K obtained as above.

[8]

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

$$G(s) H(s) = \frac{720(s + 1.25)}{s(s + 10)(s^2 + 2s + 9)}$$

Determine the closed loop stability using Bode Plot Method. [8]

OR

Q.3. The block diagram of a Robot Joint Control is shown in fig.3.Various control parameters are -

J= 10kg/m², f = 20 Nm/rad/sec.

Motor Torque Constant K_m = 2 Nm/V

Velocity feedback constant K_V = 1V/ rad/Sec.

Error amplification Ke (in V/degree), to be determined.

(i) Calculate the value of Kc for the closed loop system to have $\varsigma=1$

(ii) Determine the steady state error θ_e (s s) when θ_d (s) = 0 and load torque of 5 Nm is suddenly applied.

(iii) Determine θ_e (s s) when $T_s = 0$ and input θ_d is unit step.   [16]
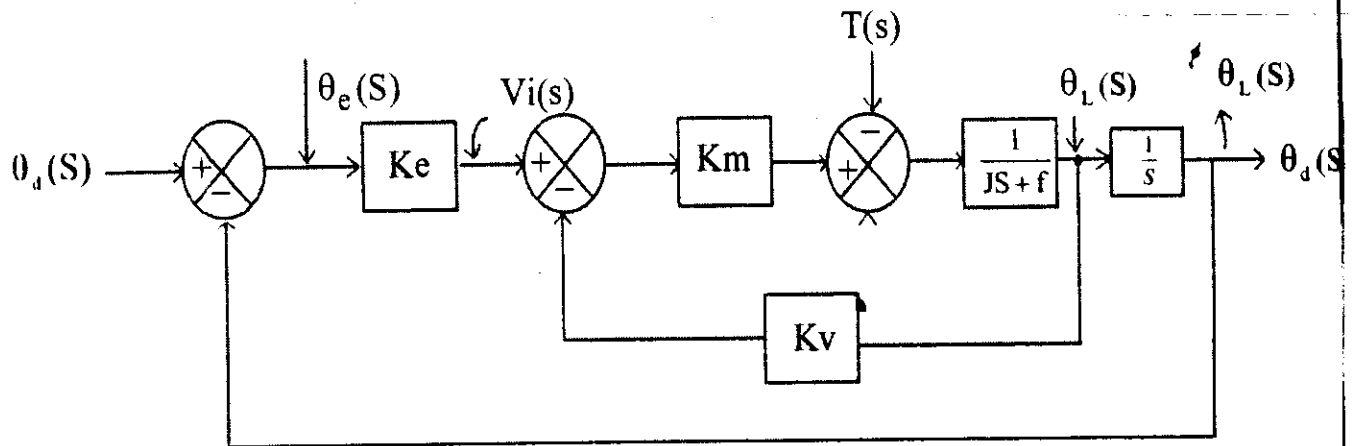
Fig. 3.

UNIT-IV

Q.4. (a) The open loop transfer function of a unity feed-back control system is given below;

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

Determine the closed loop stability by using Nyquist Criteria   [8]

Q.4 (b) (i) Determine the stability of a closed loop system whose characteristics equation is -

$$S^5+S^4+2S^3+11S+10= 0$$

(ii) Determine the stability of a system having following characteristic eqn   [8]

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

OR

Q.4 (a) Sketch the Root-Locus plot for the open-loop transfer function given below-

$$G(S)H(S) = \frac{K(s^2+4)}{s(s+2)}$$

Calculate the value of K at -

(i) Breakaway Point

(ii) s = -0.69+ jo.9. [10]

Q.4 (b) (i) What is Hurwitz Stability Criterion? Explain it with suitable example.

(ii) Write a short note on absolute stability and relative stability. [6]

UNIT-V

Q.5 (a) What is the concept of controllability and observability. Explain both with suitable example and mathematical expressions. [10]

(b) Obtain the state equations for the field controlled d.c. motor shown in fig. 5 (b) below - [6]

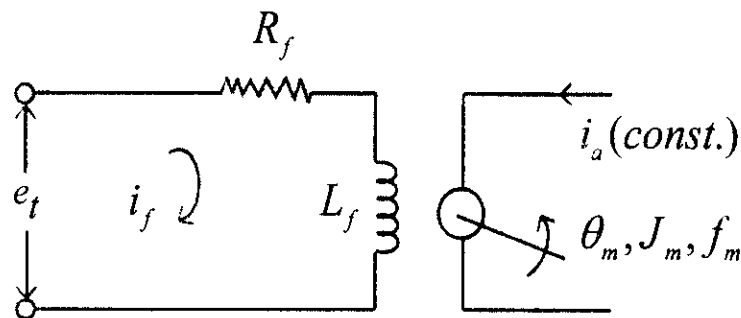*Fig.5(b)*

OR

Q.5 (a) For the system given below obtain -
(i) Zero input response
(ii) Zero state response
(iii) Total response

