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[3564] - 29

B.E. (E & TC)

RADIATION & MICROWAVE TECHNIQUES

(1997 Course)

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

Instructions to the candidates:

    1)   *Answer any three questions from each section.*

    2)   *Neat diagrams must be drawn wherever necessary.*

    3)   *Figures to the right indicate full marks.*

    4)   *Use of logarithmic tables, slide rule, Molier charts, electronic pocket calculator and steam tables is allowed.*

    5)   *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Write the frequency range of the following microwave band frequencies **[5]**

    i)   Ku band   ii)   S band

    iii) C band   iv)   L band

    v)   X band

    b) Draw E & H field pattern for following **[6]**

    i)   TE 10 mode in rectangular wave guide.

    ii) Microstrip line.

    iii) Open two wire transmission line.

    c) Compare Co-axial transmission line with waveguide. **[5]**

Q2) a) Find the cutoff frequency for the TE 10 mode in a rectangular waveguide with dimention 4cm × 2cm find also, **[8]**

    i)   Guide wavelength λ_g

    ii) Phase velocity v_p

    at a frequency 25 percent higher than the cutoff frequency.

    b) Find resonant frequency and Q of copper rectangular cavity of dimention a = b = d = 10cm for TE 101 mode (for copper $\sigma = 5.8 \times 10^7$ s/m). **[8]**

Q3) a) What is magic Tee? Write it's scattering matrix and give it's any two applications. **[8]**

    b) If the incident power of 10db directional coupler is 350 mw calculate **[8]**

    i)   O/p power in main arm.

    ii) O/p power in Auxillary arm.

Q4) a) With the applegate diagram explain the process of velocity modulation in reflex klystron. **[8]**

b) Explain the principle of working of a **[8]**

   i)   Travelling wave tube.

   OR

   ii) Cavity Magnetron.

Q5) a) Explain the experimental setup for the measurement of following parameters for microwave devices. **[10]**

   i)   S parameters   ii) Attenuations

b) Explain following terms in brief **[8]**

   i)   Dielectric constant   ii) Insertion loss

   iii) Noise factor   iv) Q of cavity resonator

SECTION - II

Q6) a) Explain following antenna parameters **[8]**

   i)   Radiation pattern   ii) Directivity & power gain

   iii) Near field & far field   iv) HPBW.

b) Find the beamwidth between first nulls and half power points of the radiation pattern of a paraboloid operating at 10GHz, which has mouth diameter of 0.15m. also find power gain. **[8]**

Q7) a) With the help of block diagram explain operation of pulsed radar. **[8]**

b) What are different feeding mechanisms for parabolic reflector. **[8]**

Q8) a) With the help of VI characteristics explain operation of Gunn diode. **[8]**

b) What is Tunnel diode? Give its construction working and applications. **[8]**

Q9) a) Explain working of a varactor diode elaborate it's use in parametric amplifier. **[8]**

b) What is doppler effect? How it is used in a cw radar? **[8]**

Q10) Write short note on any THREE: **[18]**

   a) Microwave Oven

   b) Microwave Transister

   c) Microstrip Antenna

   d) Industrial applications of microwaves.

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[3564] - 37
B.E. (E&TC)
COMMUNICATION NETWORKS
(404188)

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)   *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)   Compare X.25 and SMDS technology.   **[8]**

    b)   What are service primitives and relationship of services to protocols. **[4]**

    c)   Draw ISO-OSI reference model & list the responsibilities of data link layer.   **[4]**

Q2) a)   Draw & explain HDLC frame format in detail.   **[8]**

    b)   Explain any one framing technique used at LLC layer.   **[4]**

    c)   Explain any one flow control technique used at LLC layer.   **[4]**

Q3) a)   Draw & explain IEEE-802.3 frame format. Also explain significance of PAD field.   **[8]**

    b)   Explain IEEE-802.6-DQDB technique in brief.   **[4]**

    c)   What is FDDI? What is its application in the area of networking?   **[4]**

Q4) Write a short note on any three :   **[18]**

    a)   802.4 Vs 802.4 technique.

    b)   Broadband ISDN.

    c)   Wireless networks.

    d)   LEO Vs MEO Vs GEO.

SECTION - II

Q5) a) Explain the applications of ICMP, ARP and RARP protocols. **[8]**

b) Compare virtual circuit Vs Datagram. **[4]**

c) Compare IPV_4 Vs IPV_6. **[4]**

Q6) a) Explain transport layer connection establishing and release procedure in detail. **[8]**

b) Compare TCP Vs UDP. **[4]**

c) What are the different responsibilities of transport layer. **[4]**

Q7) a) Messages independently arrive to a system at the rate of 10 per minute. Their lengths are exponentially distributed with an average of 3600 characters. They are transmitted on a 9600bps channel. A character is 8 bits long. **[8]**

Calculate i) Average service time Ts

ii) What is arrival rate A

iii) What is Service rate D

iv) What is utilization of server U.

b) Explain M/M/1 queue system. **[4]**

c) Explain Erlang-B function. **[4]**

Q8) Write short note on any three : **[18]**

a) SNMP system.

b) Cryptography.

c) Socket programming.

d) Remote login.

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[3564]-198

B.E. (E & TC)

EMBEDDED SYSTEM DESIGN

(2003 Course) (404218) (Elective - I)

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

Instructions to the candidates:

  1) *Answers to two sections should be written in separate sheet.*
  2) *Answer Que. 01 or 02, Que. 03 or 04, Que. 05 or 06 from section I and Que. 07 or 08, Que. 09 or 10, Que. 11 or 12 from section II.*
  3) *Neat diagrams must be drawn wherever necessary.*
  4) *Figures to the right indicate full marks.*

SECTION - I

Q1) a) With the help of revenue generation model for computing losses from delayed entry, justify how delayed entry in the market is costly.   **[10]**

   b) Compare RTU and ASCII transmission mode of MODBUS. Explain device addressing in MODBUS.   **[8]**

OR

Q2) a) What is design metrics? Explain following design metrics.   **[10]**
   i)   Time to Market.
   ii)   Latency.
   iii) Speedup.
   iv)   NRE cost.

   b) Differentiate General Purpose system and Embedded System. What are the recent trends in embedded system design.   **[8]**

Q3) a) Justify the usage of RISC processor in majority of the embedded system.   **[8]**

   b) What are expected features of processor to be used in embedded systems.   **[8]**

OR

Q4) a) Explain use and importance of following memory types in embedded systems. . **[8]**
  i)   ROM.
  ii) EEPROM.
  iii) FLASH.
  iv) SDRAM.

  b) Explain role of context switching in interrupt service routine. How interrupt latency is related to context switching. **[8]**

Q5) a) What is semaphore? Why multiple semaphores to be used more carefully? **[8]**

  b) Explain task states and valid transitions with the help of suitable diagram. **[8]**

<div align="center">OR</div>

Q6) a) Explain general architecture of device driver. **[8]**

  b) What is re-entrant function? State the rules to decide whether the function id re-entrant. **[8]**

<div align="center">

SECTION - II

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Q7) a) Differentiate General purpose OS (GPOS) and RTOS with reference to following **[8]**
  i)   Task Management.
  ii) Inter-task communication.
  iii) Timing Services.
  iv) Memory Management.

  b) Explain following inter process communication primitives **[8]**
  i)   Message Queue.
  ii) Mailbox.
  iii) Pipes.
  iv) Events.

