Total No. of Questions : 10] [Total No. of Pages : 2

P1185

[3564] - 47
B.E. (Electronics)
PROCESS INSTRUMENTATION (Elective - I)
(1997 Course) (404205)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answer three questions from Section I and three questions from Section II.***
3) ***Answers to the two sections should be written in separate books.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
7) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Define the term transducer. With suitable examples give the classification of transducers. **[8]**

b) List the different non contact type methods for temperature measurement. Explain any one in detail. **[8]**

Q2) a) Explain transit type ultrasonic flowmeter in detail. **[8]**

b) Draw & explain V/I & I/V converters using op-amp. **[8]**

Q3) a) Explain the term conductivity. Explain any one method to measure conductivity. **[8]**

b) A strain gauge of 120Ω is mounted on a steel cantilever beam at a distance of 20cm from its free end. An unknown force applied at free end, produces deflection of 9.5 mm of free end. Calculate unknown force if the beam is 0.25m long with width = 20cm & depth of 3mm. For steel E = 200 GN/m^2. **[8]**

Q4) a) Explain electropneumatic converter in detail. **[8]**

b) Explain in detail 2-wire transmitter. **[8]**

Q5) Write a short note on (any three) **[18]**

a) pH measurement.
b) Process characteristics
c) Hydraulic PID controller.
d) Distributed control system.

P.T.O.

SECTION - II

Q6) a) Define the term proportional band. Explain electronic proportional controller in detail. **[8]**

b) Explain in detail pneumatic P+I controller. **[8]**

Q7) a) List the different types of control valves. Explain in detail the factors for selection of control valve. **[8]**

b) Explain in detail Electro-pneumatic actuator and explain the concept of valve positioner. **[8]**

Q8) a) Explain pressure control & fuel control in boiler. **[8]**

b) Explain the term heat exchanger. For heat exchanger explain the following terms. **[8]**

i) Degree of freedom.

ii) Total heat transferred.

iii) Dead time.

Q9) a) Define the term PLC. List out different specifications of PLC. Draw & explain the architecture of PLC. **[8]**

b) Explain magnetic tape recorder in detail. **[8]**

Q10) Write a short note on (any three) **[18]**

a) Control valve noise.

b) Ratio control system.

c) Alarm annunciators.

d) Control panel.

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Total No. of Questions : 10] [Total No. of Pages : 2

P1184

[3564] - 45
B.E. (Electronics)
ELECTRONICS COMMUNICATION - II
(1997 Course)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Define the following with respect to a waveguide. **[8]**

i) Cut off frequency ii) Guide wavelength

iii) Phase velocity iv) Wave impedance.

b) What are the methods of excitation of various modes in a waveguide? Explain the difference between TE and TM mode. **[8]**

Q2) a) What is a 'Magic Tee'? Explain the operation with neat diagram and S-matrix. List its applications. **[8]**

b) Compare: Resonant Antennas with Non Resonant Antennas. **[8]**

Q3) a) Define 'pattern multiplication'. Explain the principle of pattern multiplication with examples, for two non isotropic and identical point sources with spacing 'd'. **[8]**

b) What are the limitations and advantages of Microstrip lines over co-axial lines and waveguides. Discuss the various design considerations of a Microstrip antenna. **[8]**

Q4) a) What is a paramp? Explain any two of its applications in detail. **[8]**

b) Compare the O-type tubes with M-Type tubes. **[8]**

P.T.O.

Q5) Write Short notes on any THREE: **[18]**

a) Antenna Array
b) Isolator & Circulator
c) Directional Coupler
d) Horn Antenna
e) Reflex Klystron

SECTION - II

Q6) a) Define and explain the following terms of optical fiber communication: **[8]**

i) Modes in fibers
ii) Index Profile
iii) Numerical Aperture
iv) Critical Angle.

b) What are various losses encountered while coupling two fibers? Explain with detailed diagrams. **[8]**

Q7) a) Derive the equation for 'Maximum Range of Radar' in terms of minimum power received. **[8]**

b) Explain the basic functions of search & tracking radars. Discuss the different scanning and tracking methods with the help of Radars. **[8]**

Q8) a) What is called a cluster? Draw a 7 Cell Re-use pattern and explain its importance. What are the other common re-use patterns? **[8]**

b) Define the term 'Co-Channel Interference Reduction Factor'? How CCIR can be calculated. Explain. **[8]**

Q9) a) Draw and explain the GSM Architecture. What is meant by IMEI? State its significance. **[8]**

b) What is the need of 'hand off in mobile communication? What are different types of hand off methods used? Explain. **[8]**

Q10) Write Short notes on any THREE: **[18]**

a) Optical Sources
b) Optical Amplifier
c) OTDR
d) Cell Sectorization
e) Channel Assignment Techniques in GSM.

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Total No. of Questions : 12] [Total No. of Pages : 2

P1157

[3564] - 227
B.E. (Electronics)
DIGITAL IMAGE PROCESSING
(2003 Course) (404212)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 , Q7 or Q8, Q9 or Q10, Q11 or Q12.***
2) ***Answers to the two sections should be written separately.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***
6) ***Use of electronic pocket calculator is allowed.***

SECTION - I

Q1) a) Explain the components of a image processing system with the help of a neat block diagram. **[8]**

b) Explain Image Processing acquisition process with the help of a neat diagram. **[8]**

OR

Q2) a) Explain why false contouring occurs in an image. Specify the technique which eliminates false contouring. **[8]**

b) Explain the basic relationship between pixels. **[8]**

Q3) a) Write the expression for two dimensional Walsh transform pair and explain it. Also state how Walsh - Hadamard transform is different from DCT. **[8]**

b) Write the equations for converting colors from RGB to HSI. **[8]**

OR

Q4) a) Explain discrete cosine transform in detail stating its application in the field of image processing. **[8]**

b) Define:

i) Radiance. ii) Luminance.
iii) Brightness. iv) Chromaticity. **[8]**

Q5) a) What do you mean by pseudocolor image processing? Discuss its any one example. **[8]**

b) Explain smoothing spatial filters in detail. Discuss any one specific application where the blurring effect of the smoothing filters proves to be helpful. **[10]**

P.T.O.

OR

Q6) a) Explain color slicing with its applications. **[8]**

b) With the help of a block diagram, explain the steps for filtering in frequency domain. Write the expression for Gaussian LPF and explain it. **[10]**

SECTION - II

Q7) a) Find a set of code words and average word length using Huffman coding scheme for a set of input gray levels with probabilities as given below:

Gray levels	G_1	G_2	G_3	G_4	G_5	G_6	G_7	G_8
Probabilities	0.02	0.15	0.03	0.15	0.05	0.2	0.1	0.3

Calculate the average length of the code. **[8]**

b) Explain JPEG standard for image compression. **[8]**

OR

Q8) a) Explain Arithmetic coding in detail. **[8]**

b) Define:

i) Data compression. ii) Data redundancy.

iii) Relative data redundancy. iv) Compression ratio. **[8]**

Q9) a) Explain dilation and erosion. **[8]**

b) Explain Hough transform algorithm for finding lines in an image. **[8]**

OR

Q10) a) Explain edge detection using Sobel mask along with the equations for G_x & G_y. Compare Sobel mask with Prewitt mask. **[8]**

b) Consider an image and write its chain code for 4-connectivity and 8-connectivity. Also write their normalized codes. **[8]**

Q11) a) Explain any two spatial filtering techniques for restoration. **[8]**

b) Draw the block diagram & discuss various steps carried out and algorithms used for remote sensing. **[10]**

OR

Q12) a) State and explain the PDFs for the following noise:

i) Gaussian noise ii) Rayleigh noise

iii) Uniform noise iv) Impulse noise. **[8]**

b) Draw the block diagram & discuss various steps carried out and algorithms used for fingerprint recognition. **[10]**

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Total No. of Questions : 12] **[Total No. of Pages : 2**

P1359

[3564]-226
B.E. (Electronics)
SYSTEM PROGRAMMING AND OPERATING SYSTEM
(2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Solve Q 1 or Q 2, Q 3 or Q 4, Q 5 or Q 6, from section-I Q 7 or Q 8, Q 9 or Q 10, Q 11 or Q 12 from section-II.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary***

SECTION - I

Q1) a) Describe data structure used for language processing. Explain any one data structure in detail. **[8]**

b) What is compiler? Explain different phases of compiler. **[8]**

OR

Q2) a) Explain in short : **[8]**

i) Loader
ii) Compiler
iii) Operating system
iv) Interpreter

b) Draw a block diagram of structure of compiler. Explain syntax analysis. **[8]**

Q3) a) What are features of assembler and explain data structure used for pass-I assembler. **[10]**

b) Define macro and explain expansion of macro with suitable example. **[8]**

OR

Q4) a) What are features of macro processor and explain data structure used for pass-I macro processor. **[10]**

b) Explain forward reference and backward reference with suitable example. **[8]**

Q5) a) What are features of loader. Explain data structures used for design of loader. **[8]**

b) What is program relocatability? What are the methods of relocation of program. Explain in detail. **[8]**

P.T.O.

OR

Q6) a) What are the functions of loader? Explain direct linking loader. **[8]**

b) What are the functions of linker? Explain subroutine linkers. **[8]**

SECTION - II

Q7) a) What is operating system? Explain the basic functions of operating system. **[8]**

b) What are semaphores? With suitable example describe the use of semaphore in mutual exclusion. **[10]**

OR

Q8) a) What is scheduling? Explain pre-emptive and non-pre emptive scheduling in detail. **[10]**

b) Define dead locks and describe how dead locks detected and resolved in operating system. **[8]**

Q9) a) Describe paging technique. Explain the steps of page fault handling in a virtual memory system. **[8]**

b) Explain virtual memory using segmentation. **[8]**

OR

Q10) a) Explain : **[8]**

i) File allocation

ii) File sharing

b) Explain contiguous and non-contiguous memory allocation. **[8]**

Q11) a) Draw the diagram showing different IOCS layers. Explain it in detail. **[8]**

b) What is device driver? Explain device drivers for USB. **[8]**

OR

Q12) Write short note on : **[16]**

a) I/O organization.

b) I/O devices.

c) Driver for parallel port.

d) Advanced I/O programming.

Total No. of Questions : 12] **[Total No. of Pages :3**

P1347

[3564] - 224
B.E. (Electronics)
ARTIFICIAL INTELLIGENCE
(2003 Course)

Time : 3 Hours] ***[Max. Marks:100***

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q910, Q11 or Q12.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain with suitable example the Hill-Climbing Method of problem solving. State its advantages and disadvantages. **[8]**

b) What is the best first search technique? Explain the various operating steps of the A* algorithm by searching a directed graph in which each node represents a point in the problem space. **[8]**

OR

Q2) a) State the conditions under which each of the forward, backward and bidirectional search is appropriate. Give examples. **[8]**

b) Discuss various definitions of Artificial Intelligence. Explain why AI programs try to model human performance. **[8]**

Q3) a) Elaborate how simple facts are represented in logic with suitable examples. What are the different ways to represent a class membership? **[8]**

b) Explain Minimax Search procedure. How the performance of the Minimax procedure can be further improved? **[8]**

OR

Q4) a) Explain the principle of resolution. Consider the following statements:

i) Parent of Parent is Grandparent.

ii) Everyone has a parent.

Using principle of resolution conclude that, 'there exists a grandparent'. **[8]**

P.T.O.

b) What is predicate logic? Explain the procedure to convert formulas into clause form. **[8]**

Q5) a) Explain how semantic nets are used for representing knowledge taking suitable example and what are conventions used? Express the following sentences using semantic nets. **[10]**

i) Every batter hit a ball.

ii) All the batters like a pitcher.

b) Explain how frames can be used for knowledge representation. Give an example. **[8]**

OR

Q6) a) Explain how scripts can be used for knowledge representation. Write a script of shopping in a supermarket. **[10]**

b) What is conceptual dependency? How it is used to represent knowledge? **[8]**

SECTION - II

Q7) a) Explain in detail how hard problem is solved using a goal stack planning. **[8]**

b) Discuss with suitable example how problem is solved using a goal stack planning. **[8]**

OR

Q8) a) Discuss Hierarchical planning with suitable example. What are reactive systems? **[8]**

b) Compare state space search and constraint posting search in case of nonlinear planning algorithm. Explain the steps involved in the nonlinear planning algorithm. **[8]**

Q9) a) Draw and explain the architecture of image understanding. How the low level and high level knowledge is used to interpret an image? **[8]**

b) Describe in detail multilayer neural networks. Explain how these networks can be used for classification of handwritten digits. **[8]**

OR

Q10) a) Explain in detail how the robots navigate through the world and manipulate objects. **[8]**

b) What are the advantages of Artificial Neural Networks? With suitable example explain the various applications of these networks. **[8]**

Q11) a) Explain syntactic processing. Explain how ATN is used for natural language understanding. **[10]**

b) Write short note on a finite state machine. **[8]**

OR

Q12) a) What is semantic analysis? With suitable example explain the conceptual parsing which uses conceptual dependency structures. **[10]**

b) Define the expert system. With neat schematic explain the functional elements of an expert system. **[8]**

Total No. of Questions : 12] **[Total No. of Pages :3**

P1335

[3564] - 218
B.E. (Electronics)
ADVANCED COMMUNICATION ENGINEERING.
(2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:-

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain following microwave components in detail. **[12]**

i) T-junction.

ii) Directional coupler.

iii) Cavity Resonator.

iv) Bends.

b) The dominant mode TE_{10} is propogated in a rectangular waveguide of dimensions a = 6 cm and b = 4 cm. The distance between a maximum and a minimum is 4.47 cm. Determine the signal frequency of the dominant mode. **[6]**