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

Where x1(0) = 1, x2 (0) = 0 and u(t) = 1 [8]

(b) Give the brief idea of state variable analysis in discrete time domain with suitable examples. [8]

6E3093

6E3093

B. Tech. VI Sem. (Main & Back) Exam. May/June-2014
Electronics & Communication Engineering
6EC6.3 Elective Optimization Techniques

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 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._____   2._____

UNIT-I

Q.1 (a) Briefly discuss historical development of the optimization method. Also write five applications of optimization in electronics and communication engineering.

[10]

(b) A firm manufacturing two types of electrical items A and B can make a profit of Rs. 20 per unit of A and Rs. 30 per unit of B. Each unit of A requires 3 motors and 2 transformers and each unit of B requires 2 motors and 4 transformers. The total supply of these per month is restricted to 210 motors and 300 transformers. Type B is an expert model requiring a voltage stabilizer, which has a supply restricted to 65 units per month. Formulate above as a linear programming problem for maximum profit.
[6]

OR

Q.1 (a) Briefly discuss six different basis for classification of optimization problem. [10]

(b) A firm manufactures headache pills in two sizes A and B. Size A contains 2 grains of aspirin, 5 grains of bicarbonate and 1 grain of codeine; size B contains 1 grain of aspirin, 8 grains bicarbonate and 6 grains of codeine. It has been found by users that it requires at last 12 grains of aspirin, 74 grains of bicarbonate and 24 grains of codeine for providing immediate effects. Formulate above as a linear programming problem for the least number of pills a patient should have to get immediate relief. [6]

UNIT-II

Q.2 (a) Solve the following problem using the revised simplex method: [8]

Minimize $Z = x_1 + 2x_2$

subject to $2x_1 + 5x_2 \geq 6$; $x_1 + x_2 \geq 2$; $x_1, x_2 \geq 0$.

(b) Use duality to solve the following LPP : [8]

Min $Z = 3x_1 + x_2$

s.t. $x_1 + x_2 \geq 1$; $2x_1 + 3x_2 \geq 2$ and $x_1 x_2 \geq 0$.

OR

Q.2 (a) Use simplex method to solve the following LPP :

Minimize $Z = x_1 + 2x_2 + 3x_3 - x_4$

s.t. $x_1 + 2x_2 + 3x_3 = 15$

$2x_1 + x_2 + 5x_3 = 20$

$x_1 + 2x_2 + x_3 + x_4 = 10$

and $x_1, x_2, x_3, x_4 \geq 0$. [8]

(b) (b) Use duality to solve the following LPP :

Min $Z = 40x_1 + 35x_2$

s.t. $2x_1 + 3x_2 \leq 60$

$4x_1 + 3x_2 \leq 96$

$x_1 \geq 0, x_2 \geq 0$. [8]

UNIT-III

Q.3 (a) Solve the following transportation problem by Vogel's approximation methods. [8]

		D1	D2	D3	Supply
		Destination			
Origin	O1	2	7	4	5
	O2	3	3	1	8
	O3	5	4	7	7
	O4	1	6	2	14
Demand		7	9	18	34

(b) Solve the minimal assignment problem whose effectiveness matrix is given blow: [8]

Persons \ Jobs	1	2	3	4
A	2	3	4	5
B	4	5	6	7
C	7	8	9	8
D	3	5	8	4

OR

Q.3 Solve the following transportations problem by the lowest cost entry method and test its optimality. [16]

	D1	D2	D3	D4	Supply
F1	8	10	7	7	50
F2	12	9	4	7	40
F3	9	11	10	8	30
Demand	25	32	40	23	120

UNIT-IV

Q.4 (a) Use Dichotomus search method to find the maximum of f(x) = x (5-x), in the interval [0, 8], taking $\delta = 0.001$. [8]

(b) Minimize $Z = f(x) = \frac{1}{3}(x_1 + 1)^3 + x_2$

Subject to $g_1(x) = -x_1 + 1 \leq 0$, $g_2(x) = -x_2 \leq 0$

by using interior penalty method. [8]