<div align="center">OR</div>

Q8) a) What are rules to use interrupt routines in RTOS environment. **[8]**

  b) What are different scheduling algorithms used in general? Explain basic scheduling policy of RTOS. **[8]**

Q9) a) What are the basic approaches of RTOS? Explain in brief. **[8]**

b) What is real time system? Explain general guidelines to design real time system. **[8]**

OR

Q10) a) What are the features of uCOS? List any four services offered by uCOS. **[8]**

b) Differentiate between QNX, RT-Linux and Vx Works. **[8]**

Q11) With respect to block diagram, processor, memory, inter processor communication, algorithms and software architecture explain design of digital camera. **[18]**

OR

Q12) a) With respect to block diagram, memory, processor explain smart card design. **[9]**

b) Explain adaptive cruise control system in a car with neat diagram. **[9]**

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[3564] - 195

B.E. (E & TC)
VOICE NETWORKS
(2003 Course) (404215)

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 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)   What is meant by Stored Program Control? Draw and explain the organization of the 'Distributed SPC'.   **[8]**

   b)   With necessary equations define and explain the terms 'Availability and Unavailability' of the dual processor system.   **[5]**

   c)   Calculate the Unavailability of the Dual Processor System for a period of 25 years if it's MTBF = 3800 Hrs & MTTR = 8 Hrs.   **[5]**

OR

Q2) a)   Explain the input controlled Time Division Space Switching with neat diagram.   **[8]**

   b)   What are various 'Enhanced Services' offered by the electronic exchange? List and explain their categories.   **[5]**

   c)   Calculate the Availability of the Dual Processor System for a period of 20 years if it's MTBF = 3300 Hrs & MTTR = 6 Hrs.   **[5]**

Q3) a)   Define and explain the terms 'Erlang' and 'CCS'. How they are related?
                                                                     [6]

   b)   Define and explain the following terms :   **[4]**
      i)   Busy Hour Call Attempts
      ii)   Average Holding time.

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c) The activity of a customer line was recorded by observing the holding times for 12 hours during the period from 6.00 a.m to 6.00 p.m. Determine the traffic intensity in Erlangs and CCS. The values are given in the table given below. **[6]**

Call No.	Call Started Time in Hours	Call Terminated Time in Hours
1	6.08	6.11
2	9.33	9.40
3	10.21	10.29
4	10.31	10.35
5	11.03	11.06
6	12.17	12.22
7	12.48	12.49
8	14.24	14.37
9	15.10	15.15
10	16.11	16.25

OR

Q4) a) List and explain various Measurement Units that are used in the Traffic Engineering. **[6]**

b) Define and explain the following : **[4]**
   i) Busy Hour Call Rate.
   ii) Call Completion Rate.

c) The data collected from a customer line during a period of 5 hours show, a total of ten active calls with call holding times as 28, 35, 84, 90, 44, 124, 72, 60, 88 & 52 seconds respectively. Calculate the traffic intensity in Erlangs and CCS. **[6]**

Q5) a) What is an ISDN? And Why ISDN is preferred? Draw and explain the significance of 'Terminal Adaptor'. **[10]**

b). Explain the functions of the Network Terminators: NT-l and NT-2? **[6]**

OR

Q6) a) What is meant by broadband ISDN and narrowband ISDN? What are various services offered by ISDN? **[10]**

b) What is a 'B-Channel' & 'D-Channel'? **[6]**

SECTION - II

Q7) a) What is meant by 'Spectral Efficiency' of modulation? Explain. **[6]**

b) What is meant by 'Cell Sectorization'? What are the advantages and disadvantages of Cell Sectorization? **[6]**

c) Write brief notes on 'Co-channel Interference Reduction Factor'. **[6]**

OR

Q8) a) Explain the concept of different multiple access techniques. Also compare them in detail. **[8]**

b) Draw the reference model of the GSM Architecture and explain it's various elements. **[10]**

Q9) a) What are the 'Radio Characteristics' of IS-95 CDMA? List them. **[6]**

b) Explain the Forward Link Channel Structures of the IS-95 CDMA Air Interface. **[10]**

OR

Q10) a) Draw the flow diagram for CDMA Call Origination. **[6]**

b) Explain the Reverse Link Channel Structures of the IS-95 CDMA Air Interface. **[10]**

Q11) a) What is the technique used to integrate the voice and data over the internet? What are their advantages and Limitations? Explain. **[8]**

b) Compare the IP Telephony Protocols: H.323 Vs SIP. **[8]**

OR

Q12) a) Write brief notes on Voice Activity Detection and Discontinuous Transmission [VAD/DTX]. **[8]**

b) List and explain any two of the IP Telephony Protocols. **[8]**

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[3564]-38

B.E. (E & TC)

CONSUMER ELECTRONICS

(1997 Course) (404189)

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)   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) What is need of biasing in magnetic recording? Explain AC biasing in detail. **[4]**

b) Explain the basic principle of magnetic recording in brief. **[4]**

c) With the help of suitable block diagram explain Tape Transport Mechanism. **[8]**

Q2) a) Explain with respect to sound recording. **[10]**
   i)   Variable area method.
   ii) Variable density method.

b) Enlist the advantages & disadvantages of Compact Disc. (CD) **[6]**

Q3) a) Draw Composite Video Signal (CVS). Explain each component in detail. **[9]**

b) Explain the following terms : **[9]**
   i)   Persistance of vision.
   ii) Vertical resolution.
   iii) Kell factor.

Q4) a) Explain interlace scanning. How bandwidth of video signal is reduced using interlace scanning. **[8]**

b) Explain the principle of operation of plumbicon camera tube. Also draw construction details of plumbicon. **[8]**

P.T.O.

Q5) a) How chroma signal is transmitted in PAL system. **[4]**

b) With the help of neat block diagram explain PAL encoder and decoder.**[8]**

c) Write short note on filter flexer? **[4]**

SECTION - II

Q6) a) What are the advantages of frequency modulation in video recording.**[4]**

b) Explain the various video formats of video recording. **[8]**

c) What is skew error in VCR? **[4]**

Q7) a) What is reliability of the product? List the various consideration for reliability. **[8]**

b) With the help of suitable diagram explain File Transfer Protocol. **[8]**

Q8) a) Explain JPEG standard for still image in detail. **[8]**

b) With the help of block diagram explain CCTV. **[8]**

Q9) a) Draw block diagram of IF modulated TV transmitter. Explain each block in brief. **[10]**

b) What are the transmission standards of HDTV? Compare these standards with conventional transmission. **[6]**

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

a) Solar pannel and Solar cells.

b) Plasma Display.

c) Cellular phone.

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P1143

[3564] - 201
B.E. (E & T/C)
ARTIFICIAL NEURAL NETWORKS
(404218) (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 Q10, 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 electronic pocket calculator is allowed.*
    6)   *Assume suitable data, if necessary.*

SECTION - I

Q1) a)   Compare the performance of biological and computer neural networks.**[6]**

    b)   Illustrate AND gate using MP neuron model.   **[4]**

    c)   Explain the following learning laws   **[6]**

        i)   Instar learning law.

        ii)   Outstar learning law.

        iii)   Delta learning law.