OR

Q2) a) Explain in detail the principle of operation of two cavity klystron and describe its application. **[8]**

b) A rectangular waveguide is filled by dielectric material of $\in_r = 9$ and has inside dimensions of 7 × 3.5 cm. It operates in the dominant TE_{10} mode

i) Determine the cut-off frequency.

ii) Find the phase velocity in the guide at a freq. of 2GHz.

iii) Find the guided wavelength λg at the same freq. **[10]**

Q3) a) Explain principle of operation of MESFET and comment on current-voltage characteristics of a typical n-channel GaAs MESFET. **[8]**

P.T.O.

b) A typical n-channel GaAs MESFET has the following parameters : **[8]**

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

Channel height : $a = 0.1$ μm

Relative dielectric constant : $\in_r = 13.1$

Channel length : $L = 14$ μm

Channel width : $Z = 36$ μm

Electron mobility : $\mu = 0.08$ $m^2/v.s$

Drain voltage : $V_d = 5$ volts

Gate voltage : $V_g = -2$ volts

Saturation drift velocity : $v_s = 2 \times 10^5$ m/s

i) Calculate the pinch off voltage.

ii) Compute the velocity ratio.

iii) Determine the saturation current at $V_g = 0$

OR

Q4) a) Explain in detail various losses in microstrip lines. **[8]**

b) Describe MMIC fabrication techniques in detail. **[8]**

Q5) a) Explain pulsed Doppler Radar and its application. **[8]**

b) Describe the various scanning techniques and tracking mechanisms. **[8]**

OR

Q6) a) Explain MTI radar and its application in detail. **[8]**

b) Derive the free space radar range equation. Explain the factors that affect the maximum range of radar. **[8]**

SECTION - II

Q7) a) Explain following terms with reference to OFC : **[12]**

i) Acceptance angle.

ii) Critical Angle.

iii) Acceptance cone.

iv) Numerical Aperture.

v) Step index & Graded index fibre.

b) Describe modulation techniques used in OFC. **[6]**

OR

Q8) a) Explain in detail various signal degradation mechanism in OFC. **[12]**

b) Describe with the help of suitable example, how to calculate power link budget. **[6]**

Q9) a) Explain various types of ARQ technique with the help of proper timing diagram. **[8]**

b) Draw the architecture of GSM and explain in detail various functional entities. **[8]**

OR

Q10)a) Describe various access mechanism used in wireless communication. **[8]**

b) Comment on Mobile-Ad-hoc networking. **[8]**

Q11)a) Explain in detail the use of spot beams in satellite communication. **[6]**

b) Describe the "Eccentricity of the orbit' of satellite in detail. **[6]**

c) State any two kepler's laws of planary motion. **[4]**

OR

Q12)a) Calculate the "Azimuth & Elevation" angles to a geosynchronous satellite in the Indian ocean operated by INTELSAT. The details of earth station and the satellite are as follows :
Earth station lattitude & longitude are 52.0°N and 0° satellite longitude is 66.0°. **[8]**

b) With the help of block diagram, explain the typical satellite link [preferably downlink] in detail. **[8]**

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Total No. of Questions : 10] **[Total No. of Pages :2**

P1330

[3564] - 70
B.E. (Industrial Electronics)
ROBOTICS & CNC
(1997 Course) (404229)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:-

1) ***Answer any three questions from section - I and any three questions from section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the concept of Automation. Give the comparison between Automation & Robotics. **[8]**

b) Explain the occurrence of events in the History of Robotics year wise. **[8]**

Q2) a) What is Human and Robotics Manipulation System? Explain it in detail. **[8]**

b) What are selection criteria of selecting Robot in Industrial application? **[8]**

Q3) a) Explain the Robot Mechanism up to Two Degree of freedom in detail. **[8]**

b) What are the different types of the Robot configuration? Explain with suitable example. **[8]**

Q4) a) Sketch and explain the following Hydraulic Actuator. **[8]**

i) Rotary Actuator.

ii) Linear Actuator.

b) Explain the Homogeneous Co-ordinate vector operation system in detail. **[8]**

Q5) Write a short Note : **[18]**

a) Explain the Advantages and disadvantages of Robotics.

b) Compare the Electrical, Pneumatic and Hydraulic Actuating system.

c) Robot Grippers.

P.T.O.

SECTION - II

Q6) a) Explain the Mathematical Model of Servo System in detail. **[8]**

b) What is Pneumatic Actuating System? Explain with suitable Example. **[8]**

Q7) a) Explain in detail of the Robot application in welding process. **[8]**

b) Explain the Proximity Tactile Sensors in detail. **[8]**

Q8) a) What are the feedback components are available in Robotics System and Explain functionality of each component. **[8]**

b) Explain the concept of Artificial Intelligence with suitable diagram. **[8]**

Q9) a) Draw the Block diagram of NC and CNC Machine. Explain it in detail with technical specification. **[8]**

b) Give the comparison of NC, CNC, and DNC Machine. **[8]**

Q10) Write a short Note : **[18]**

a) Machine Vision.

b) Explain the specification of Robot.

c) Explain the concept of Optical Encoder.

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Total No. of Questions : 10] **[Total No. of Pages :2**

P1329

[3564] - 69

B.E. (Industrial Electronics)

BIOMEDICAL ENGINEERING

(1997 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:-

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***

SECTION - I

Q1) a) Draw the neat block diagram of ECG Machine. Explain the working with necessary waveform. **[8]**

b) Explain the Biopotential electrodes in detail with diagram. **[8]**

Q2) a) Explain in brief the cardiovascular system with the electrical signals orginating at different points. **[8]**

b) Describe the rectilinear and curvilinear recorder in brief. **[8]**

Q3) a) Explain the working of x-ray machine with the help of neat diagram. **[8]**

b) What is phonocardiography. Explain the basic working principle with necessary diagram. **[8]**

Q4) a) Name different methods of blood flow measurement. Explain any one in detail. **[8]**

b) Explain the working of respiration rate meter with the help of neat diagram. **[8]**

Q5) Write short notes on : **[18]**

a) Blood pressure measurement.

b) Stress test monitor.

c) Flame photometer.

P.T.O.

SECTION - II

Q6) a) What is X-ray? State the properties of X-rays. Explain how X-rays are generated. **[8]**

b) Explain the finger plethysmography for peripheral pulse monitoring. **[8]**

Q7) a) What is the use of cardiac pacemaker. Explain programmable pacemaker in details. **[8]**

b) Explain the procedure to measure the Haemoglobin in the blood. **[8]**

Q8) a) Explain the electrodes used for external defibrillator. **[8]**

b) Describe the DC and AC defibrillators with necessary diagrams. **[8]**

Q9) a) Explain grounding and shielding techniques for medical equipments. **[8]**

b) With the help of neat diagram, explain the working of blood gas analyser. **[8]**

Q10) Write short notes on : **[18]**

a) Colorimeter.

b) Pulse oximeter.

c) Mediscope.

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Total No. of Questions : 10] **[Total No. of Pages : 3**

P1327

[3564]-46
B.E. (Electronics)
DIGITAL SIGNAL PROCESSING & APPLICATIONS
(1997 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer any three questions from Section I and any three questions from Section II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain sampling Theorem. **[2]**

b) A continuous time sinusoid X_a (-1)with fundamental period $T_m = 1/f_m$ is sampled at a rate $f_s = 1/T$ to produce discrete time sinusoid $X(n) = X_a(nT)$. **[14]**

i) Show that $X(n)$ is periodic if $T/T_m = K/N$ where K & N are integers.

ii) If $X(n)$ is periodic, what is its fundamental period in seconds?

Q2) a) Explain the following properties of the convolution sum. **[6]**

i) Associative.

ii) Shifting.

iii) Convolution with impulse.

b) Perform the linear convolution of the two sequences. **[5]**

$X_1(n) \& Y_1(n)$ where

$X_1(n) = \{1, 2, 3, 4\}$
$\uparrow$

$Y_1(n) = \{3, 1, 4, 2\}$

c) Write the steps for convolution & correlation & hence comment on how you can use convolution program to calculate correlation. **[5]**

P.T.O.

Q3) a) Explain linear phase filters with suitable example & illustrate how an FIR filter can give linear phase characteristics. **[5]**

b) Find the Z-transform of **[6]**

i) $X(n) = -a^n u(n-1)$

ii) $X(n) = (1/2)^n u(n) + (1/3)^n u(n)$ **[5]**

c) Final the inverse Z-transform of

i) $$X(z) = \frac{Z}{2Z^2 - 3Z + 1}$$

ii) $$X(z) = \frac{Z}{Z(Z-1)(Z-2)^2}$$

Q4) Explain with a neat butterfly diagram the DIF FFT algorithm. Also explain the time & space complexity. Write the pseudocode for the same. **[16]**

Q5) Write short notes on : **[18]**

a) Gortzel Algorithm.

b) Properties of DFT.

c) Architecture of a typical DSP processor.

SECTION - II

Q6) a) Explain why recursive filters are called as IIR filters. **[6]**

b) Design an IIR filter using impulse invariance method to realize the first order analog low pass Butter Worth filter with **[10]**

$$H_a(S) = \frac{W_c}{S + W_c} \qquad W_c = 10^6 \ rad/\sec$$

Q7) Design a symmetric FIR LPF whose desired frequency response is given by **[16]**

$$Hd(W) = \begin{cases} e^{-jWT} & \text{for } |W| \le W_c \\ 0 & \text{elsewhere} \end{cases}$$

The order of the filter should be 7 and W_c = 1 rad/sec. Use Blackman window.

Q8) a) Explain in detail. **[9]**

i) Von-Neumann Architecture.
ii) Harward Architecture.
iii) Modified Harward Architecture.

b) What is the need of a DSP processor? How it differs from a microprocessor? **[4]**

c) A system is represented by **[3]**

$$H(z) = 3 + \frac{4z}{z - \frac{1}{2}} - \frac{2}{z - \frac{1}{4}}$$

Is it FIR or IIR system? Why?

Q9) a) Draw and explain telephone echo cancellation system. **[6]**

b) Explain using example the vibration Analysis application of DSP. **[6]**

c) What is zero padding? Explain. **[4]**

Q10) Write short notes on : **[18]**

a) Gibbs phenomenon.

b) Homomorphic Signal Processing.

c) Notch & Comb filters.

Total No. of Questions : 10] [Total No. of Pages :2

P1264

[3564] - 219
B.E. (Electronics)
SOFTWARE ENGINEERING
(2003 Course) (404205)

Time : 3 Hours] *[Max. Marks:100*

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) What do you mean by software myths? **[8]**

b) What are different attributes of software Engineering? **[4]**

c) What are characteristics of software those are totally different from hardware. **[4]**

Q2) a) Explain Capability Maturity Model Integration (CMMI) in detail. **[8]**

b) Explain the umbrella activities that are applicable to all process models of SDLC. **[8]**

Q3) a) What is software engineering practice ?Explain types of practices. **[10]**

b) How system modeling and simulation help software engineering. **[6]**

Q4) a) Explain the steps involved in object oriented analysis. **[8]**

b) Explain Hately-Pirabhai modeling. **[8]**

Q5) Write short notes on any three : **[18]**

a) System modeling with UML.

b) Deployement principles.

c) Various programming team structures.

d) Software Metrics.

P.T.O.

SECTION - II

Q6) a) A library management system is to be developed for an engineering college. Write problem definition and level 0, 1,2 DFD for the same. **[10]**

b) Explain the elements of interface designing. **[6]**

Q7) a) Explain in detail software process and project metrics. **[8]**

b) What is the need of project estimation? What are the steps involved in estimating the software? **[8]**

Q8) a) What are the layers of SCM process, explain each layer. **[10]**

b) What is the difference between forward engineering and reverse engineering . **[6]**

Q9) a) What is the problem with make/buy decision, how decision tree help to solve these problems. **[8]**

b) Explain methods of tracking a software project. **[8]**

Q10) Write Short Notes (Any three) : **[18]**

a) Architectural design styles.

b) Software testability.

c) Requirement management.

d) Patterns.

e) Gantt Charts.

f) Structured coding techniques.

Total No. of Questions : 12] **[Total No. of Pages : 4**

P1263

[3564]-212
B.E. (Electronics)
ELECTRONIC PRODUCT DESIGN
(2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer to a new question should start on new page.***
3) ***Draw neat diagrams wherever necessary.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***
6) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Describe the steps involved in development of an electronic product that is required to be manufactured in large quantity. What is the importance of "field trials" and environmental testing in product design cycle? **[9]**

b) Draw the circuit diagram of Audio amplifier system consisting of

i) Four-channel audio mixer circuit with three microphone channels and one auxiliary input and

ii) The mixer stage is followed by class AB complementary symmetry audio power amplifier and a loudspeaker. Calculate MTTF for the circuit. Failure rates of individual components used are given below- **[9]**

Component	Failure rate for 10^6 hours
Metal film resistors	0.04
OPAMP	0.004
Power transistor	0.02
Electrolytic capacitor	0.6
Regulator IC	0.003
High power resistor	0.08
Diode	0.002
Audio input connector	0.05

P.T.O.