OR

Q.4 (a) Minimize the function:

$$f(x_1, x_2) = 6x_1^2 + 2x_2^2 - 6x_1 x_1 - x_1 - 2x_2$$

u ing Powell's method of conjugate directions. [8]

(b) Solve by univariate search method:

Minimum: $f = 2x_1^2 - 2x_1 x_2 + 5x_2^2 - 6x_1 + 6x_2 + 5$ [8]

UNIT-V

Q.5 Solve the following L.P problem by dynamic programming:

Maximize : $Z = 500 x_1 + 800 x_2$

Subject to : $5x_1 + 6x_2 \leq 60$, $x_1 + 2 x_2 \leq 16$, $x_1 \leq 8$, $x_2 \leq 6$, $x_1, x_2 \leq 0$,

Verify your solution by solving it graphically. [16]

OR

Q.5 Determine -

Max $Z = y_1^3 + y_2^3 + y_3^3$

Subject to $y_1 y_2 y_3 < 5$, $y_i > 0$ and integral. [16]

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6E3041

6E3041

B. Tech. VI Sem. (Main & Back) Exam., May/June-2014
Applied Elect.
6A11 Process Control Systems

Time: 3 Hours   Maximum Marks: 80
                                                       Min. Passing Marks: 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. _____   2._____

UNIT-I

Q.1 (a) Explain the difference between interacting and non interacting systems. Take an example of interacting system and derive its Transfer function.   [8]

  (b) Derive the Transfer function for the temperature response of stirred tank when I/P is steam temperature.   [8]

OR

Q.1 (a) Explain linearization of non linear terms by taking a suitable example.   [10]

  (b) A certain thermometer has a time constant of 15 sec and an initial temperature of 20°C. It is suddenly exposed to a temperature of 100°C. Determine the time required to attain 90% of the step size and the temperature at this time.   [6]

UNIT-II

Q.2 (a) Explain the effect of proportional control on a single capacity process when a step change is made in (a) Set point (b) Load [10]

(b) A proportional controller is used to control the height of water in a tank where the water level can vary from 0-9 m. Calculate the value of proportional Band and K_p that will set the water level at desired height of 5.0m. The controller is required to fully close the inlet valve when water level rises to 5.5m and fully open the inlet valve when water level falls down to 4.5m. [6]
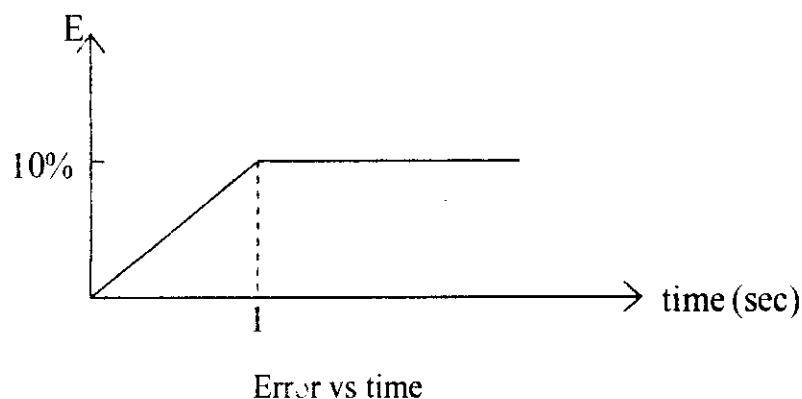
OR

Q.2 (a) Explain [10]

(i) Averaging control

(ii) Effect of Tank dynamics in context with level control system.

(b) The governing equation of a PD controller is $m(t) = K_p \left(E + k_d \dfrac{dE}{dt} \right) + P_o$. For unit K_p and K_d draw the response of PD controller to the error curve shown below when P_O is 50% [6]

Error vs time

UNIT-III

Q.3 (a) Explain process lag and measurement lag in a typical flow control system. What are typical characteristics of flow system? [8]

(b) Explain clearly the choice of controllers for the control of noisy signals like pressure. [8]

OR

Q.3 (a) What are the different temperature measurement techniques used in heat exchanger? [8]

(b) Explain the different control schemes used to control exit temperature of fluid in heat exchanger. [8]

UNIT-IV

Q.4 (a) Explain Basic features of composition control in a distillation column. [8]

(b) Why is location of sensing element so important in distillation column? Discuss the location of temperature bulbs. [8]

OR

Q.4 (a) Discuss different control schemes for controlling pressure in distillation column.

[8]

(b) What is reflux? Discuss internal reflux control schemes in a distillation column.