OR

Q2) a)   What is activation dynamics models?   **[4]**

    b)   Explain additive activation models and shunting activation models in detail.
                                                              [8]

    c)   What are the two general methods of recall of information in neural networks?   **[4]**

Q3) a)   What is perceptron learning for pattern classification?   **[4]**

    b)   What is meant by perceptron representation problem?   **[3]**

    c)   Distinguish between linearly separable and linearly inseparable problems.
                                                              [5]

    d)   Why a single layer of perceptron cannot be used to solve linearly inseparable problems?   **[4]**

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OR

Q4) a) What is meant by gradient descent method? **[4]**

b) Draw the architecture of Hadaline. **[6]**

c) Explain the training algorithm used in back propogation network. **[6]**

Q5) a) Explain how to derive the state transition diagram for a stochastic neural network. **[10]**

b) What differences will you observe in the state transition diagrams at different temperatures? **[4]**

c) What do you mean by the term auto association and hetero association? **[4]**

OR

Q6) a) What is meant by capacity of feedback network? **[4]**

b) Describe the Boltzmann machine. **[4]**

c) What is meant by simulated annealing? What is annealing schedule? **[6]**

d) What is the basis of Boltzmann learning law? **[4]**

SECTION - II

Q7) a) Explain what do you mean by stability plasticity dilemma? **[4]**

b) Draw and explain the architecture of ART 1 network. **[6]**

c) Explain the training algorithm used in ART 1 network. **[6]**

OR

Q8) a) What is simple competitive learning? **[2]**

b) What is LVQ? Explain the training algorithm used in LVQ. **[6]**

c) What is principal component analysis? **[4]**

d) Describe the architecture of Kohonen network. **[4]**

Q9) a) Explain Neocognitron and its application. **[6]**

b) What is a linear association? What are its limitations as an associative memory? **[6]**

c) Explain the distinction between pattern association and pattern classification task. **[4]**

*Q10)*a) What is bidirectional associative memory? What is meant by BAM is unconditionally stable? **[6]**

b) What is a temporal associative memory? What are the limitations in recalling a sequence of temporal patterns? **[6]**

c) Explain the architecture of RBF networks. **[4]**

*Q11)*a) What are some important applications of the principles of neural networks? Why are they called direct applications? **[8]**

b) What is meant by complexity for a set of objects for classification? Explain this in relation to olympic symbols and printed characters. **[10]**

OR

*Q12)*a) What is a modular architecture in neural networks? **[6]**

b) What is the significance of neural networks in the NETtalk application?**[6]**

c) What is image segmentation problem? **[6]**

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[3564] - 200
B.E. (E & T/C)
ADVANCED DIGITAL SIGNAL PROCESSING
(404218) (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 Q10, 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 electronic pocket calculator is allowed.
   6)   Assume suitable data, if necessary.

SECTION - I

Q1) a)   Define random signals. Explain the characteristics of random signals.**[4]**

   b)   A three stage decimator is used to reduce the sampling rate from 96 kHz
        to 1 kHz. Assume decimation factors of 8, 6 and 2 respectively for the
        three stages.   **[14]**
        i)   Indicate the sampling rate at the output of each of three stages.
        ii) Assume the decimator above satisfies the following overall
             specification.

             Input sampling frequency F_s = 96 kHz

             Decimation factor M = 96

             Passband ripple = 0.01 dB

             Stopband ripple = 60 dB

             Frequency band of interest = 0 to 450 Hz

             Determine the band edge frequencies for the decimating filter at
             each stage.

OR

Q2) a)   Explain polyphase implementation of interpolators.   **[6]**

   b)   Explain clearly the roles of each of the following in the multirate processing
        system.   **[6]**
        i)   Decimating filter.
        ii) Sampling rate compressor.

c) Consider the signal $x(n) = a^n u(n)$, $|a| < 1$. **[6]**
   i) Determine spectrum $X(w)$.
   ii) The signal $x(n)$ is applied to a decimator that reduces the rate by a factor of 2. Determine the output spectrum.

Q3) a) Explain briefly with the aid of a block diagram the basic concepts of adaptive noise cancelling; Discuss critically the benefits and limitations of adaptive noise cancelling in a real time application of your choice and suggest ways of overcoming the limitations. **[8]**

   b) Starting with the equation for Mean Square error derive Wiener Hopf equation. **[8]**

OR

Q4) a) Derive the Widrow Hopf LMS algorithm for adaptive noise cancellation stating any reasonable assumptions made. **[8]**

   b) Bringout the limitations of basic LMS and RLS algorithm. **[8]**

Q5) a) Determine the lattice coefficients corresponding to FIR filter described by system function **[8]**

$$H(z) = A_3(z) = 1 + \frac{13}{24}z^{-1} + \frac{5}{8}z^{-2} + \frac{1}{3}z^{-3}$$

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

OR

Q6) a) Explain how to find the solution of normal equation using Levinson Durbin algorithm. **[10]**

   b) Determine the parameters and sketch the lattice ladder filter structure for the system with system function **[6]**

$$H(z) = \frac{1 - 0.8z^{-1} + 0.15z^{-2}}{1 + 0.1z^{-1} - 0.72z^{-2}}$$

SECTION - II

Q7) a) Explain the non parametric methods of power spectrum estimation. **[12]**

   b) Explain the use of DFT in power spectrum estimation. **[4]**

OR

Q8) a) Explain the parametric methods of power spectrum estimation. **[12]**

b) Suppose we have N = 1000 samples for a sample sequence of a random process. Determine the frequency resolution of the Bartlett and Welch (50% overlap) for a quality factor Q = 10. **[4]**

Q9) a) Compare DSP architecture and Microprocessor architecture. **[8]**

b) Write short notes on **[8]**
   i)   SIMD processing.
   ii) Static superscalar processing.

OR

*Q10)*a) Explain the concept of pipelining in Harvard architecture with neat timing diagram. **[8]**

b) Explain the architecture of fixed point processor TMS 320C 54 X with the help of neat diagram. **[8]**

*Q11)*a) Explain the digital model of speech production with block diagram. **[8]**

b) What do you mean by short time spectrum analysis of speech? **[5]**

c) What is formant synthesis? **[5]**

OR

*Q12)*a) Explain the LPC model of speech production. **[10]**

b) Draw the schematic diagram of human speech production mechanism and explain. **[8]**

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[3564] - 199

B.E. (E & TC)

ADVANCED POWER ELECTRONICS

(2003 Course)

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

Instructions to the candidates:-

    1)   *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 questions from section I and Q7 or Q8, Q9 or Q10, Q11 or Q12 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 logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

    6)   *Assume suitable data, if necessary.*

SECTION - I

Q1) a)   Draw the circuit diagram of 3-ϕ fully controlled converter operating with highly inductive load and explain operation with following waveforms for $\alpha = 90°$ **[10]**

    i)   Load voltage.

    ii)   Load current.

    iii)   Supply current (any one phase).

  b)   Draw and explain the necessity of static and dynamic equalising circuit for series connected SCRs? Derive relations used for determining the values of shunt resistor R and capacitor C in this circuit.   **[8]**

<div align="center">OR</div>

Q2) a)   Explain the effect of source inductance on the performance of a single phase full converter with waveforms.

    Derive expression for its output voltage interms of maximum voltage (v_m), firing angle (α) and overlap angle (μ).   **[8]**

  b)   Explain how two 3-ϕ full converters can be connected back to back to form a circulating current type of dual converter.

    Discuss its operation with the help of voltage waveforms across

    i)   Each converter.

    ii)   Load.

    iii)   Reactor.   **[10]**

Q3) a) With the help of circuit diagram explain the circuit of Boost inverter circuit with analysis. **[8]**

b) Explain the necessity of voltage control & harmonic reduction in inverter. **[4]**

c) Write note on space vector modulation. **[4]**

OR

Q4) a) With the help of a neat circuit diagram, relevant waveforms, explain the operation of three-phase 180° mode voltage source inverter feeding a balanced star-connected resistive load. **[8]**

b) A three phase voltage source inverter with 120° angle of conduction has a star connected load of $R = 5\Omega$. The inverter frequency is 50 Hz & d.c. supply is 220 V. Determine **[8]**
   i) The R.M.S. line and phase voltage.
   ii) R.M.S. load current.
   iii) R.M.S. thyristor (SCR) current.
   iv) Average SCR current.