OR

Q2) a) Compare Consumer products, Industrial products and Military products for -

i) Cost/performance ratio.
ii) Reliability.
iii) Competition.
iv) Temperature rating of components used. **[9]**

b) Explain in detail how the power supply requirement for an electronic product containing 4 × 4 matrix keyboard, 4 digital multiplexed 7-segment LED display, a Microcontroller, few CMOS logic gates and OPAMP based signal conditioning circuitary is estimated. What is the safety margin between calculated current capacity and actual power supply capacity? **[9]**

Q3) a) Explain different impedance matching and termination schemes for high-speed PCB design. **[6]**

b) i) Calculate resistance of a track laid down on PCB laminate using 35-micron copper clad. The track width is 1.2 mm and length is 3.5 cm. Assume resistivity of copper to be 1.724×10^{-6} ohm-cm.

ii) Calculate capacitance of two overlapping tracks laid on opposite faces of PCB using 3.2 mm thick FR4 laminate. The dielectric constant for laminate is 4.3. The track thickness is 2.0 mm on component side and 2.2 mm on solder side.

iii) Calculate inductance of a 10 cm long track having width of 0.3 mm. The track is etched on standard 35-micron PCB laminate. **[10]**

OR

Q4) a) Explain in detail the recommended PCB design practices for avoiding -

i) Ground loops in analog circuits.
ii) Decoupling problems in digital circuits.
iii) Ground bounce in high-speed digital circuits. **[8]**

b) Explain in brief the recommendations for placing following components on PCB -

i) Power Transformer.
ii) 40–pin Flat Ribbon Cable (FRC) Connector.
iii) Heat sink.
iv) Multi-turn potentiometer for setting gain of particular stage
v) Power transistors. **[8]**

Q5) Explain with justification and schematic arrangement, the type of instrument that you will use to find faults in following -

a) A dual regulated power supply that is not giving output on one of the outputs.

b) A Microcontroller circuit with a hairline cracks on two lines of data bus.

c) A combinational logic that is producing glitches or hazards.

d) A memory interface that is suspected to comply with set up and hold time requirements. **[16]**

OR

Q6) a) With the help of proper examples establish the need for following diagnostic instruments -

i) Digital storage oscilloscope.

ii) Mixed signal oscilloscope.

iii) Logic analyzer. **[8]**

b) Draw the circuit diagram of transistor series regulator and explain how you can make use of -

i) DC or operating point analysis.

ii) Transient analysis. **[8]**

SECTION - II

Q7) A Microcontroller based four-channel data acquisition system uses two thermocouple and two RTD channels. The system uses 4-digit multiplexed LED display and a 4 × 1 matrix keyboard. Each channel has a facility to set LO and HI set point and trigger an alarm if the measured temperature exceeds set vale.

a) Draw detailed flow chart for development of software.

b) i) Identify software modules that are functionally independent of each other.

ii) Modules that should be coded in assembly language. Justify your choice.

iii) Modules that should be coded in assembly language. Justify your choice. **[18]**

OR

Q8) What are the desirable features of -

a) Assemblers.

b) Cross compilers.

Explain the use of each listed feature in testing software with the help of practical example. **[18]**

Q9) a) Explain different types of temperature tests to be carried out on industrial product. What are the representative severities and profiles used during testing? **[8]**

b) Specify with justification the choice of environmental tests to be carried out on following products -

i) Industrial PC.
ii) CNC machine.
iii) Industrial DC drive. **[8]**

OR

Q10) a) What different tests are required to be carried out on a product for EMI/ EMC? Discuss the origin of different types of electromagnetic interference and the mechanism by which functioning of electronic product is affected. **[8]**

b) Which of the above tests will be essential for following products -

i) Bedside ECG monitor.
ii) Domestic washing machine.
iii) Industrial arc furnace controller.
iv) Vacuum cleaner.

Justify your choice of test(s). **[8]**

Q11) Draw the circuit diagram of transistor series regulator. For this circuit,

a) Perform DC analysis and hence prepare detailed Product Test Specification and

b) Draw up the Bill of materials (BOM). **[16]**

OR

Q12) A high-speed, high track density PCB is required to be mass-produced. Explain in details the documentation to be given to -

a) The fabricator of PCB and

b) The designer of PCB.

Explain the concept of Bare Board testing. Will it be necessary to carry out this test in above case? Justify your choice. **[16]**

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Total No. of Questions : 10] **[Total No. of Pages :3**

P1190

[3564] - 60

B.E. (Industrial Electronics)

POWER ELECTRONICS DRIVES AND APPLICATIONS

(1997 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:-

1) ***Answer any three questions from each Section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Explain the operation of 3ϕ half controlled bridge rectifier fed dc drive with the help of a neat circuit diagram and necessary wave forms for continuous armature current. **[16]**

Q2) a) What are dc drives? Explain with necessary circuit diagram and waveforms the working and speed control techniques of DC motor using fully controlled converter. **[8]**

b) The speed of a separately excited dc motor is controlled by a single phase full controlled converter. The field current is also controlled by a full converter and field current is set to maximum value. The Ac supply is 1ϕ, 208 volts, 50 Hz, R_a = 0.5 Ω, R_f = 345 Ω and motor armature current is 55 amp. The motor constant is 0.71 V/A - rad/sec. If the delay angle of armature converter is 45°. Determine **[10]**

i) Torque developed

ii) Speed

iii) Input P.F of supply.

P.T.O.

Q3) a) Compare HVDC and HVAC transmission. **[4]**

b) Explain the principle of operation of Induction Heating. State its applications. **[6]**

c) State and explain in brief the various operating modes of dc motor in variable speed application. **[6]**

Q4) a) Explain in detail the requirements of traction drives. Draw circuit of chopper drive for DC railway system. **[8]**

b) Draw a neat block schematic of typical Brushless DC motor drive. Explain its operation. **[8]**

Q5) Write short note (any three) : **[16]**

a) Dual converter drive.

b) PWM converter drive.

c) Electronic Welding.

d) DC motor performance parameters.

SECTION - II

Q6) a) What is significance of slip in induction motor? Explain. **[3]**

b) Explain stator voltage control for controlling speed and torque of an induction motor. **[6]**

c) A 3ϕ, 4 pole induction motor is operated from 415 volts, 50 Hz stator voltage control is employed for varying speed. The motor is driving a load torque of 100 N.M. Find out the following of the motor speed is 100 rad/sec. **[9]**

i) Slip

ii) The rotor power components

1) Air gap power

2) Mechanical o/p power

3) Slip power

iii) The efficiency of rotor circuit.

Q7) a) Draw out line of vector control system for induction motor. Explain the principle of operation of vector control system. **[8]**

b) What is slip recovery system for induction motor? Explain static kramer drive. **[8]**

Q8) a) What are the two modes of variable frequency control of synchronous motors? Explain any one in detail. **[8]**

b) Draw the circuit diagram of three phase cycloconverter drive for synchronous motor. State its application. **[8]**

Q9) a) Draw neat block schematic of microprocessor based stepper motor drive. Explain its operation. **[8]**

b) Explain the driver circuits for permanent magnet and hybrid stepper motor. **[8]**

Q10) Write short notes (any three) : **[16]**

a) Microprocessor based control of induction motor drive.

b) Electric drives used in sugar industry.

c) VCVF drive.

d) Microstepping in stepper motors.

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Total No. of Questions : 10] **[Total No. of Pages : 2**

P1189

[3564]-56
B.E. (Electronics)
ADVANCED COMPUTER PROGRAMMING
(1997 Course) (404210)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Discuss the spiral model and its advantages over waterfall model. **[10]**

b) Discuss unit testing with example. **[8]**

Q2) a) What is encapsulation? Explain how java supports encapsulation with example. **[8]**

b) Write a note on exception handling in java. **[8]**

Q3) a) Write a note on string class in java. **[6]**

b) Explain the architecture of Applet. **[10]**

Q4) a) With an example explain the multi-threaded programming in java. **[8]**

b) Describe the synchronization of threads in java. **[4]**

c) Explain the importance of thread priority. **[4]**

Q5) a) Write a program to copy a file in java. **[8]**

b) Explain the following methods with respect to java **[8]**

i) Overloaded.
ii) Overridden.
iii) Constructor.
iv) Finalize.

P.T.O.

SECTION - II

Q6) a) Discuss the order by and group by clauses of select statement with examples. **[8]**

b) Write and explain an embedded (dynamic) SQL program to delete rows from a table. **[10]**

Q7) a) Explain Sub-query with example. **[8]**

b) With an example explain the calculated column. **[8]**

Q8) a) Write a note on SQL data base update statements. **[8]**

b) List and explain SQL column functions. **[8]**

Q9) a) What is a view? Explain the advantages and drawbacks of views. **[10]**

b) Explain CREATE and drop statements for views. **[6]**

Q10) Write short notes on any four : **[16]**

a) Relational data base.

b) Primary and foreign keys.

c) Tables.

d) SQL data types.

e) Sub Queries.

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Total No. of Questions : 10] **[Total No. of Pages : 2**

P1188

[3564]-54
B.E. (Electronics)
POWER ELECTRONICS - III
(1997 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) State the various DC motor performance parameters. Explain it in detail. **[8]**

b) A separately excited dc motor is controlled by 1ϕ semiconverter. The field current is also controlled by 1ϕ semiconverter. The field current is set to maximum value. The input to converter is 230V, 50Hz. If R_a = $0.25\,\Omega$, R_f = $147\,\Omega$, K_v = 0.7032 V/A – rad/sec. Load torque is 35 N-m at 1000 rpm for continuous and ripple free armature current. Determine

i) The field current

ii) The delay angle of armature converter. **[8]**

Q2) Draw neat circuit diagram of 3ϕ full converter drive for dc motor. Explain its operation with waveforms for continuous armature current with firing angle 60^o. **[16]**

Q3) a) Explain the operation of dual converter with circulating current. **[8]**

b) Explain Dynamic and Regenerative braking. **[8]**

Q4) a) Explain the operation of 4 quadrant chopper with the help of neat circuit diagram and waveforms. **[8]**

b) Explain in briefly the working of AC and DC traction drives. **[8]**

P.T.O.

Q5) Write short notes (Any three) **[18]**

a) Reversible Drives.

b) 1ϕ full converter dc drive.

c) Requirements of traction drive.

d) Three phase semiconverter drive.

SECTION - II

Q6) State the different methods of controlling the speed of induction motor. Explain it in detail. **[16]**

Q7) a) Draw and explain the block schematic of self controlled synchronous motor fed from a 3ϕ inverter. **[8]**

b) How microstepping is achieved in stepper motor drives? Explain any one application where microstepping is necessary. **[8]**

Q8) a) Explain the operation of 3ϕ BLDC motor control with neat circuit diagram. State the types of sensor used in this control. **[8]**

b) With the help of block schematic explain stepper motor drive. Also draw different power circuit configuration for stepper motor drive. **[10]**

Q9) a) State the different types of resonant pulse converters. Also state advantages and disadvantages of resonant pulse converters. **[6]**

b) Draw neat circuit diagram of class E resonant rectifier. Explain its operation for different modes with the help of equivalent circuits and waveforms. **[10]**

Q10) Write short note (Any three) **[16]**

a) Digital control of DC motor.

b) Parallel resonant Inverter.

c) Braking of induction motor.

d) Dual mode dual converter.

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Total No. of Questions : 10] **[Total No. of Pages : 3**

P1187

[3564]-52
B.E. (Electronics)
COMPUTER BASED SIMULATION & MODELING
(1997 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answer three questions from Section I and three questions from Section II.***
3) ***Answers to the two sections should be written in separate books.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Your answers will be valued as a whole.***
7) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
8) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the following terms with an example. **[12]**

i) Normal Distribution.
ii) Poisson Distribution.
iii) Erlang Distribution.

b) Explain the simulators. **[6]**

i) Distributed simulators
ii) Hybrid simulators.

Q2) a) Explain the simulation of a continuous system using flow-chart. **[8]**

b) Implement the following system using analog system blocks.
$x[n] = 3y[n-1] - 3y[n-2] + 2y[n]$ **[8]**

Q3) a) What are the limitations of **[10]**

i) Differential Equations for Modeling.
ii) Simulation packages.

b) Explain the post-synthesis and pre-synthesis in simulation of system. **[6]**

P.T.O.

Q4) a) Model and Simulate Servo System. **[10]**

b) Explain System Designing. **[6]**

Q5) Write notes on : **[16]**

a) System Dynamics.

b) Data Structure for Telephone System.

SECTION - II

Q6) a) Show that Poisson Arrival Pattern. **[10]**

$$q_n(t) = \left(\frac{t}{\alpha}\right)^n \frac{1}{\text{K!}} f(t)$$

Where

α : Mean Arrival Time

$q_n(t)$: Probability of Arrival.

b) For following arrival determine queue status, wait time and server idle-time using 1 - Server System. **[8]**

i	Arrival Time	Service Time
1	0	20
2	10	12
3	15	10
4	25	5
5	35	15
6	45	10

Q7) a) What is the significance of Random Number? Explain. **[6]**

b) Explain the methods of generating random numbers. Explain the test of randomness. **[10]**

Q8) a) What is the significance of Chi^2 test? Explain the pre-requisites and comment on its value. **[8]**

b) For a server system show that **[8]**

$$\rho_n = \rho^n \rho_0$$

Q9) a) Explain the following system dynamics terms **[8]**

i) Rate
ii) Level
iii) Decision function
iv) Constant

b) What are the building blocks of Analog Computer? Explain. **[8]**

Q10) Write notes on : **[16]**

a) Packages & its effectiveness for simulation.

b) Dynamic Modeling & Physical Modeling.