[8]

UNIT-V

Q.5 (a) Explain concept of cascade and feed forward control with the help of suitable example. [8]

(b) Explain any closed loop method to find the optimum controller settings for a plant. [8]

OR

Q.5 (a) List the advantages and disadvantage of feed forward and feedback control configuration. [8]

(b) Explain any open loop method to find the optimum controller setting for a plant.

[8]

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Total No of Pages: 3

6E3042

6E3042

B. Tech. VI Sem. (Main & Back) Exam., May/June-2014
Electronic Inst. & Control Engg.
6EI6.1 Elective Computer Architecture

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 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._____   2._____

UNIT-I

Q.1 (a) What do you Understand by RTL. Draw clear block diagram. Explain Logic Micro operation?   [8]

(b) Explain Bus system for 4-register with block diagram.   [8]

OR

Q.1 (a) Explain Arithmetic Microoperation with all operation.   [4]

(b) Draw block diagram 4-bit adder subtractor & explain its working.   [6]

(c) Explain 4-bit arithmetic circuit with block diagram.   -   [6]

UNIT-II

Q.2 (a) Define different addressing mode with block diagram. [8]

(b) What are the differences between zero address instruction & three address instruction? [4]

(c) Explain RISC instruction set. [4]

OR

Q.2 (a) Explain the different data transfer technique with instruction mode. [4]

(b) What are the difference between handling of interrupts & subroutines? [6]

(c) Explain instruction pipelining with Block diagram. [6]

UNIT-III

Q.3 (a) Explain the working of Array Multiplier with neat sketch. [8]

(b) Addition & subtraction of signed magnitude with suitable block diagram. [8]

OR

Q.3 (a) Derived an algo in flow chart from for adding & subtracting two fixed point binary numbers when negative numbers are signed -1's. Complement represention. [8]

(b) Derive algo for evaluating the square root of a binary fixed point number [8]

UNIT-IV

Q.4 (a) Explain Horizontal & Vertical format. Also draw block diagrams of micro programmed control organization. [8]

(b) Define the following: [8]

(i) Micro operation & Microinstruction.

(ii) Micro code & Micro program.

OR

Q.4 (a) Explain hardwired & micro programmed in depths with Example. Is it possible to have hardwired control associated with a control memory? [8]

(b) Write a short note on Address sequencer. [8]

UNIT-V

Q.5 (a) Explain the concept of Two-way associative memory & also explain how it beneficial from simple associative memory organization. [8]

(b) Explain handshaked based communication. [8]

OR

Q.5 (a) Explain DMA controller with its working & block diagram. [8]

(b) Explain cache memory organization & also define the difference between cache memory & vertical memory organisation. [8]

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6E3043

6E3043
B. Tech. VI Sem. (Main & Back) Exam., May/June-2014
Electronics Instrumentation & Control Engineering
6EI2 Analytical & Environmental Instrumentation

Time: 3 Hours   **Maximum Marks: 80**
                                                     Min. Passing Marks: 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._____   2._____

UNIT-I

Q.1 (a) Explain the "Beer Lambert Low".   [8]

(b) Explain the flame-photometer in context to the construction and working principle.   [8]

OR

Q.1 (a) Why do we use the X-Ray spectrometer? Explain its working with a suitable diagram.   [8]

(b) Explain the "Time-of-flight type Mass spectrometer" with the neat sketch and mathematical equations.   [8]

UNIT-II

Q.2 Write short note on following:

    (a)   Chemilluminescence analyzer.   [8]

    (b)   Magnetic wind oxygen analyzer.   [8]

OR

Q.2 Write short note on following:

    (a)   Thermal conductivity analyzer.   [8]

    (b)   Ultraviolet absorption analyzer.   [8]

UNIT-III

Q.3 (a)   What are the requirements of the detectors used in the gas chromatography? Explain "Electron Capture Detector" used in gas chromatography.   [4+4=8]

    (b)   Write short note on TLC.   [8]

OR

Q.3 (a)   Write short note on paper chromatography.   [8]

    (b)   Explain the classification of liquid chromatography.   [8]

UNIT-IV

Q.4 (a)   Draw the block diagram of the air pollution monitoring instruments and explain each block.   [8]

    (b)   What is "smoke monitor"? How does it work? Explain with neat sketch.   [8]

OR

Q.4 (a) Explain all kinds of air pollutants. [8]

    (b) Explain the construction and working of the 'visible emission monitoring system'. [8]

UNIT-V

Q.5 Write short note on following:

    (a) Ammonia Analyzer. [8]