Q5) Explain the concept of power factor on which parameters does the power factor depend? Enlist various power factors improvement techniques for line commutated converters. Explain any one method of power factor improvement in details. Compare it with other techniques. **[16]**

OR

Q6) a) With the help of circuit diagram and associated waveforms, explain the operation of class E resonant inverters. **[8]**

b) How will you measure **[8]**
   i) Sinusoidal voltage and current.
   ii) Nonsinusoidal voltage and current.

SECTION - II

Q7) a) Draw and explain the power circuit of single phase full converter feeding a separately excited d.c. motor. Explain with typical voltage and current waveforms, the operation in continuous armature current mode. **[8]**

b) Draw the circuit diagram and explain the working of chopper drive (unipolar) for stepper motor. **[8]**

OR

Q8) a) Explain 'Field failure' and under voltage protections for DC motor. **[6]**

b) The speed of separately excited d.c. motor is controlled by 1-ϕ full converter. The field current is also controlled by a full converter & field current is set to the maximum possible value. The a.c. supply voltage is one phase 208 V, 50 Hz, the armature resistance R_a = 0.50 Ω, field resistance R_f = 345 Ω & motor voltage constant is 0.71 V/A-rad/sec. If the delay angle of armature converter is 45° and armature current F_a = 55 A. Determine **[10]**
   i) Torque developed.
   ii) The speed.
   iii) F/P power factor of supply.
   Assume the armature and field current to be continuous and ripple free.

Q9) a) Draw and explain the operation of three phase brushless d.c. motor drive. Also explain the related waveforms. **[8]**

b) Explain briefly the following methods of braking a d.c. motor **[6]**
   i) Regenerative braking.
   ii) Dynamic braking.

c) Justify "The speed range of an induction motor is restricted to above 30% of full range while operating with slip power regulation system".**[4]**

OR

Q10) a) Explain the following speed control methods for an induction motor **[8]**
   i) Stator voltage control.
   ii) Rotar resistance control.

b) Enlist various protection circuits required for induction motor. Explain one in details. **[6]**

c) What do you understand by soft start? State and explain the soft start methods employed for motors. **[4]**

Q11) a) What is energy audit? Explain types of energy audit. **[8]**

b) Define the term voltage sag? Explain different sources of sags and interruptions. **[8]**

OR

Q12) a) What is power quality? Why it is required? Explain different types of power line disturbances. **[8]**

b) Explain probable preventive solutions to control the factors contributing the power quality distortions. **[8]**

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P1140

[3564] - 196

B.E. (E & T/C)

ELECTRONIC PRODUCT DESIGN

(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 books.
  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) A high reliability system is to be built. Discuss redundancy technique for high reliable system.   **[8]**

   b) Discuss the noise compling mechanisms and how to minimize these at board level.   **[6]**

   c) Compare reliability of linear power supply with SMPS.   **[4]**

OR

Q2) a) Compare consumer, Industrial and military products for   **[6]**

   i)   Cost/performance ratio.

   ii)   Reliability.

   iii) Temperature rating.

   b) Explain how a pocket calculator satisfies the ergonomics & aesthetic design considerations of this product.   **[8]**

   c) For a military product it is desirable to achieve 60 dB shielding effectiveness using conductive coating on enclosure. What should be coating impedance in Ω/square inch.   **[4]**

Q3) a) Discuss how EMI can be controlled at PCB level.   **[8]**

   b) i)   Calculate a distributed resistance of copper track on PCB 5 cm long, 0.3 mm wide with Cu foil 70 micron thick. Assume resistivity of copper ρ_1 1.8×10^{-6} Ω - cm.   **[4]**

   ii)   Find inductance of a 1 cm long, 0.25 mm wide track on PCB with standard 35 micron Cu clad.   **[4]**

Q4) a) Give practical examples where the PCB layout design practices given below need careful attention. **[10]**
   i) Ground loops.
   ii) Star grounding.
   iii) Board level shielding.
   iv) Guarding.

b) Calculate the propagation delay offered by a PCB track on high-speed board, of length 5 cm. Assume dielectric constant of PCB substrate $f_r = 4.1$. **[4]**

c) What is need of decoupling capacitor. Where it is located on board. **[2]**

Q5) a) Explain the importance and usefulness of following terms as applicable to DSO/MSO and logic Analyser. **[8]**
   i) Band width.
   ii) No. of channels.
   iii) Sampling rate.
   iv) Memory depth.

b) Explain how integrated state and timing acqusion mode of logic analyser helps in finding faults in high frequency circuits. **[8]**

OR

Q6) Explain with justification and schematic arrangement for finding fault the type of instrument (s) that will be used in following situations. **[16]**

a) A sequential circuit that is producing erratic out put due to slow rising edge of clock.

b) A memory interface that is suscepted to comply with setup and hold time requirements.

c) A micro controller circuit with hair line short on two adjacent lines of data bus.

d) A LED drive circuit in which few segments are not glowing.

SECTION - II

Q7) Take a suitable example of a microcontroller based electronic product and explain the different steps in software design for this product. **[18]**

OR

Q8) An eight channel ADC reads temperature data using RTDs. The temperature data is to be logged in system memory and then plot is drawn on system's laser printer. Then. **[18]**

    a)   List all steps necessary to develope the software for this system.

    b)   Draw software structure diagram.

    c)   Draw detailed flow chart for acquiring data and displaying it on 6 digit multiplexed LCD display.

    d)   Explain with reason the portions of software that will be developed in assembly language and high level language.

Q9) a)   Explain different types of tests carried out on a product to confirm its electromagnetic compatibility. **[8]**

    b)   Which of the above tests will be essential for following products. Justify your answer. **[8]**

        i)   Mobile phone.

        ii)   Industrial PC.

        iii)   Domestic Inverter.

        iv)   Baking ovens.

OR

Q10) a)   Explain different temperature tests that should be carried out on CNC machine. Indicate different parameter (s) settings associated with these tests. **[8]**

    b)   Specify with justification the essential environmental tests to be carried out on the following products. **[8]**

        i)   PLC.

        ii)   TV receiver.

        iii)   ECG machine.

Q11) For a 6 channel P.A. system delivering 100 watts power to 8 Ω loudspeaker system. Explain the importance of following documents/drawings for this PA system. **[16]**

    a)   Schematic diagram.

    b)   PCB assembly.

    c)   Interconnection diagram.

    d)   Front and rear panel.

    e)   Bill of material.