Total No. of Questions : 10] **[Total No. of Pages : 2**

P1186

[3564]-51
B.E. (Electronics)
MODERN ELECTRONICS SYSTEM
(1997 Course) (404208)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain washing machine with fuzzy logic control? **[8]**

b) How does a microwave oven work? How does it cook the food. **[8]**

Q2) a) Explain electronic security system. **[8]**

b) Compare semiconductor and gas lasers. **[8]**

Q3) a) Explain the working of solar cell and its characteristics. **[8]**

b) Give advantages, disadvantages & applications of CO_2 lasers. **[8]**

Q4) a) Explain spontaneous and stimulated emission phenomenon. **[8]**

b) Explain digital sound recording and reproduction. **[8]**

Q5) a) Explain with neat diagram working of LCD overhead projector. **[10]**

b) Give objectives of signalling. Also give the classification and types of signals. **[8]**

SECTION - II

Q6) a) What are the various methods of air pollution control? Explain any one in brief. **[8]**

b) Explain the working of solar pump. **[8]**

P.T.O.

Q7) a) Describe the construction of Ruby laser. **[8]**

b) Write a short note on vibration measurement. **[8]**

Q8) a) Explain in brief ISDN. **[8]**

b) Explain the basic principle of photocopying. Explain its components. **[8]**

Q9) a) Explain in brief water pollution measurement. **[8]**

b) Explain with neat diagram laser welding. **[8]**

Q10) Write short notes on (Any two) : **[18]**

a) GPS.

b) EPABX.

c) W.L.L.

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Total No. of Questions : 12] **[Total No. of Pages : 4**

P1156

[3564] - 223

B.E. (Electronics)

REAL TIME OPERATING SYSTEMS

(404212) Elective - II (2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***In section - I attempt Q.1 or Q.2, Q.3 or Q.4 and Q.5 or Q.6. In section - II attempt Q.7 or Q.8, Q.9 or Q.10 and Q.11 or Q.12.***
3) ***Neat diagrams, flow charts must be drawn and well commented pseudo code written wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Compare Reentrant and Non-reentrant function with suitable example. **[4]**

b) What is priority inversion? How to overcome priority inversion? **[4]**

c) What are the methods to obtain the exclusive access to shared resources? Explain any two of them with suitable example. **[4]**

d) What is disjunctive and conjunctive synchronization? How event flags are useful for this Explain. **[4]**

OR

Q2) a) Describe Non-preemptive and Preemptive kernel with suitable diagrams. **[4]**

b) Explain RMS theorem and task priority assignment. **[4]**

c) What is counting semaphore? How it can be used for buffer management? **[4]**

d) Compare using proper diagram foreground/background, nonpremptive and preemptive kernel on the basis of interrupt latency, response and recovery. **[4]**

Q3) a) What are critical methods provided in uCOSII? Explain them. **[3]**

b) Explain

i) What is ready list in uCOSII? **[2]**

ii) How uCOSII add the task in the ready list? **[2]**

iii) How uCOSII remove a task from ready list? **[2]**

P.T.O.

c) Explain

i) Locking and unlocking of scheduler in uCOSII. **[2]**

ii) Nesting of scheduler lock. **[2]**

iii) Possible situation and precautions while using scheduler lock/unlock. **[2]**

d) Explain, how interrupt is serviced under uCOSII. **[3]**

OR

Q4) a) What is the use of following members of OS_TCB? And how they are manipulated? **[6]**

```
INT8U    OSTCBX;
INT8U    OSTCBY;
INT8U    OSTCBitX;
INT8U    OSTCBitY;
```

b) Explain the steps involved for task level context switching in uCOSII when OS_TASK_SW() is called. **[4]**

c) What different pools are initialized when OSInit() is executed? What is the limit on the size of the each pool? **[5]**

d) What are different events handled using ECB in uCOSII. Explain data structure OS-EVENT. **[3]**

Q5) a) Compare Semaphore and Mutex in uCOSII. **[4]**

b) What is event flag management in uCOSII? Explain the use of it. **[4]**

c) Explain the relationship between Mutex, Task and ISR. **[4]**

d) Explain with diagram the addition of current task to the wait list of the event flag group. **[4]**

OR

Q6) a) Compare Semaphore and Event Flag management in uCOSII. **[4]**

b) What is Mutex and how uCOSII manages the Mutex? **[4]**

c) Explain the relationship between event flag, task and ISR. **[4]**

d) Explain with diagram the ECB just before OSMutexCreate() returns. **[4]**

SECTION - II

Q7) a) Discuss relationship between Mailbox, Task and ISR? **[4]**

b) How Message Queue is managed in uCOSII? **[4]**

c) How to use message queue as counting semaphore, explain by using pseudo code? **[4]**

d) Discuss configuration of Mailbox. **[4]**

OR

Q8) a) Discuss relationship between Message Queue, Task and ISR? **[4]**

b) How message is managed in the uCOSII? **[4]**

c) How to use MailBox as binary semaphore? Explain by using pseudo code. **[4]**

d) Discuss configuration of message queue. **[4]**

Q9) a) Explain Memory Control Block data structure OS_MEM. **[4]**

b) Explain memory partition and multiple memory partition in uCOSII. **[4]**

c) Define porting of uCOSII. What requirements the processor should satisfy to run uCOSII? **[4]**

d) What is testing of port? What are the steps to follow for testing of port? **[4]**

OR

Q10)a) Explain the need of memory management services by OS as compare to compiler functions. **[4]**

b) What are memory management services in uCOSII? Explain any one of them. **[4]**

c) How OS_CPU.H makes uCOSII processor and implementation specific? **[4]**

d) Explain uCOSII hardware / software architecture. **[4]**

Q11)Consider implementation of 'Chocolate vending machine' by using uCOSII. Assume appropriate data wherever necessary.

a) State the system requirements and functions. **[3]**

b) Define the tasks for the system. **[3]**

c) State real time constraints for the tasks defined. **[3]**

d) Model the task and their synchronization. **[3]**

e) Perform the priority assignment to defined tasks. **[3]**

f) Write coding steps for the above system. **[3]**

OR

Q12) Consider implementation of 'Temperature Controller' by using uCOSII. Assume appropriate data wherever necessary.

a) State the system requirements and functions. **[3]**

b) Define the tasks for the system. **[3]**

c) State real time constraints for the tasks defined. **[3]**

d) Model the task and their synchronization. **[3]**

e) Perform the priority assignment to defined tasks. **[3]**

f) Write coding steps for the above system. **[3]**

Total No. of Questions : 12] **[Total No. of Pages : 3**

P1351

[3564] - 222

B.E. (Electronics)

BIOMEDICAL ELECTRONICS

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams should be drawn weherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain the process of polarization, depolarization and repolarization of the cell structure. **[6]**

b) Give the full expanded form of the following **[6]**

i) EKG ii) EEG

iii) EMG iv) ERG

v) EOG vi) EGG.

c) State the different types of Electrodes used for measurement of ECG. Explain any three in detail. **[6]**

OR

Q2) a) Give the classification of transducers with examples. Explain any one transducer based on the optoelectronic principle. **[6]**

b) State and explain the sensor performance characteristic. **[6]**

c) Explain the fibre optic sensor for temperature measurement. Give four advantages of fibre optic sensor. **[6]**

Q3) a) Write the equations to calculate : **[4]**

i) aVF ii) aVR

iii) aVL iv) lead II.

b) Draw the ECG amplifier to measure the output at lead II configuration and reduce noise effect by using right leg drive. **[8]**

c) State and explain the properties of a "Biosignal amplifier". **[4]**

OR

P.T.O.

Q4) a) Draw and explain the Electronic method to measure Blood pressure. State its advantages and disadvantages. **[8]**

b) Explain the salient features of Electromagnetic blood flow meter with necessary diagram. **[8]**

Q5) a) Explain the concept of vectorcardiography with a typical normal loop patterns recorded in three planes. **[8]**

b) Draw and explain the block diagram of central monitoring system with waveforms at the input and output. **[8]**

OR

Q6) a) Differentiate between External pacemaker and Implanted Pacemaker with minimum 6 points. **[6]**

b) Explain the working of DC defibrillator with circuit diagram and waveform. **[8]**

c) What are the different types of shielding? **[2]**

SECTION - II

Q7) a) Draw the block diagram of Auto analyzer system and explain the functioning of each block in detail. **[6]**

b) Give the comparison between flame photometer and spectrophotometer. **[6]**

c) Explain the operation for computation with the help of neat circuit diagram for the following **[6]**

i) bicarbonate

ii) Base Excess

iii) Total CO_2.

OR

Q8) a) State the different methods of cell counting. Explain any one with neat diagram. **[8]**

b) Draw and explain the block diagram of pulse oximeter with timing signals for LED drivers. **[10]**

Q9) a) Explain the working of EEG machine with the help of neat block diagram. **[8]**

b) Draw and explain the 10-20 system of placement of Electrodes. **[8]**

OR

Q10)a) Name the different types of EMG. Explain the procedure to perform EMG with the help of neat block diagram. **[8]**

b) Explain the different components of cenral nervous system in detail. **[8]**

Q11)a) What are the properties of X-ray? Explain in detail the techniques for visualization of X-rays. **[8]**

b) Draw and explain the block diagram and working principle of MRI machine. **[8]**

OR

Q12)a) Name the detectors used in CT Scanners. Explain each of them with their features. **[8]**

b) Give the comparison between CT Scan, Image intensifier and ultrasonic image display system. **[8]**

Total No. of Questions : 12] **[Total No. of Pages : 14**

P1294

[3564]-221

B.E. (Electronics)

MANAGEMENT INFORMATION SYSTEMS

(404210) (2003 Course)

Time : 3 Hours*]** **[*Max. Marks : 100

Instructions to the candidates :

1) ***Answer 3 questions from each section.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) "A data processing system processes transactions and produces reports. It represents the automation of fundamental, routine processing to support operations. A management information system is more comprehensive; it encompasses processing in support of a wider range of organizational functions and management processes; namely, operational control level, management control level and strategic planning level. However, every MIS will also include transaction processing system as one of its functions. One important aspect of the difference between MIS and routine data processing is the capability to provide analysis, planning and decision making support."
Define Management Information System (MIS) as it is generally understood. How does it differ from "Data Processing System"? While answering the question you may draw on examples from business functional subsystems, such as production, inventory, finance, marketing, sales, etc. **[8]**

b) "**Pre-amble 1:**

- Recognize following environmental anomaly:
  - — Dell Inc. selling flat screen TVs,
  - — Microsoft unveiling a system to compete with the iPod that plays movies as well as music,
  - — Cisco Systems Inc. hawking a Wi-Fi boombox you can carry anywhere,
  - — Japanese TV manufacturers and Korean cell-phone makers rigging their products with microprocessors and software,
  - — Sony in India producing TV entertainment software,

Message 1: *For survival and growth, nearly everyone is venturing far from their specialities.*

Pre-amble 2:

- Since mid eighties (i.e., 1984-85), anticipation of the coming converging digital technology age,
- Almost twenty years later (i.e., by 2004), the anticipation becoming reality. Observe:
  - — The market for personal digital assistants, so hot in the late '90s, is vanishing as customers get the same functions in a cell phone-often with a camera to boot.
  - — Latest TVs from Royal Philips Electronics and Sony Corp. posses enough computing firepower to extract (receive) streaming video off the Net.

Message 2: *Anticipation is becoming reality mainly due to: Faster chips, Broader bandwidth, and a common Internet standard.*

Pre-amble 3:

- Convergence is computing, consumer electronics which is further powered by content, and communications."
- Through this convergence, digitization is creating products that cannot be categorized as technology or consumer electronics.

Message 3: *The walls are coming down.*

What do you understand by the term "convergence technology"? What are its implications for technology industry? **[8]**

OR

Q2) a) With the help of Figure (1), critically analyze (based on an illustrative example of your selection) the business transformation and its implication for information system design, which is taking place in the wake of rise of convergence technology. Explain why the business information system has a need to go beyond the quality information system. **[8]**

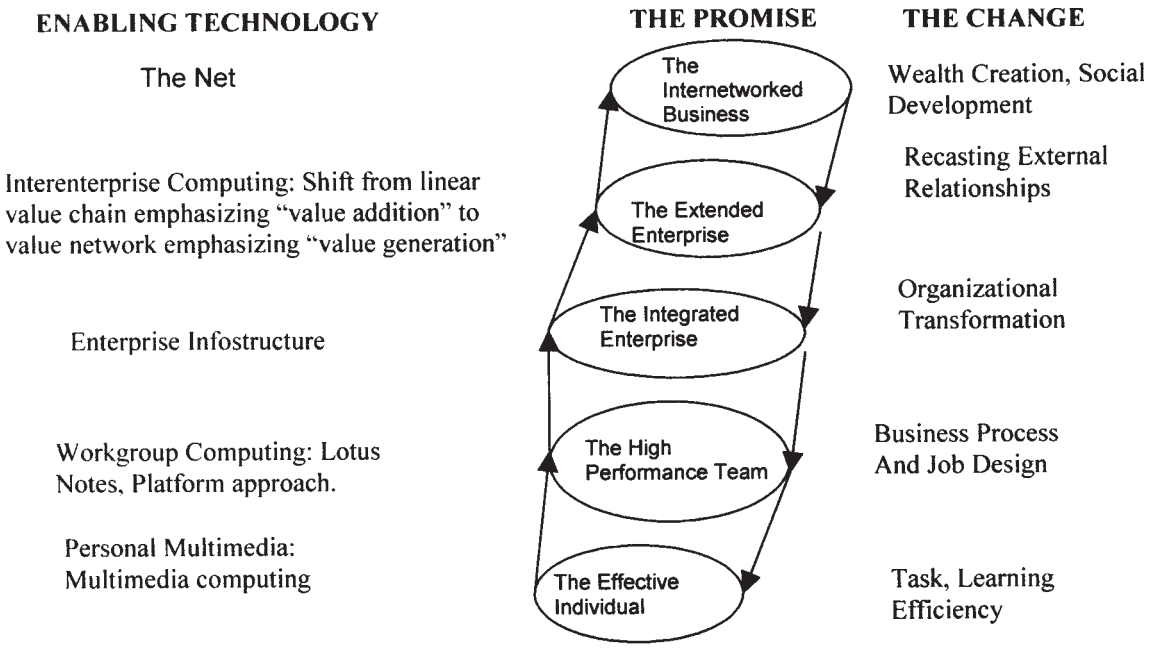

Fig. (1): Business Transformation through Convergence Technology

b) Discuss implications of convergence technology for any two of the following: **[8]**

i) IT infrastructure, ii) Network Equipment,

iii) Enterprise Applications, iv) Wireless Network,

v) Mobile devices, and vi) Mobile Users.