    (b) Silica Analyzer. [8]

OR

Q.5 Write short on following:

    (a) PH meter [8]

    (b) Dissolved oxygen analyzer [8]

	Roll No. _____	Total No of Pages: 3

6E3045

B. Tech. VI Sem. (Main & Back) Exam. May/June-2014
Electronic Instrumentation & Control Engineering
6EI4 Biomedical Instrumentation

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 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._____   2._____

UNIT-I

Q.1 (a). Describe how does the blood circulate in a human body.   [8]

(b) Explain human respiratory system with a suitable diagram.   [8]

OR

Q.1 (a) Explain the construction of a human cell & show its polarization & depolarization.   [8]

(b) Explain the structure & functioning of neuron along with diagram.   [8]

UNIT-II

Q.2 (a) Explain the working with the help of block diagram for monitoring the arterial blood pressure. [8]

(b) How are the potentials in muscle fibers measured & what is the record called that is obtained there from. [8]

OR

Q.2 (a) What is the difference between echocardiograph & ECG? [8]

(b) Draw the block diagram of an ECG M/C & explain the function of each block & its controls [8]

UNIT-III

Q.3 (a) Define the term 'pH'. Describe the construction of pH measuring electrodes. [8]

(b) Explain the principle & working of 'Gamma camera' along with the proper diagram. [8]

OR

Q.3 (a) Describe colorimeter method for determining chemical concentration. [8]

(b) What are the basic components of an MRI imaging system? Explain function of each component in brief. [8]

UNIT-IV

Q.4 (a) What are the advantages & disadvantages of bio-telemetry? [8]

(b) With the help of block diagram explain the ICU system. [8]

OR

Q.4 (a) What are shock hazards from electrical equipments? [8]

(b) Explain the basic capabilities of the computer system that makes it suitable to be used in conjunction with Biomedical Instrumentation [8]

UNIT-V

Q.5 (a) Mention the advantages of DC defibrillator in comparison to AC defibrillator. Describe the control circuit of ADC defibrillator. [8]

(b) What are various applications of Lasers in Biomedical Instrumentation? Explain any one in detail. [8]

OR

Q.5 Write short notes on :-

(i) Muscle stimulators.

(ii) Diathermy.

(iii) Cardiac Pacemaker.

(iv) Hemodialysis Machine [4 x 4 =16]

Roll No. _____   Total No of Pages: 3

6E3048

6E3048
B. Tech. VI Sem. (Main & Back) Exam., May/June-2014
Bio Medical Engineering
6BM5 Micro Controller & Embedded System
Common for AI, BM, EI

Time: 3 Hours   ` `   **Maximum Marks: 80**
                                               Min. Passing Marks: 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._____   2._____

UNIT-I

Q.1. Show the signals at the 8051 pin. Explain meaning of each signal. Also indicate when a signal is input and when output. What are signals multiplexed at the port PO? What are the signals multiplexed at the port P_3?   [16]

OR

Q.1. (a) How do you program a watchdog timer in 8051?

(b) How are interrupt vector used to service the timer, serial transfer and external interrupt in 8051?   [8+8=16]

UNIT-II

Q.2. (a) Compare program, Routine and an interrupt service routine.

(b) Describe different types of data transfer instruction in 8051. Explain the differences between the mov, MOVC and MOVX instructions. [8+8=16]

OR

Q.2. (a) Explain the addressing modes of 8051 instruction set.

(b) Explain all the instruction modes available to move a byte to a direct address.

[8+8=16]

UNIT-III

Q.3. (a) List the timer features that are programmable in a timer as a free-running counter.

(b) How does the timer overflow interrupt differ from the real- time clock interru, Give four applications of the real- time clocked interrupt? [8+8=16]

OR

Q.3. (a) Explain four applications of real time clock interrupts. How does the real- time clock interrupt in 68 HC11 differ from the software timer interrupt in 80x96?

(b) Describe the concept of interrupt intervals, interrupt density and interrupt constraints. [8+8=16]

UNIT-IV

Q.4. (a)   How will you interconnect the 8251 with modem?

(b)   How will you interconnect the 8251 at the addresses F000H and F001H?

[8+8=16]

OR

Q.4. (a)   How will you program the DMA address register and terminal count register of Ch 0 and Ch 1?

(b)   How will you mask the IRQ3 and IRQ4 in 8259?   [8+8=16]

UNIT-V

Q.5. Explain the Round Robin scheduling with suitable application and example.   [16]

OR

Explain the application of micro controllers in interfacing with suitable example.   [16]