OR

*Q12)*a)   What is need for bare board testing for mass produced high track density PCB.

b)   Why multilayer PCBS be preferred for ICS on densed embedded circuits.

c)   With the help of suitable example illustrate good documentation practices for a C program.

d)   Explain use of engineering note book in development of a product. **[16]**

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P1139

[3564] - 194
B.E. (E & TC)
COMPUTER NETWORKS
(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 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)   What is distributed network? What are their advantages & disadvantages?
                                                                  [6]

      b)   Explain TCP/IP layers and their functions.   **[10]**

OR

Q2) a)   Give reasons why OSI model failed to take off?   **[6]**

      b)   Differentiate between Peer-to-Peer network and client server network.**[10]**

Q3) a)   Find maximum effective data rate of telephone line with bandwidth 3.4 kHz and signal-to-noise ratio is 30 dB.   **[6]**

      b)   Explain in detail what is circuit switching?   **[8]**

      c)   What is DSL? Explain.   **[4]**

OR

Q4) a)   A noiseless channel of 4kHz sampled every 1 ms. What is maximum data rate.   **[6]**

      b)   What is packet switching? Explain.   **[8]**

      c)   What is cable modem? Explain.   **[4]**

Q5) a) Draw HDLC frame structure. Write function of each field. **[10]**

b) A telephone modem is used to connect a personal computer to a host computer. The speed of modem is 56 kbps and one way propagation delay is 100 ms. Find efficiency of stop-and-wait ARQ if frame size is 256 bytes. **[6]**

<div align="center">OR</div>

Q6) a) Draw PPP frame structure. Write functions of each field. **[10]**

b) Calculate maximum throughput possible for slotted ALOHA and pure ALOHA for a radio system with 9600 bps channel used for call setup request to base station. Take frame length of 200 bits. **[6]**

<div align="center">

SECTION - II

</div>

Q7) a) What are various transport service primitives. Explain in brief. **[6]**

b) What is congestion? Explain any one congestion control technique. **[6]**

c) What are functions of network layer? **[6]**

<div align="center">OR</div>

Q8) a) What are chocke packets? Explain. **[6]**

b) What is distance vector routing? Explain the algorithm used for distance vector routing. **[6]**

c) Justify the statement "If application developer uses UDP then the application talks directly to IP". **[6]**

Q9) a) Explain five basic functions in electronic mail. **[6]**

b) Write difference between conventional and public key encryption. **[4]**

c) Explain the need of DNS. **[6]**

<div align="center">OR</div>

*Q10)*a) What is private key algorithm? Explain. **[6]**

b) Explain how a web page is accessed through internet by a browser. **[6]**

c) What is a socket? Explain. **[4]**

Q11) Write short notes on (any three) :   **[16]**

    a)   Telnet.

    b)   FTP.

    c)   SMTP.

    d)   RARP.

<div align="center">OR</div>

Q12) Write short notes on (any three) :   **[16]**

    a)   ARP.

    b)   IGMP.

    c)   SNMP.

    d)   BOOTP.

<div align="center">■■■■</div>

P1262 **[3564]-210**

B.E. (E&TC)
SYSTEM PROGRAMMING AND OPERATING SYSTEM
(2003 Course)

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

Instructions :

1) *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section-I and Q7 or Q8, Q9 or Q10, Q11 or Q12 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) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Define the following terms. **[8]**
    i) Language Processor.
    ii) Translator.
    iii) Impure Procedure.
    iv) Preprocessor.

  b) Explain different phases of compilers. **[10]**

OR

Q2) a) Compare the following : **[8]**
    i) Pseudo code and machine code.
    ii) Compiler and Interpreter.

  b) Explain following terms of compilers : **[10]**
    i) The Parser.
    ii) The semantic Analyzer.

Q3) a) Explain the various data structures that are used for pass-I assembler. **[8]**

  b) What are Macros? Explain the different features of a MACRO. **[8]**

OR

Q4) a) With the help of neat algorithm, explain the pass-II of an assembler. **[8]**

  b) Explain the forward referencing with suitable example. **[8]**

Q5) a) Name the various types of loaders and enlist the function of each in brief. **[8]**

b) What is Dynamic loader? Explain it in detail. **[8]**

OR

Q6) a) What are data bases that are required during the pass-I and pass-II of direct linking loader? **[8]**

b) What are different features of MS-DOS linker. **[8]**

SECTION - II

Q7) a) Explain in brief different operating system. **[10]**

b) Explain the scheduling algorithms. **[8]**
   i)   First-come, First-serve.
   ii) Priority scheduling.

OR

Q8) a) What is deadlocks? Explain it with suitable example. **[8]**

b) What is process synchronization? Explain how it is achieved. **[10]**

Q9) a) Explain the term paging. **[8]**

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

OR

Q10) a) Explain FAT 32 NFS system. **[8]**

b) Explain the term. **[8]**
   i)   Swapping.
   ii) Segmentation.

Q11) a) What are features of physical IOCS? **[8]**

b) Explain the single buffer and double buffer in case of I/O buffering. **[8]**

OR

Q12) a) What is disk scheduling? Explain different terms of disk scheduling. **[8]**

b) With help of algorithm explain device drivers for USB. **[8]**

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P1148   **[3564] - 209**

B.E. (E&TC)
AUDIO - VIDEO ENGINEERING
(404225) (2003 Course) (Elective - II)

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

Instructions to the candidates:

1) Answer three questions from Section - I and three questions from Section - II.

2) Answers to the two sections should be written in separate answer books.

3) Neat diagrams must be drawn wherever necessary.

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) Define Luminance, saturation and Hue.   **[6]**

b) Explain frequency interleaving technique.   **[4]**

c) Give construction and operation of LCD TV screen and TFT displays used for TV.   **[8]**

OR

Q2) a) Explain why bandwidth in CCIR-B standards is 5 MHz.   **[5]**

b) Explain construction & operation of Vidicon camera.   **[5]**

c) Draw neat sketch of composite video signal. Indicate numerical values for different timing for various pulses.   **[4]**

d) Explain construction & operation of any one colour picture tube.   **[4]**

Q3) a) With block diagram explain low level modulated TV transmitter.   **[8]**

b) Explain working of PAL Encoder with suitable block diagram.   **[8]**

OR

Q4) a) Explain in brief remote control system for Television receiver.   **[4]**

b) State importance of pattern generator in TV receiver alignments.   **[4]**

c) With block diagram explain NTSC receiver.   **[8]**

Q5) a) State advantages of digital television over analog television.   **[4]**

b) Explain in detail MAC technology.   **[8]**

c) Explain MPEG-2 video compression format.   **[4]**

P.T.O.

Q6) a) Explain DCT base image encoding for JPEG. **[8]**

b) Explain in detail digital TV receiver. **[8]**

SECTION - II

Q7) a) Discuss a live TV coverage plan for a cricket match. Clearly show camera placements at different locations and equipment set-up for Live broadcast. **[10]**

b) List out HDTV parameters. **[4]**

c) State different standards used for HDTV broadcast. **[4]**

OR

Q8) a) Explain 3D stereoscopic technique. **[6]**

b) With suitable block diagram explain CCTV system. State its applications. **[6]**

c) Explain the concept of video on demand in satellite television. **[6]**

Q9) a) With the help of block diagram explain CD recording and reproduction system. State specifications of CD. **[8]**

b) Compare the performance of magnetic tape recording with optical recording. **[8]**

OR

Q10) a) Explain MPEG Audio compression formats. **[8]**

b) Compare performance parameters of
VCD, DVD, HD-DVD, BD-DVD. **[8]**

Q11) a) Explain acoustical design of an auditorium. **[8]**

b) Explain with the help of block diagram satellite radio receiver. **[8]**

OR

Q12) a) Explain concept of reverberation and Echo. **[8]**

b) Write short notes on : **[8]**

i) Absorption co-efficient in acoustic design.

ii) Cordless microphone.

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P1334   **[3564]-208**

B.E. (E & T/C)

BIO MEDICAL ENGINEERING

(404218) (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)   Neat diagrams must be drawn wherever necessary.

4)   Figures to the right indicate full marks.

5)   Assume suitable data, if necessary.

SECTION - I

Q1) a) Explain different types of electrodes for measurement of bio-signals with their properties and the material used for the same.   **[10]**

   b) Why silver chloride electrode is popular in bio-signal measurement?