Q3) a) With the help of Figure (2), describe a generic business process as integral to a closed loop information and control system constituting a Business process IS view. **[8]**

b) With the help of Figure (2), write short note on any two of the following:

i) How business uncertainties render flexible business information decision with loss of Information Integrity?

ii) Define Simple Error and Complex Error.

iii) "Information should be seen as a composite good; a bundle of interrelated attributes. Given that information is for use, one attribute is relevance , i.e., usefulness, second is usable information, and third is integrity, i.e., freedom from distortion and noise". What do you understand by this? Explain briefly.

iv) Engineering practice is to define a hazard as a situation in which there is actual or potential danger to the environment. Risk is then seen as a combination (often multiplication) of the frequency or probability of a specified hazardous event, and its consequence (severity). Risk view has no requirement to originate information.

Against this, the kind of a risk that a system can experience in the presence of complex and continuously changing environment is that of originating information (a choice making situation) *ex ante* which will, according to the system's *ex ante* estimate, perhaps turn out to have been sub-optimal *ex post*. This kind of risk has to be caused by insufficiently perfect (i.e., distorted) and insufficiently full (i.e., incomplete or noisy) information origination."

Explain the term "Information Integrity Risk". How does it differ from functional view of risk currently practiced by industry? **[8]**

OR

Q4) a) i) With the help of Figure (3), describe a business process model, with a controls interpretation, as integral to a close loop information and control system.

ii) Compare the business process model in Figure (3) with the systems view of business process in Figure (2). **[8]**

b) "Systems theorists and economists argue that the complexity of an organization is ultimately limited by the amount of information it (i.e., organization) can (economically) process and transfer. This holds for the open system as a whole, for part systems, and for components. The degree to which higher efficiency through increased specialization is feasible is governed by the means that are available to control the ensuing complexity, that is by the cost and efficiency of the available information flow systems."

Within above framework briefly discuss what are open and closed systems? How do they differ? What is it that open systems must control and to what purpose? To answer you may refer to Figures (2) and (3). **[8]**

Q5) a) i) "An electrocution occurred at Los Alamos (a National laboratory in USA) when a manufacturer's representative was providing service to the electrical system of an industry X-ray machine. Although a safety watch was present during work on energized circuits as required by Laboratory policy, the trouble-shooter was operating in very limited space, and his head contacted a live circuit as his arm pressed against a grounded support. The path of electron flow through his body and the amperage was such that it proved fatal instantly. Medical attention was administered, but revival was not possible".

With the help of the above example, explain what do you understand by the term "complex error'? In the process also explain, what do you understand by the term information error? In this case was there a loss of goal integrity? Explain.

ii) Figure (4) gives a simple inventory-ordering system.

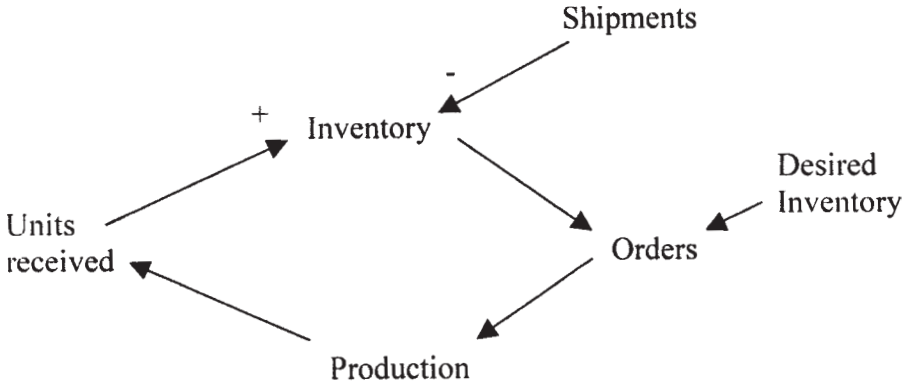

Figure (4): A simple inventory-ordering system

Given here is the description of Figure (4) with blanks. Fill in the blanks by putting at the blank indicated by number, the appropriate word from the set of words given at the end of Figure (4) description.

"An inventory control system is a --------(1)-------- system. Shipments deplete inventory, so, as it drops below some --------(2)--------, someone in the inventory department places orders with producers to bring inventory --------(3)--------. --------(4)-------- (the size of current inventory) is --------(5)-------- to the ordering department and then to producers and eventually returns in the form of widgets received into inventory from the producers."

Set of words to choose appropriate word to fill in the blank:
{information, feedback, transmitted, desired level, back up}.

Note: You may write answer by pairing *number* and *word.* **[9]**

b) Figure (5) gives an overview of the system dynamics modeling approach.

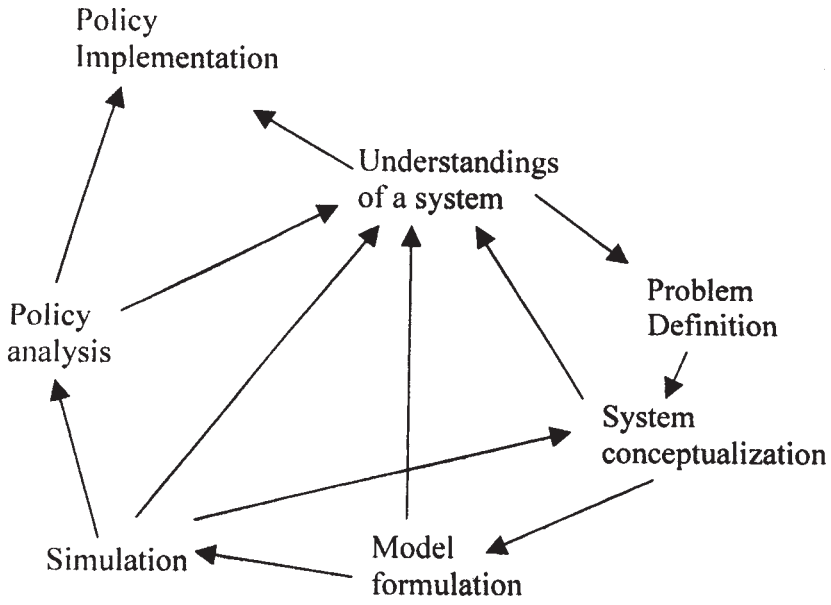

Figure (5): Overview of the system dynamics modeling approach

Describe the system dynamics methodology for resolving problems in a system. **[9]**

OR

Q6) a) Write short notes on any three of the following: **[9]**

i) Open System and Open-Loop System.

ii) Close System and Closed-Loop System.

iii) Negative Feedback System and Positive Feedback System.

iv) Dynamic behavior in Negative feedback system and in Positive feedback system.

b) Figure (6) gives a causal loop model for a "Progress of an Engineering Project". The physical processes considered in the model include the performance of the tasks, which compose the project, the movement (into and out of the system) of the workforce, who perform the tasks, and the time movement of the project along toward completion.

i) Describe the model in Figure (6).

ii) Identify feedback loops in the causal loop.

iii) Describe the nature of the causal loop feedback structures.

[9]

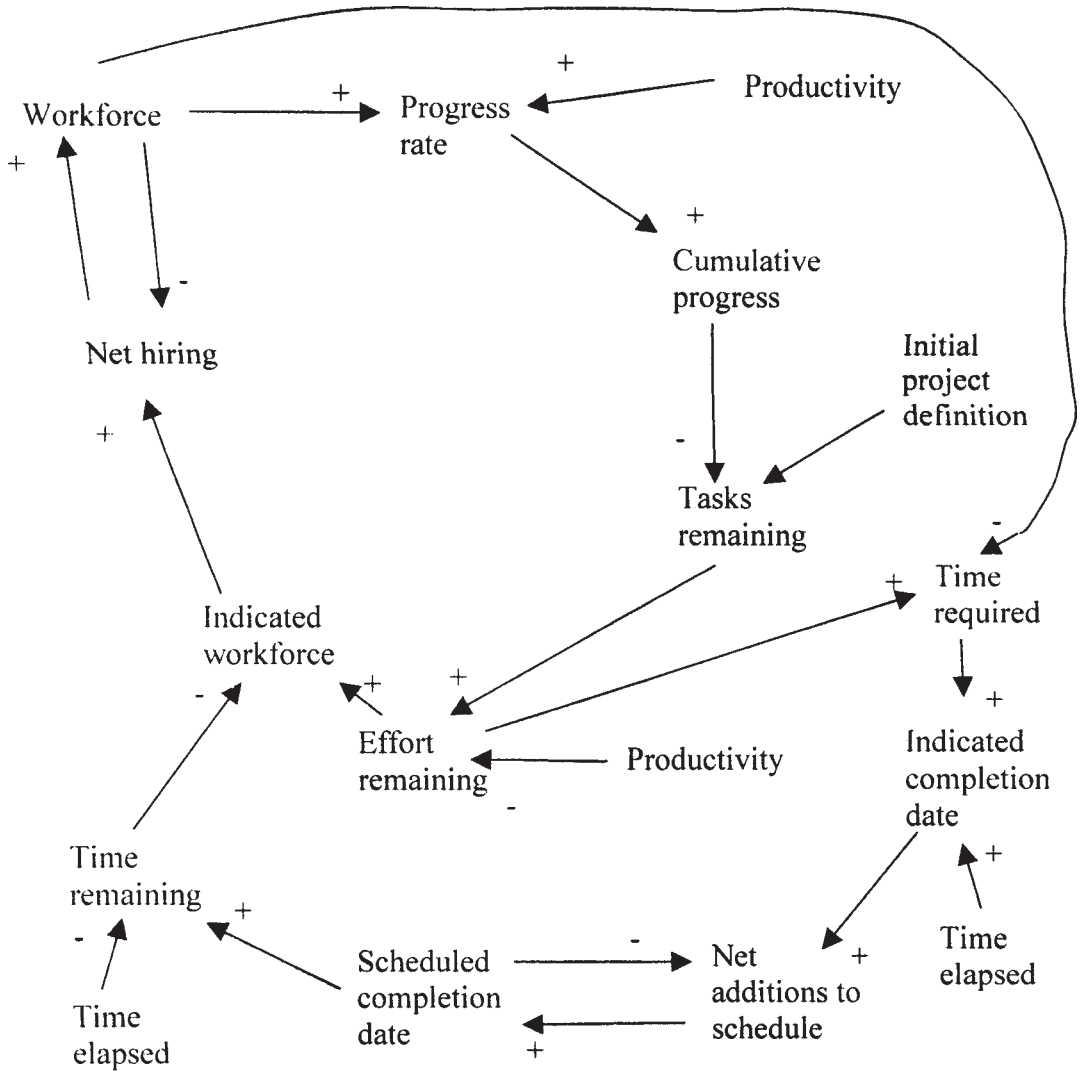

Figure (6): A Causal Loop Model for a "Progress of an Engineering Project"

SECTION - II

Q7) a) "System Dynamics modeling uses causal-loop diagrams. One category of these diagrams are referred as influence diagrams, or, more mathematically, as directed graphs. This is because the individual links (giving variable influence or graph direction) in such diagrams are labeled to show whether the nature of the causal-link is "positive" (+) or "negative" (–)".

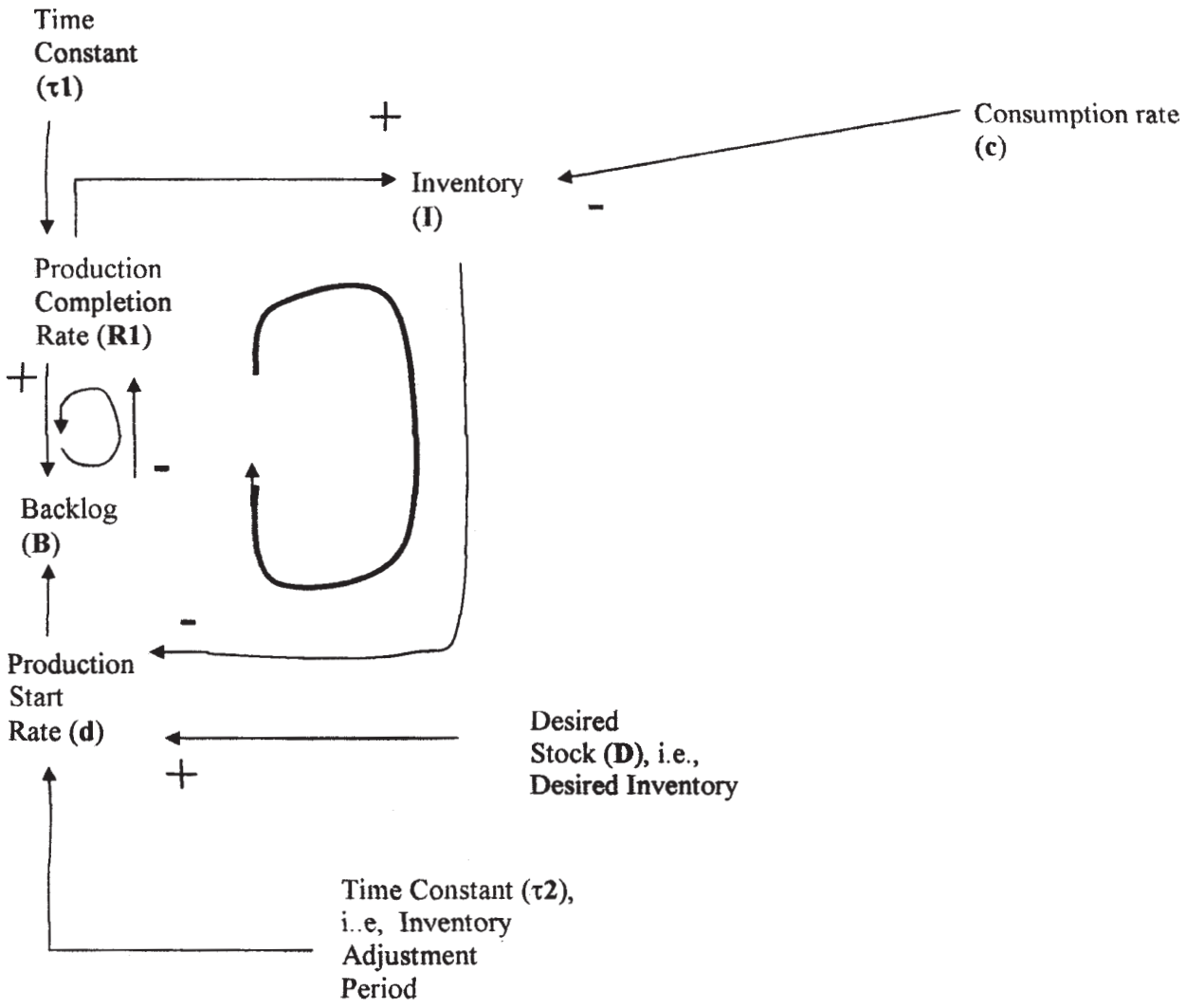

Figure (7): Example of a complex Production-Inventory System (Model) represented as Influence diagram

Describe in your own words the Production-Inventory System Model in Figure (7).

[8]

b) For a System Dynamic model, define following terms: **[8]**

i) Level variable,

ii) Rate variable,

iii) Input variable,

iv) Parameter, and

v) Supplementary variable.

OR

Q8) a) Figure (8) represents causal loop diagram of heroin addicted people in an urban community.

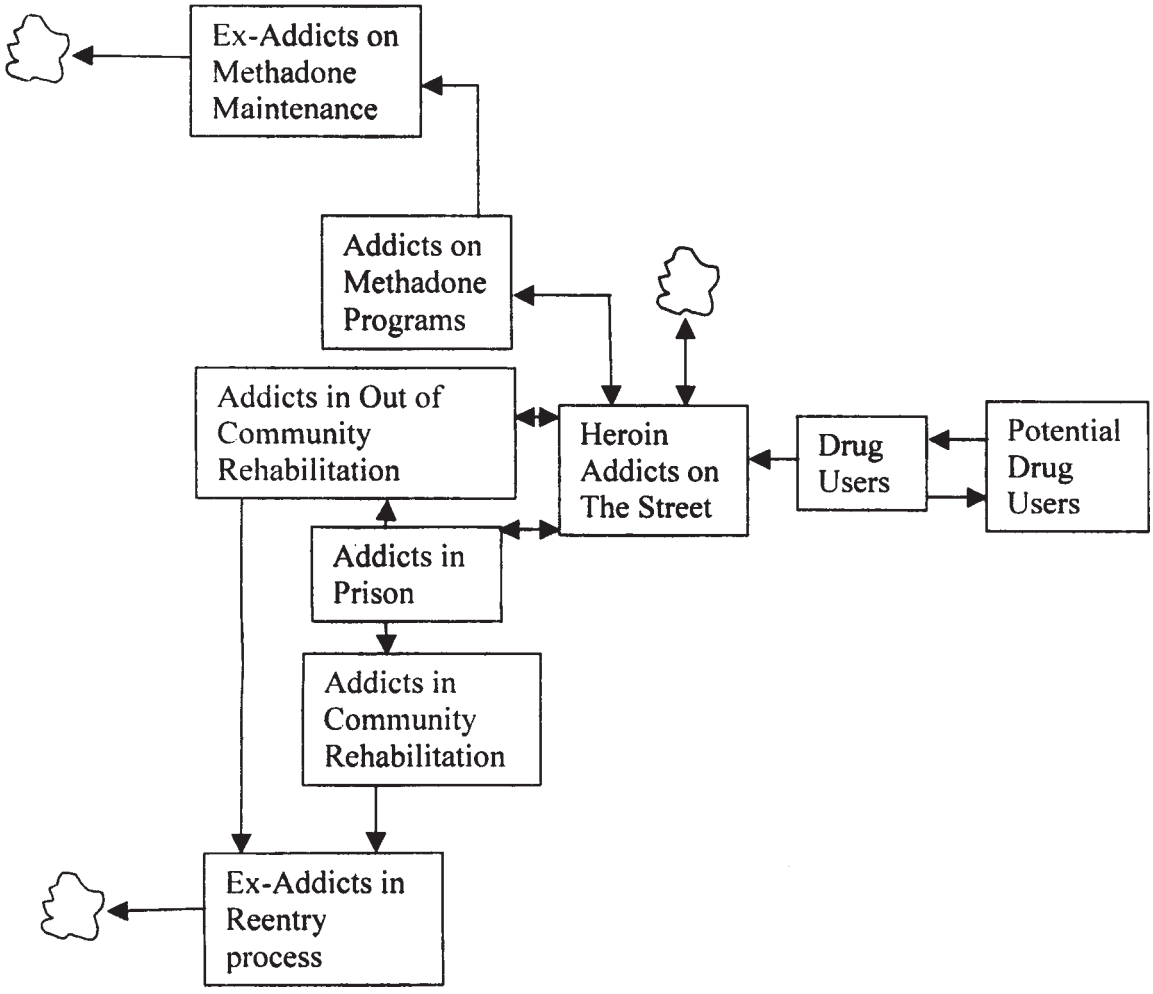

Figure (8): A causal loop diagram of heroin addicted people in an urban community

Describe in your own words the flow of people in the causal loop model in Figure (8).

[8]

b) Figure (9) represents causal loop diagram of simplified urban model containing an effect of land on business construction. The causal loop structure depicts the construction and demolition of business structures in a city of fixed land area.

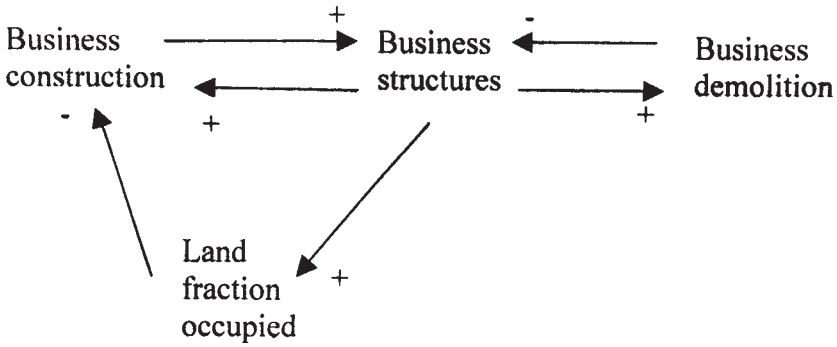

Figure (9): A causal loop diagram of the simplified urban model

Describe in your own words the simplified urban model shown in figure (9). Is there feedback loop in the model? What is its nature and significance? **[8]**

Q9) a) Describe briefly loss of integrity in various dynamic decision stages from *Long Term Goal* to *Flexible Information Decision* to *its implementation* in Business IS view in Figure (2). **[8]**

b) List elements of the information origination process. Also discuss uncertainty present in an element of your choice. **[8]**

OR

Q10) a) "Existing integrity mechanisms do not have cost-benefit analysis framework". Discuss. **[8]**

b) Information is a composite good of interrelated attributes, namely, Usefulness (relevance), Usefulness factor, and Integrity."

Briefly discuss Usefulness-Usable factor-Integrity paradigm. **[8]**

Q11) a) i) "Integrity attributes are: Accuracy, Consistency and Reliability." Discuss. **[9]**

ii) Equation (1) gives Cost benefit Analysis Equation of Information Integrity.

$$\Delta IU(I)\,|_{s_i} = [\{[\alpha(I) \times \beta(I) \times IUUB(I)]\,|_{s_i}\} \times \{A(I)\,|_{s_i}\}] - [COST_{OI}(I)\,|_{s_i} + COST_{ANALY}\{A(I)\}\,|_{s_i} + COST_{OPPORT}\{A(I)\}\,|_{s_i}]$$

..... Equation (1)

Explain various terms in Equation (1).

b) Figure (10) gives a systems view of a design basis for the "Information Integrity Technology Development System".

Using Figure (10), explain any three terms from the following: **[9]**

i) Environment - External and Internal.

ii) Normative Information and Factual Information.

iii) I*I value.

iv) I*I Gap or I*I risk.

v) Information Flow Rate.

OR

Q12) a) With the help of Figure (10), explain how I*I Technology system delivers I*I control for achieving business competitive advantage in the face of complex and changing customer requirements. **[9]**

b) Write a short note comparing a Traditional IS, a Quality IS and an Integrity IS. **[9]**

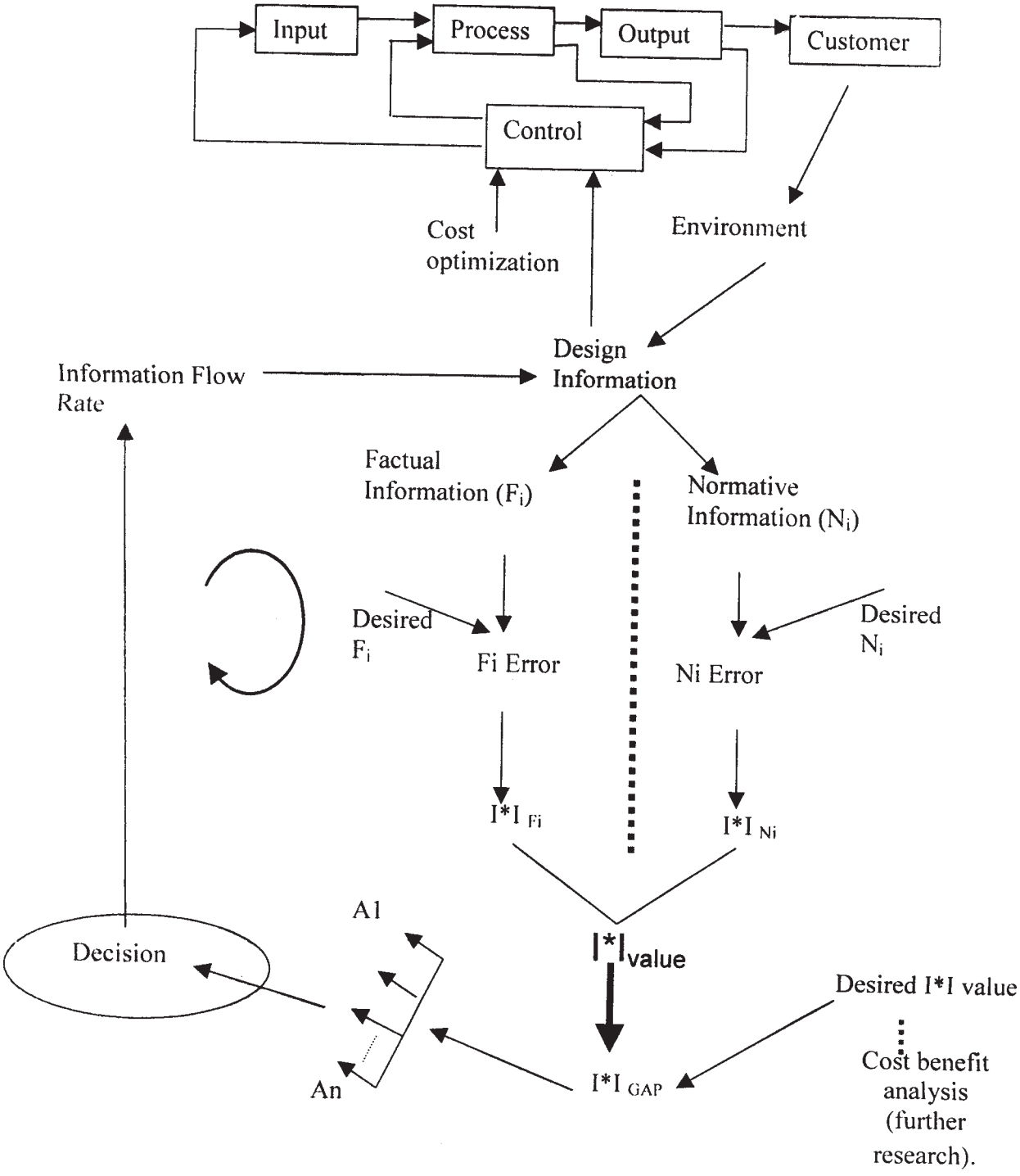

Figure (10): A systems view of a design basis for the "Information Integrity Technology Development System" leading to Integrity Information System

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Total No. of Questions : 12] **[Total No. of Pages : 3**

P1155

[3564] - 220

B.E. (Electronics)

ELECTRONICS MEASUREMENT

(404209) (2003 Course) (Theory)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) State the difference between measurement using vector impedance meter and vector voltmeter. Explain any one of the two with neat Block diagram. **[10]**

b) Explain how h-parameters of a transistor are measured using a transistor meter. **[8]**

OR

Q2) a) What do you mean by calibration of an instrument? Explain calibration methodology in detail. **[10]**

b) Using LCR-Q meter, explain the measurement of inductance, capacitance and resistance. Also state how will you measure 'Q' of a coil. **[8]**

Q3) a) State the significance of $\frac{1}{2}$ (half) digit in $3\frac{1}{2}$ digit DMM. Explain autozeroing concept in DMM. **[8]**

b) State and explain in brief different high frequency measurement techniques used in DFM. (Digital Frequency Meter). **[8]**

OR

Q4) a) State the significane of $\frac{1}{2}$ (half) digit in $6\frac{1}{2}$ digit DMM. Explain Autoranging concept in DMM. **[8]**

b) What is a $\pm\frac{1}{2}$ digit error in Digital Frequency Meter? How will you rectify this error in Time Period Measurement mode? **[8]**

P.T.O.