                                                                              [4]

   c) Define: Bio-electrode, Electrode offset voltage.   **[4]**

                              OR

Q2) a) Explain with reference to medical instrumentation.   **[10]**

   i)   Precision

   ii)   Accuracy

   iii)   Repeatability

   iv)   Roll over error

   v)   Linearity

   b) A 'PT100' Temperature sensor has temperature coefficient of 10 miliohms per degree centigrade. Calculate the difference resistance between temperatures 97°F to 104°F.   **[8]**

                                                                        P.T.O.

Q3) a) Discuss the problem of motion artifacts in bio-signals measurements.**[6]**

b) State the voltage range and frequency range for bio signals of ECG and EMG. Which electrodes are used for the measurement of the same signals? **[6]**

c) Write a typical application of strain gauge in Bio-medical measurements. **[6]**

OR

Q4) a) Explain electro conduction system of heart and resulting waveforms with typical timings and amplitudes. **[8]**

b) Explain Riva-Rocci method of B.P. measurement. **[8]**

c) Calculate systolic pressure for a patient having MAP=105 mm of Hg and diastolic pressure of 78 mm of Hg. **[2]**

Q5) a) Explain different disorders generated in smooth functioning of heart.**[6]**

b) Compare the use of pacemaker with defibrillator recommended to a patient. **[6]**

c) Calculate energy stored in 20 Farad Capacitor that is charged to 1200 Volts DC. **[2]**

OR

Q6) a) Define the Let go current and hold on current related to electric shock. Explain different safety measures to minimize shock hazards. **[8]**

b) When phono cardiography is used? Explain various microphones used in phono cardiography. **[6]**

SECTION - II

Q7) a) Explain 'Parade' mode of Non-Fed CRO. **[6]**

b) Draw and explain front panel diagram and various controls of a Mediscope. **[8]**

c) Which type of recorder is used in ECG Machine? **[4]**

Q8) a) What are typical counts of different cells in a human blood sample? **[4]**

b) How WBC's and RBC's are separated in a Blood Cell counter? **[8]**

c) What is principle of blood cell counting? **[6]**

Q9) a) Explain the principle of S_pO_2 measurement. **[8]**

b) Explain which instrument measures concentrations of Na & K in blood sample. Explain the working of instrument in detail. **[8]**

OR

Q10) a) What is an EEG? Explain various types of EEG electrodes. **[8]**

b) Draw and explain the block diagram of Electromyograph. **[8]**

Q11) a) What is an Ultrasound? Give the properties of Ultrasound that enable to use ultrasound in medical field. Discuss the Doppler effect of ultrasound used in imaging. **[8]**

b) What is diabetic retinopathy? How it is corrected by using LASER? **[8]**

OR

Q12) a) What is port wine stain? How it is treated with the help of LASER? **[8]**

b) Write short notes on:

i) Ximer Laser and its applications in medical field. **[4]**

ii) Autoanalyzer. **[4]**

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P1261   **[3564]-207**

B.E. (E&TC)

DIGITAL IMAGE PROCESSING

(2003 Course) (404225)

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

Instructions :

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)   What is connectivity between pixels? Explain 4 connectivity, 8 connectivity and mixed connectivity.   **[8]**

b)   What are the different statistical properties of an image? Explain briefly.**[8]**

OR

Q2) a)   What is a distance function? Explain different distance functions generally used in DIP.   **[8]**

b)   Explain, how sampling and quantization is used in an image? Also, explain uniform and non-uniform sampling.   **[8]**

Q3) a)   With reference to a 2D Transform, explain.   **[8]**
  i)   Basis images.
  ii)   Energy Compaction.
  iii)   Symmetry.
  iv)   Separability.

b)   What is the need to study color models in image processing? Compare RGB and HSI color models.   **[8]**

OR

Q4) a)   What is DFT and DCT? How DCT is used in Digital Image Processing?   **[8]**

b)   Explain RGB to HSI conversion. What is its need?   **[8]**

Q5) a)   Discuss various Pseudocoloring techniques used for Image Enhancement? Give its applications.   **[8]**

P.T.O.

b) Explain any one non-linear smoothing filter used in image processing. Compare nonlinear filter with the linear filter. **[8]**

c) What is Gray Level Resolution? Explain. **[2]**

OR

Q6) a) Explain following methods of Image Enhancement in spatial domain. **[8]**
   i) Contrast stretching.
   ii) Power law transformation.

b) What is Histogram Equalisation? Explain it with the help of algorithm. **[8]**

c) What is spatial Resolution? Explain. **[2]**

SECTION - II

Q7) a) Explain Huffman coding with suitable example. Give its application. **[8]**

b) Explain the following wrt image compression. **[8]**
   i) Entropy and Entropy coding methods.
   ii) Compression Ratio and compression ratio used in JPEG and MPEG compression standards.

OR

Q8) a) What is Data Redundancy? Explain the various Data Redundancies identified in an image. **[8]**

b) What is Lossy and Lossless compression methods? Compare these methods. **[8]**

Q9) a) What are the different masks used in Edge Detection? Explain. **[8]**

b) What is Hough Transform? Explain its application in detail. **[8]**

OR

Q10) a) Explain Local and Global Thresholding in Segmentation. **[8]**

b) Explain, Dilation and Erosion with reference to morphological image processing. **[8]**

Q11) a) Explain any one spatial filtering algorithm for Restoration of an image degraded by salt and pepper noise. **[9]**

b) What is classification and Recognition? Explain the algorithm for Character Recognition. **[9]**

OR

Q12) a) What is Remote Sensing? How Remote sensing of satellite image is achieved? Explain. **[9]**

b) Compare Image Restoration with image Enhancement. How Wiener filter is used for Image Restoration? Explain. **[9]**

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P1147   **[3564] - 206**

B.E. (E&TC)

ADVANCED COMMUNICATION SYSTEMS

(2003 Course) (Elective - II)

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 the significance of an "Optical Amplifier". Enumerate the properties and applications of optical amplifiers. **[10]**

     b)   Explain each of the following in brief. **[6]**

        i)   Coupling Ratio.

        ii)   Insertion Loss.

        iii)   Cross Talk.

<div align="center">OR</div>

Q2) a)   What is a "Wavelength Converter"? Explain. **[5]**

     b)   Describe an WDM system. **[5]**

     c)   Determine the limitations of transmission length caused by fiber loss for P in = 0.025 mW, P out = 0.004 mW and fiber attenuation "α" = 0.3 dB/km. On the basis of the above calculation, suggest the typical distance between two amplifiers. **[6]**

Q3) a)   List all the "Test Equipment" used in optical links. Explain the parameters that can be measured with these test equipment. Describe any one in detail. **[8]**

     b)   Write detailed notes on : **[8]**

        i)   Optical sensors.

        ii)   Single Hop and Multi-Hop Networks.