Q5) a) Draw the block diagram of and explain the spectrum analyzer used for the analysis of high frequency signals. **[8]**

b) State two types of wave analyzers and write their applications. With the help of block diagram explain the analyzer used to measure total harmonic distortion. **[8]**

OR

Q6) a) State the applications of Logic Analyzer. Related with logic analyzer explain in brief **[8]**

i) Function of Storage Qualifier.

ii) Continuous storage mode.

iii) Transitional timing mode.

b) Define the term 'protocol'. Compare any two types of protocol analyzers on the basis of their features, merits, demerits and applications. **[8]**

SECTION - II

Q7) a) With the help of diagrams explain sensitivity measurement and selectivity measurement setups of a Receiver. **[10]**

b) Write a brief note on measurement accuracy of a Network Analyzer. **[8]**

OR

Q8) a) Draw and explain the block diagram of SINAD sensitivity test set-up. What is 'phase jitter'? **[10]**

b) With a neat diagram, explain elements of Network analyzer system. Explain each block in detail. **[8]**

Q9) a) Explain various aquisition methods in DSO. **[8]**

b) State the advantages of sampling oscilloscope. Also draw the block diagram of sampling Oscilloscope and explain. **[8]]**

OR

Q10)a) Write a brief note on ATE. **[8]**

b) Compare DSO with Analog storage Oscilloscope. State in short any four automatic measurements in DSO. **[8]**

Q11)a) Draw the bus structure of GPIB and explain. **[8]**

b) What do you mean by virtual instrumentation? Explain in brief any one virtual instrumentation workbench. **[8]**

OR

Q12)a) Explain the phase shift keying transmission technique, with the help of Block Diagram. **[8]**

b) With the help of block schematics explain any two virtual instrumentation classes. **[8]**

Total No. of Questions : 12] **[Total No. of Pages : 3**

P1154 **[3564] - 217**

B.E. (Electronics Engg.)

ADVANCED DIGITAL SIGNAL PROCESSING

(404205) (2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What are deterministic signals? **[3]**

b) What are random signals? **[3]**

c) What is power density spectrum? **[3]**

d) What is meant ergodic process? **[3]**

e) Explain what do you mean by stationary random process. **[4]**

OR

Q2) a) Explain sampling rate conversion by a rational factor I/D. **[4]**

b) Explain polyphase filter structures. **[4]**

c) Design a two stage decimator for the following specifications **[8]**

D = 100

Passband : $0 \leq F \leq 50$

Transitionband : $50 \leq F \leq 55$

Input sampling rate 10,000Hz.

Ripple : $\delta_1 = 10^{-1}, \delta_2 = 10^{-3}$

Q3) a) Explain the basic concept of adaptive filtering. **[5]**

b) Explain the main components of adaptive filtering. **[5]**

c) Explain LMS adaptive algorithm. **[6]**

P.T.O.

OR

Q4) a) Explain the basic Wiener filter with the help of neat diagram. **[4]**

b) Derive the Wiener - Hopf equation. **[8]**

c) Draw the error performance surface and explain its characteristic. **[4]**

Q5) a) Explain the Levinson Durbin recursion algorithm for solving normal equations. **[12]**

b) Define the following : **[6]**

i) AR process.

ii) MA process.

iii) ARMA process.

OR

Q6) a) Draw the block diagram of a forward linear predictor and explain its operation. **[8]**

b) Consider a signal $x(n) = s(n) + w(n)$, where $s(n)$ is an AR(1) process that satisfies the difference equation $s(n) = 0.6\ s(n - 1) + v(n)$

Where v(n) is a white noise sequence with variance $\sigma_v^2 = 1$. Design a Wiener filter of length M = 2 to estimate $\{s(n)\}$. **[10]**

SECTION - II

Q7) a) Explain the Welch method of power spectrum estimation. **[8]**

b) Compare the Welch method and the Blackman and Tukey method for power spectrum estimation. **[6]**

c) What do you mean by parametric method of power spectrum estimation? **[2]**

OR

Q8) a) Determine the mean and the autocorrelation of the sequence $x(n)$ which is the output of a ARMA (1, 1) process described by the difference equation.

$$x(n) = \frac{1}{2} x(n-1) + w(n) - w(n-1)$$

Where $w(n)$ is a white noise process with variance σ_w^2. **[8]**

b) Explain the MA model of power spectrum estimation. **[8]**

Q9) a) Draw the general architecture for signal processing and explain. **[6]**

b) Explain the concept of pipelining with an example. **[6]**

c) Draw and explain the typical Mac configuration in DSP's. **[4]**

OR

Q10)a) What are fixed point digital signal processors? **[4]**

b) Draw the block diagram of fixed point DSP architecture and explain. **[8]**

c) Explain the principles of very long instruction word (VLIW) architecture. **[4]**

Q11)a) Explain the speech production mechanism with the help of a neat diagram. **[8]**

b) Explain the following : **[10]**

i) Bilabial.

ii) Alveolar.

iii) Velar.

iv) Gloltal.

v) Nasal.

OR

Q12)a) Draw the block diagram of homomorphic Vocoder and explain. **[7]**

b) What is formant? **[4]**

c) Draw the block diagram of formant synthesizer and explain. **[7]**

Total No. of Questions : 12] **[Total No. of Pages : 3**

P1153

[3564] - 216

B.E. (Electronics)

PROCESS INSTRUMENTATION

(2003 Course) (Elective - I)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Draw the block diagram of a SMART TRANSMITTER for transmitting flow signal. Explain the function of each block. **[10]**

b) Write the specifications of a Digital conductivity meter. **[6]**

OR

Q2) a) Explain an optical method for measurement of displacement. **[6]**

b) Temperature for a plating operation must be measured for control with in a range of 500°F - 600°F (260°C to 315.6°C). Develop a measuring system that scales this temperature into 0-5V for input to an 8 bit ADC measurement must be within $\pm 1^{o}$ F. Sensor is a J type thermocouple which outputs 12.84 mV to 15.90 mV with 25°C reference. **[10]**

Q3) a) Sketch the following types of control valve actuators.

i) Spring diaphragm actuator with positioner.

ii) Electropneumatic actuator. **[10]**

b) Justify the statement with suitable example "Control valve characteristics should match process characteristics". **[6]**

OR

Q4) a) A temperature control system inputs the controlled variable as a range 0 - 2V. The final control element is a heater control module which requires 0 - 5V. Design a PID controller with K_P = 2.4%/%, K_I = 9%/min/%, K_D = 0.7%/%/min.

P.T.O.

The period of fastest expected change in process is estimated to be 8 sec. **[10]**

b) Explain tuning of controllers by "Process Reaction Curve" method. **[6]**

Q5) a) Draw the P&I diagram of the following control schemes. Write the specifications of the instruments used in these schemes.

i) Three element control of boiler drum level.

ii) Cascade temperature control of a jacketed CSTR. **[12]**

b) Write a short note on statistical Process Control. **[6]**

OR

Q6) a) With a P&I diagram explain how selective control scheme is applied to protect the compressor from excess discharge pressure. **[8]**

b) With a block diagram explain.

i) Model reference adaptive controller.

ii) Self Tuning regulator. **[10]**

SECTION - II

Q7) a) What are the different modelling approaches in process control? Compare among them. **[10]**

b) With a block diagram explain "Feed forward optimizing control". **[6]**

OR

Q8) a) Explain the mathematical dynamic model of any temperature process. **[10]**

b) With a suitable example explain "Model Predictive Control". **[6]**

Q9) a) Compare between Reloy Ladder logic and PLC Ladder logic. **[4]**

b) Draw the block diagram of a PLC and explain the function of each block. Write sample specifications of a PLC. **[8]**

c) Define the following terms with reference to a PLC.

i) I/o Scan Mode.

ii) Execution Mode. **[4]**

OR

Q10)a) Draw the event sequence and ladder diagram for a PLC system for a "Conveyor System for Bottle Filling" consider all sensors as direct inputs to PLC. **[12]**

b) How the interpretation of an NO symbol and NC symbol differ in a programmed ladder diagram from the same in physical ladder diagram. **[4]**

Q11) a) Draw the block diagram of a SCADA system and explain the function of each block. **[10]**

b) Explain following terms with reference to a DCS (Distributed Control System)

i) Data Highway configuration.

ii) Star type configuration.

iii) Ring type configuration.

iv) Mesh type configuration. **[8]**

OR

Q12) a) Write short notes on the following **[10]**

i) Flow totaliser.

ii) Classification of control panels.

b) Explain "Direct Digital control" with a block diagram. **[8]**

Total No. of Questions : 12] **[Total No. of Pages : 2**

P1152

[3564] - 215

B.E. (Electronics)

EMBEDDED SYSTEM DESIGN

(404205) (2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer three questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***

SECTION - I

Q1) a) What is an embedded system? Explain with atleast two examples. **[9]**

b) Explain the NRE cost of embedded system design. **[9]**

OR

Q2) a) Explain the different categories of embedded systems. **[6]**

b) Explain the blue tooth network architecture with protocol. **[8]**

c) Explain the architecture of IrDA. **[4]**

Q3) a) With suitable cases discuss the processor selection for embedded systems. **[6]**

b) Discuss the basics of interrapts and interrupt latency. **[6]**

c) Explain the services provided by an O.S. **[4]**

OR

Q4) a) Draw and explain the architecture of INTEL network processor. **[10]**

b) What is watchdog timer? Explain it's use in embedded systems. **[6]**

Q5) a) Explain the various tools used for software development of embedded systems. **[8]**

b) With a pseudo code explain the round-robin architecture of scheduler. **[8]**

OR

P.T.O.

Q6) a) Explain the automic and critical sections of embedded system software. **[8]**

b) Write a note on device drivers. **[8]**

SECTION - II

Q7) a) Discuss the various states of Task. **[6]**

b) Explain the scheduler functions. **[6]**

c) Discuss the shared data problem. **[6]**

OR

Q8) a) What do you mean by Hard real time embedded systems? How it differs from other systems? **[6]**

b) Explain the inter-task communication facilities provided by O.S. **[6]**

c) Explain deadly embrace and how it is avoided in embedded systems. **[6]**

Q9) a) Explain the Task service functions of μcos O.S. **[8]**

b) Explain the various functions of μcos related to semaphores. **[8]**

OR

Q10)a) What is POSIX? Explain with respect to RTLinux. **[8]**

b) What is MUTEX? Explain its use in embedded system design. **[8]**

Q11)a) Explain JPEG encoding used in digital camera design. **[10]**

b) Explain the tags used in RFID systems. **[6]**

OR

Q12)a) With neat diagram explain the adaptive cruise control system used in car. **[10]**

b) What is smart card? Explain with neat diagram. **[6]**

Total No. of Questions : 12] **[Total No. of Pages : 3**

P1151

[3564] - 214

B.E. (Electronics)

VLSI DESIGN

(404204) (2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer any 3 questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***
5) ***Neat diagrams must be drawn wherever necessary.***
6) ***Use of non programmable electronic pocket calculators is allowed.***

SECTION - I

Q1) a) What is necessity of test benches? State types of test benches and Explain any one with suitable example. **[8]**

b) Explain the following delays and Write VHDL code for the following with an example.

i) Transport delay modeling.

ii) Inertial delay modeling. **[8]**

OR

Q2) a) Explain the VLSI design flow from design entry to Downloading. **[8]**

b) Write sequential and concurrent VHDL descriptions, to describe a 2 : 4 decoder. **[8]**

Q3) a) Draw state diagram and write VHDL code for traffic light controller controlling traffic for two lane intersection. **[10]**

b) What are the effects of synchronous clock on power dissipation, noise in FSM with examples. **[8]**

OR

Q4) a) Draw state machine chart of UART transmitter and write VHDL code for UART Baud rate generator for baud rate of 9600 assuming system clock of 8 MHz. **[10]**

b) What is metastability? State the solutions. Explain any one solution in detail. **[8]**

P.T.O.

Q5) a) What size lookup table (LUT) is required, if we want to implement two independent logic functions of 5 variables? **[2]**

b) When implementing an 8 bit counter in an FPGA How many CLBs are required? **[2]**

c) Explain (with diagram) how is a 2 : 1 mux implemented in an FPGA. **[4]**

d) What are the merits of FPGA/CPLD over other logic implementing devices? **[8]**

OR

Q6) a) On FPGAs that use LUTs, we can build larger SRAMs out of individual LUTs. However, most FPGAs include monolithic blocks of SRAMs. What are the advantages of a monolithic SRAM block over a SRAM built from LUTs? **[4]**

b) A PLL, DLL on an FPGA accomplishes two functions. What are these functions? **[4]**

c) What is the difference between logic implemented in CPLD and Logic implemented in FPGA? **[8]**

SECTION - II

Q7) a) Explain the two methods of clock distribution. **[8]**

b) Explain the parasitics involved in routing matrix. How to achieve EMI immune design? **[8]**

OR

Q8) a) Explain SRC and DRC. **[8]**

b) Explain power distribution and how to achieve power optimization? **[8]**

Q9) a) Derive the relationship between width of n and p channel MOSFET in an inverter. Why sizing is so important? **[8]**

b) Why is the Pull up of size 2W and Pull Down of size W in an inverter considered in design? **[4]**

c) Draw 3 input CMOS NOR gate. Evaluate the sizing of transistors? **[6]**

OR

Q10)a) If all transistors were of the same size in a gate, how would it affect the performance? **[4]**

b) Draw 3 input CMOS NAND gate. Evaluate the sizing of transistors? **[6]**

c) Write short note on CMOS layout. **[8]**

Q11)a) Explain stuck at fault methods. **[8]**

b) Explain TAP controller with its state diagram. **[8]**

OR

Q12)a) What is the need of design for testability? Explain in short different types of faults. **[8]**

b) What is need of boundary scan? Give suitable examples. **[8]**

Total No. of Questions : 12] **[Total No. of Pages : 4**

P1150

[3564] - 213

B.E. (Electronics)

ADVANCED POWER ELECTRONICS

(2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section - I and Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section - II.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) With the help of neat circuit diagrams and relevant waveforms, explain the operations of three-phase full converter and three-phase semi-converter. Compare the two types of converters including their appropriate applications. **[12]**

b) A three-phase semi-converter operates from the 415V, 50 Hz mains and feeds a highly inductive (level) load. If the firing angle is 45^{o}, calculate :

i) Average (DC) load voltage.

ii) RMS line current assuming that the level load has a resistance of 20Ω. **[6]**

OR

Q2) a) Why are dual converters important? With the help of a neat circuit diagram and relevant waveforms, explain the operation of a single-phase circulating mode dual converter. **[12]**

b) A single-phase circulating-current dual converter is operated from a 120V, 60 Hz supply and feeds a level (highly inductive) load of 5A. If the load voltage is 60V, calculate the value of the circulating current reactor to limit the peak SCR current to 10A. **[6]**

Q3) a) With the help of a neat circuit diagram, relevant waveforms and mode equivalent circuits, explain the operation of a three-phase, 120^{o} mode, voltage source inverter feeding a balanced, star-connected resistive load.

P.T.O.

Also derive an expression for the RMS phase output voltage. **[10]**

b) The above inverter operates from a 380V DC supply and feeds a balanced, star-connected resistive load of 15 Ω per-phase. Calculate

i) RMS line-to-neutral output voltage.

ii) RMS SCR current.

iii) load power. **[6]**

OR

Q4) a) Draw the circuit diagram, relevant waveforms and mode equivalent circuits of a three-phase ASCSI feeding an induction motor load. Also derive an expression for the peak commutation capacitor voltage in terms of the CSI current, operating frequency, and motor back emfs (assumed constant during the commutation process). **[10]**

b) Briefly explain any one technique for output voltage control and harmonic reduction in inverters? **[6]**

Q5) a) Derive an expression for the rms nth harmonic supply current of a single-phase AC-to-DC converter feeding a level load and operating under Symmetrical Angle Control. **[10]**

b) A single-phase forced-commutated full converter employing the Symmetrical Angle Control method for input power factor improvement, operates from the 240 V, 50Hz mains and feeds a level load of 20A. For a conduction angle of 90°, calculate : **[6]**

i) RMS input current.

ii) RMS fundamental input current.

iii) input power factor.

OR

Q6) a) With the help of a power circuit diagram, control circuit block diagram and waveforms, explain the operation of a single-phase active wave-shaping circuit for power factor improvement. **[10]**

b) What are the advantages of resonant converters over switched-mode converters? **[6]**

SECTION - II

Q7) a) Compare a DC motor with a typical stepper motor for the following performance parameters : **[6]**

i) generated shaft torque,

ii) rotor inertia,

iii) motor speed and possible variation,

iv) power output efficiency.

b) What are the driver requirements to accelerate the stepper motor without skipping its steps? **[4]**

c) Compare half-step and full-step modes for the resulting torque-speed characteristics. **[4]**

d) What is the role of tachogenerator and pulse encoder in a typical DC motor control drive? **[4]**

OR

Q8) A DC motor is used to drive an extruder unit through a belt-pulley mechanism. The motor is driven at a constant speed of 1200 rpm and the power delivered by the motor to the load is 3 kW. Find the tension 'T' on the belt if the pulley fitted on the motor shaft has a diameter of 40cm.

Assuming 90% efficiency of the motor, find the armature current if the rated armature voltage is 200VDC. What should be the minimum horsepower rating of this motor? Make suitable assumptions. **[18]**

Q9) a) Explain electromagnetic braking of three-phase induction motors driven in constant V/f control mode. Suggest a suitable circuit diagram to implement this braking scheme. **[6]**

b) A three-phase induction motor is driven in constant V/f control mode. If the rated values of the motor specification are known, write a systematic procedure to calculate the motor speed, slip and slip frequency when the motor is actually run at 75% of both the rated supply frequency and rated motor output torque. **[10]**

OR

Q10)a) With the help of neat circuit diagrams and relevant equations, explain regenerative braking, rheostatic (dynamic) braking and plugging as applied to separately excited DC motors and DC series motors. **[12]**

b) A 4 pole, 415 V, 50Hz, three-phase induction motor has a rated speed of 1440 rpm. Calculate its speed under constant V/f control for a stator frequency of 25Hz, the load torque being equal to 75% of rated motor torque. **[4]**

Q11)a) Enumerate the different types of short-duration power-line voltage disturbances and explain any two in detail. **[12]**

b) Briefly explain how energy audit helps to control energy losses in industrial plants. **[4]**

OR

Q12)a) What do you understand by the term 'Energy Audit'? How is energy audit carried out in a typical industrial plant? **[12]**

b) Explain the origin and effects of voltage spikes and voltage dips relating to power line disturbances. **[4]**

Total No. of Questions : 12] **[Total No. of Pages : 3**

P1149 **[3564] - 211**

B.E. (Electronics Engineering)
COMPUTER NETWORKS
(404201) (2003 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates:

1) ***Answer three questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.***
6) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain in detail working of WAN with the help of its basic model. **[6]**

b) Which are the design issues for the layers? Give detailed explanation. **[6]**

c) What is protocol? Which are the key elements of Protocol? Explain them in detail. **[6]**

OR

Q2) a) What is confirmed service and nonconfirmed service? Explain in detail with the help of service premitives. **[6]**

b) Write short note on network topologies. **[6]**

c) Draw and explain OSI reference model. **[6]**

Q3) a) Compare optical fiber media and copper media used for data transmission. **[6]**

b) Which are the different multiplexing techniques? Explain in detail WDM. **[6]**

c) If a binary signal is sent over a 3-KHz channel whose signal-to-noise ratio is 20dB, what is the maximum achievable data rate? **[4]**

OR

Q4) a) State different switching techniques. Why packet switching is preferred in computer networks? **[6]**

P.T.O.

b) What is modem? Explain its working with the help of block diagram. **[6]**

c) Draw the block diagram of Cable Modem Transmission System (CMTS) and explain how it works? **[4]**

Q5) a) What is framing? List different methods of framing. Explain in detail any one method. **[6]**

b) Explain in detail a Bit-Map protocol. **[6]**

c) Draw the data frame format of IEEE 802.5 LAN. Also give length and meaning of each field in the format. **[4]**

OR

Q6) a) What is bridge? Give its different types and explain working of any one in detail. **[6]**

b) Write short note on FDDI. **[6]**

c) HDLC defines how many different types of frames? Give detailed format of I - frame. **[4]**

SECTION - II

Q7) a) What is TCP connection management? Explain it in detail with the help of TCP connection management finite state machine. **[8]**

b) Explain in detail Link State Routing Algorithm. **[8]**

OR

Q8) a) State the different causes of congestion in subnet. List various congestion control methods used in Datagram subnets. Explain in detail Hop-by-Hop choke packets technique. **[8]**

b) Write short note on UDP. **[8]**

Q9) a) Which types of resource records are used in DNS? What are the components of DNS? Explain them in detail. **[8]**

b) What is public-key Algorithm? Explain in detail RSA algorithm. **[8]**

OR

Q10)a) Write short note on video on Demand. **[8]**

b) What is socket? List different socket premitives. Explain socket programming with an example. **[8]**

Q11)a) What is SMI and MIB in SNMP? **[6]**

b) Which are the classes of IP addresses? Explain them in detail along with their ranges. What are the advantages of sub-netting? **[6]**

c) Write short note on http. **[6]**

OR

Q12)a) Explain SMTP in detail. What are the disadvantages of this protocol? **[6]**

b) Write short note on ARP. **[6]**

c) What is IPv6? Explain in detail. **[6]**

Total No. of Questions : 10] **[Total No. of Pages : 2**

P1281 [3564]-58

B.E. (Electronics)

VLSI DESIGN (Elective - II)

(1997 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions to the candidates :

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) Draw FSM state diagram for Tea/Coffee vending machine working on Moore principle. Write optimum VHDL code for it. Also write full test bench. **[16]**

Q2) a) What is noise margin in CMOS logic? How does it help designer? **[8]**

b) Why is device sizing so important in CMOS? Derive the relationship between PMOS & NMOS dimensions. **[8]**

Q3) a) Certain CMOS logic operates at 1GHz at load of 10 pF & supply of 1 volt. What is total dissipation if static dissipation is 1 μW. **[8]**

b) Design CMOS logic for Y = AB + CDE + FG. **[8]**

Q4) Explain high level design flow in detail. Mention the names of advance tools being used in each step. Give the names of the files generated by individual process. **[16]**

Q5) Write short notes on any three: **[18]**

a) Technology scaling.

b) Place & Rout.

c) Design validation.

d) Mealy m/c.

e) Synthesis.

P.T.O.

SECTION - II

Q6) Write VHDL code for 1000 bit shift register. Also write test bench for it. **[16]**

Q7) Write VHDL code for 16 byte RAM. Write full test bench to ensure writing & reading operations. **[16]**

Q8) Draw the architecture of FPGA. Explore logic cell, I/O block & interconnect matrix in detail. **[16]**

Q9) a) What is need of attributes? Explain any two attributes with suitable examples. **[8]**

b) What is synthesizable statement? Explain two with the hardware infered. **[8]**

Q10) Write short notes on any three: **[18]**

a) Signals & variables.

b) Function & procedure.

c) RTL code.

d) Structural modeling.

e) Verification.

Total No. of Questions : 10] **[Total No. of Pages : 2**

P1253

[3564]-57
B.E. (Electronics)
IMAGE PROCESSING (404191)
(1997 Course)

Time : 3 Hours] ***[Max. Marks : 100***

Instructions :

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate answer papers.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) With the help of neat diagram explain the basic elements in image acquisition process. Briefly explain the image formation model used in image processing. **[8]**

b) Explain with block schematic methods of image analysis and image understanding. **[8]**

Q2) a) Explain the importance of hystereosis thresholding and nonmaximal suppression in the canny edge detection process. How do these two concepts influence the resulting edge image? **[8]**

b) What is a histogram? Explain histogram equalization and adaptive histogram equalization. **[8]**

Q3) a) Briefly explain the following terms: **[9]**

i) Constrast Sensitivity.

ii) Simultaneous Contrast.

iii) Colour Blindness.

b) A three bit image has following gray level distribution. **[7]**

Gray Level	G_0	G_1	G_2	G_3	G_4	G_5	G_6	G_7
No. of Pixels	500	800	1150	510	300	150	5000	0

Determine gray level distribution for the output image using histogram equalization procedure.

P.T.O.

Q4) a) State the basic formulae for computing DCT and IDCT for two dimensional image data. Illustrate the properties of the DCT. **[8]**

b) Explain pseudo color image enhancement. **[8]**

Q5) Write short notes on any three of the following: **[18]**

a) Homomorphic Filtering.

b) Use of chain code and B-splines in boundary detection.

c) Edge linking using Hough transform.

d) Multispectral image enhancement.

SECTION - II

Q6) a) Explain the following methods of image segmentation. **[8]**

i) Thresholding.

ii) Region merging and region growing.

b) Explain arithmetic coding with example. Compare it with Huffman coding. **[8]**

Q7) a) Explain thinning algorithm with proper example. **[8]**

b) What is texture? Explain any statistical method to analyze the texture. **[8]**

Q8) a) With reference to relation between pixels, explain. **[9]**

i) 4-connectivity.

ii) 8-connectivity.

iii) Mixed connectivity

Explain with suitable example where the concept of connectivity is used in image processing.

b) What is Hough transform? Explain how it is used to determine the colinearity of points. **[7]**

Q9) a) Explain uniform and nonuniform quantization. **[8]**

b) Explain any one of the following image processing application, specifying various I.P. algorithms which may be used: **[8]**

i) Remote sensing using satellite images.

ii) Face Recognition system.

Q10) Write short notes on any three of following: **[18]**

a) Image Compression.

b) Gaussian Low Pass Filtering for images.

c) Run length coding.

d) LOG filter.

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