<div align="center">OR</div>

Q4) a) Describe with neat diagrams the different "Network Topologies" used in "Optical Networks". **[6]**

b) Explain in detail SONET / SDH. **[5]**

c) Write a note on "Optical Sensors". **[5]**

Q5) a) List the advantages of Geostationary satellites. **[5]**

b) Explain the affects of "Orbital Effects" on the performance of Satellite Communication System. **[8]**

c) Explain with a block schematic the digital optical fiber link. **[5]**

OR

Q6) a) What are the major subsystems required on a satellite? Explain. **[6]**

b) Compare LEO, MEO and GEO satellites. **[6]**

c) The earth subtends a beam width between half power points of the antenna pattern, with an angle of 19°, when viewed from geostationary orbit. Calculate the aperture dimension and gain of a horn antenna that will provide global coverage at 4.4 GHzs. Assume the aperture efficiency as 60%. **[6]**

SECTION - II

Q7) a) What is "Quantization"? Explain its types with neat diagrams. **[8]**

b) What is the use of "Pre-Emphasis" and "De-Emphasis" in FM. **[5]**

c) What is the significance of signal to Noise Ratio in a satellite communication system? **[3]**

OR

Q8) a) Compare the BPSK and QPSK systems. **[5]**

b) Write a note on Digital Television. **[5]**

c) A satellite transponder has a band width of 358.4 MHzs. The earth stations use RRC filters with $\alpha = 0.4$. What is the max bit rate that can be sent through this transponder with BPSK and QPSK? **[6]**

Q9) a) Explain the terms : **[12]**

i) C/N ratio.

ii) G/T ratio.

iii) Noise temperature and Noise figure.

iv) EIRP.

b) Calculate the Noise Temperature (T_S) of a 8 GHzs receiver, which has different gains and noise temperatures as given below. **[4]**

T_{in} = 50 k

T_{RF} = 50 k, G_{RF} = 23 db.

T_M = 500 k, G_M = 0 db

T_{IF} = 1000 k, G_{IF} = 30 db.

OR

*Q10)*a) Explain in detail the working of a double conversion superheterodyne earth station receiver. **[10]**

b) Explain the working of "Direct Broad Cast Satellite Television - [DBS-TV]". **[6]**

*Q11)*a) Explain the necessity of "Multiple Access Techniques". **[4]**

b) Explain the various Multiple Access Techniques used in satellite communication. **[6]**

c) Describe the benefits of spread spectrum system? Explain the two types of spreading. **[8]**

OR

*Q12)*a) With a neat schematic of a VSAT/WLL communication network explain how a GEO satellite is used to link a large number of VSATs. **[10]**

b) Explain the terms with respect to VSAT. **[8]**

   i)   Link Budget.

   ii) Free-space path loss.

   iii) Noise Band width.

   iv) Edge of coverage loss.

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P1146   **[3564] - 205**

B.E. (E&TC)

OPTICAL AND MICROWAVE COMMUNICATION

(404224) (2003 Course)

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

Instructions to the candidates:

1)   *Attempt 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 answer books.*

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 logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

SECTION - I

Q1) a)   Explain the three transmission windows along with the attenuation curve for single mode fiber.   **[8]**

   b)   If a multimode step index fiber having the core refractive index of 1.5, cladding refractive index of 1.38, core radius of 25 μm operates at a wavelength of 1300 nm. Calculate   **[8]**

   i)   Numerical aperture.

   ii)   Normalized frequency.

   iii)   Solid acceptance angle.

   iv)   Total no. of modes entering the fiber.

OR

Q2) a)   Draw the structure of p-i-n photodiode and explain its operation in brief. Plot the responsivity curve as a function of wavelength for p-i-n photodiode constructed of silicon.   **[6]**

   b)   Define and explain the following terms of fibers.   **[4]**

   i)   Index profile.

   ii)   Modes.

   c)   A given silicon APD has a quantum efficiency of 65% at a wavelength of 900 nm. Suppose 0.5 μW of optical power produces a multiplied photocurrent of 10 μA. Find multiplication factor.   **[6]**

Q3) a) List three major causes of attenuation in an optical fiber and explain their mechanisms. **[6]**

b) Write a note on OTDR (Optical Time Domain Reflectometer). **[4]**

c) Estimate the rms pulse broadening per km for the fiber when optical source used is an injection laser with a relative spectral width $6\lambda / \lambda$ of 0.0012 at a wavelength of 0.85 μm. **[6]**

OR

Q4) a) Define fiber splicing. Explain different types of splicing. **[6]**

b) For a 30 km long fiber attenuation 0.8 dB/km at 1300 nm. If a 200 μW power is launched into the fiber, find the output power. **[4]**

c) Explain material dispersion in brief with suitable sketch. **[6]**

Q5) a) Explain different possible applications of optical amplifier in practical fiber optic communication system. **[6]**

b) Components are chosen for a digital optical fiber link of overall length 7 km and operating at a 20 M bit/s using an RZ code. It is decided that an LED emitting at 0.85 μm with graded index fiber to a p-i-n photodiode is a suitable choice for the system components, giving no dispersion - equalization penalty. An LED which is capable of launching an average of 100 μW of optical power [including connector loss into a 50 μm core diameter graded index fiber is chosen]. The proposed fiber cable has an attenuation of 2.6 dB/km and requires splicing every km with a loss of 0.5 dB per splice. There is also a connector loss at the receiver of 1.5 dB. The receiver requires mean incident optical power of - 41 dBm in order to give the necessary BER of 10^{-10}, and it is predicted that a safety margin of 6 dB will be required. Write down the optical power budget for the system and hence determine its viability. **[8]**

c) Explain the concept of wavelength division multiplexing. **[4]**

OR

Q6) a) A 2 x 2 biconical tapered fiber coupler has an input optical power $P_0 = 300$ μW. The output powers at the three other ports are $P_1 = 150$ μW, $P_2 = 65$ μW & $P_3 = 8.3$ nW. Calculate the splitting ratio, excess loss, insertion loss and cross talk for this coupler. **[8]**

b) Write a short note on Phonic switching. **[6]**

c) Explain the convenient budget analysis for determining the dispersion limitation of an optical fiber link. **[4]**

Q7) a) Explain the operating principle of microwave isolator in detail. **[6]**

b) A section of transfer band waveguide with dimensions a = 2.286 cm and b = 1.016 cm has perfectly conducting walls and is filled with a lossy dielectric whose conductivity is 367.5 μ s/m and permittivity is 2.1 and permeability is 1.0. Find the attenuation factor of this waveguide in dB/m. For the dominant mode of propagation at a frequency of 9 GHz. **[6]**

c) Explain the following terms : **[4]**

   i) Cut off frequency.

   ii) Phase velocity.

OR

Q8) a) Define scattering matrix and state its properties for a reciprocal and lossless network. **[6]**

b) Discuss the power losses & power transmitted in a rectangular waveguide. **[6]**

c) Design a rectangular waveguide to propagate 10 GHz signal under dominant mode. **[4]**

Q9) a) Explain the high frequency limitations of conventional tubes. **[8]**

b) A two cavity klystron is operated at 10 GHz with V_0 = 1200V, I_0 = 30mA, d = 1 mm, L = 4 cm and R_{sh} = 40 kΩ. Neglecting beam loading, calculate :

   i) Input RF voltage, V_1 for a maximum output voltage.

   ii) Voltage gain.

   iii) Efficiency. **[8]**

c) What is the need of slow wave structure? **[2]**

OR

Q10) a) What do you mean by crossfield device? Explain the phase focussing effect in magnetron. **[8]**

b) Explain working of HTWT with the help of suitable diagram. **[6]**

c) A helical TWT has diameter of 2 mm with 50 turns per cm. Calculate -

   i) Axial phase velocity.

   ii) Anode voltage at which TWT can be operated for useful gain. **[4]**

*Q11)*a)	Explain different operating modes of Gunn diode. Explain LSA mode and give limitations of this mode.	**[8]**

b)	Explain the principle of working of tunnel diode in brief.	**[8]**

<center>OR</center>

*Q12)*Write short notes on the following microwave devices / systems including applications.	**[16]**

i)	PIN diode.

ii)	Microwave transistor.

iii)	Microstrip line.

iv)	Terrestrial microwave link [Any one application].

<center>✦✦✦✦</center>

P1145   **[3564] - 204**

B.E. (E&TC)
TELECOM. NETWORK & MANAGEMENT
(404223) (2003 Course)

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

Instructions to the candidates:

   1)   Answer 3 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)   Discuss major issues to be considered while designing communication Network.   **[8]**

   b)   Explain Network Devices and facilities provided in brief.   **[6]**

   c)   Compare centralized and distributed Networks.   **[4]**

OR

Q2) a)   Draw the structure of Network Design Tool and explain each block.**[6]**

   b)   Write short note on 'Data in support of Network Design'.   **[6]**

   c)   What are different approaches for Network Design? Explain in brief. **[6]**

Q3) a)   Enumerate the advantages of frame relay over traditional packet switching and x.25. Explain frame relay protocol architecture in detail and state various approaches for setting up frame relay connections.   **[6]**

   b)   Draw and explain 'ATM reference model'.   **[6]**

   c)   Write short note on SONET pointers.   **[4]**

OR

Q4) a)   Draw and explain STS-1 frame format.   **[8]**

   b)   What do you mean by frequency justification? What may cause negative frequency justification.   **[4]**

   c)   Explain channels used in ISDN.   **[4]**

Q5) a)   Answer in one sentence only.   **[6]**
   i)   What do you mean by leased line?
   ii)   What are the types of leased lines?
   iii)   How fast is a leased line?
   iv)   What is the lead time for a leased line?
   v)   Is a leased line suitable for heavy bandwidth use?
   vi)   What are the important criteria for selecting your ISP?

   b)   Explain WLL Technology in detail? Compare LMDS and MMDS. **[10]**

OR

Q6) a)   Write short notes on :   **[10]**
   i)   x DSL
   ii)   Cable modem.

   b)   What are the types of services offered by ISDN?   **[6]**

SECTION - II

Q7) a)   Explain the different design goals of typical routing algorithm. What are different routing metrics?   **[8]**

   b)   What are advantages and disadvantages of Adaptive routing and Explicit routing?   **[8]**

OR

Q8) a)   Explain flooding algorithm for routing packets.   **[8]**

   b)   Compare Link-state routing verses Distance-vector routing.   **[8]**

Q9) a)   Discuss performance analysis of communication Network.   **[8]**

   b)   What are security attacks? Explain the categorization of these attacks. **[8]**

OR

*Q10)*a)   Write short note on :   **[8]**
   i)   Network Survivability.
   ii)   Network Reliability.

   b)   What layer is responsible for providing QOS? How that layer provides QOS? Explain functioning of transport layer in general.   **[8]**

*Q11)*a) Draw and describe TNM Architectures.   **[10]**

   b) What are different security requirements.   **[4]**

   c) Discuss support environment for TNM Architecture.   **[4]**

<div align="center">OR</div>

*Q12)*a) What are the different management application functional areas? Explain each in brief.   **[10]**

   b) What is SNMP? What is the structure of SNMP managed Network?**[4]**

   c) What are the basic TNM objectives?   **[4]**

<div align="center">✦ ✦ ✦ ✦</div>

P1144   **[3564] - 203**
B.E. (E&TC)
ELECTRONIC MEASUREMENT SYSTEMS
(404222) (2003 Course)

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

Instructions to the candidates:

1) *Answer three questions from Section - I and three questions from Section - II.*

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, electronic non-programmable pocket calculator is allowed.*

6) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) What do you mean by static characteristics of measuring instruments? Explain them in brief. **[10]**

b) Write important specification of digital LCR-Q meter. **[6]**

OR

Q2) a) Draw block diagram of vector impedance meter. Explain each block & its operation. **[8]**

b) Explain following terms and give example of each with any instrument

i) Accuracy

ii) Precision

iii) Sensitivity

iv) Resolution. **[8]**

Q3) a) What is the need of regression analysis? Differentiate linear and multiple regression analysis. **[8]**

b) With the help of universal frequency counter explain following measurements **[9]**

i) Time

ii) Frequency

iii) Ratio.

OR

P.T.O.

Q4) a) Explain the method of statistical analysis for analytical determination of the uncertainty of the measurement. **[8]**

b) Explain calibration, calibration standards and traceability. **[9]**

Q5) a) Explain following w.r.t. CRO. **[9]**
   i) Zoom mode.
   ii) Roll mode.
   iii) Glitch mode.

b) Explain the technique of delayed sweep of CRO. When it is used? **[8]**

OR

Q6) a) What are the different parameters which effects deflection of the electron beam in CRO? Explain them in details. **[7]**

b) Write short notes on **[10]**
   i) Sampling oscilloscope.
   ii) Hall effect probe.

SECTION - II

Q7) a) How logic analyser is different than spectrum analyzer? **[6]**

b) Draw block diagram of **[10]**
   i) Heterodyning wave-analyzer.
   ii) Harmonic distortion analyzer.

OR

Q8) a) Compare Harmonic analyzer and distortion factor meter. **[8]**

b) Write different types of spectrum analysers. Explain general purpose spectrum analyser with the help of suitable block diagram. **[8]**

Q9) a) Write salient features of synthesized RF signal generator? **[5]**

b) Write short note on **[12]**
   i) SINAD sensitivity test setup.
   ii) Network analyzer.

OR

*Q10)*a) How scalar network analyzer is different than vector network analyser?   **[8]**

   b) Give experimental setup of sensitivity, selectivity & SNR measurement.**[9]**

*Q11)*Write short note on   **[17]**

   a) OTDR

   b) IEEE 488.

   c) Power scope.

                              OR

*Q12)*a) For a typical measurement draw & explain computer controlled test measurement.   **[8]**

   b) Write short note on   **[9]**

      i)   Lab view.

      ii) PCI / PCI express.

                         ✦ ✦ ✦ ✦

P1346   **[3564]-202**

B.E. (E & TC)
ROBOTICS & INDUSTRIAL AUTOMATION
(404218) (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 Q10, Q11 or Q12.*

     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)   *Use of electronic pocket calculator is allowed.*

SECTION - I

Q1) a)   Explain the following terms-   **[10]**

       i)   Payload.

       ii)   Work envelope.

       iii)   Degree of freedom.

       iv)   Resolution.

       v)   Repeatability.

     b)   Discuss typical specifications of a robot.   **[8]**

<div align="center">OR</div>

Q2) a)   Explain different types of robots based on the types of joints with the help of neat sketches.   **[10]**

     b)   Sketch the functional block diagram of a typical robot system & explain.   **[8]**

Q3) a)   Explain the method of obtaining the forword solution giving the set of equations.   **[8]**

     b)   What is inverse solution? Explain the direct approach.   **[8]**

<div align="center">OR</div>

Q4) a)   Explain the D-H algorithm.   **[8]**

     b)   What is T matrix? Explain in detail about its use.   **[8]**

Q5) a)   What is internal sensor & external sensor? Explain any one of them in detail.   **[8]**

     b)   What is the role of actuator in robot? Give its types. Explain any one of them in detail.   **[8]**

Q6) a) Discuss various types of grippers used in robotics. What is the meaning of the term end effector? **[8]**

b) Explain the Lift & Tray Technique for slip detection with the help of a neat diagram. **[8]**

SECTION - II

Q7) a) Draw the block diagram of Fuzzy Logic Controller & explain. **[8]**

b) Which types of motions are used in the motion planning of robotic manipulator? Explain in detail. **[10]**

OR

Q8) a) What is the meaning of trajectory and trajectory planning of a robot? Explain the term on - off trajectory. **[10]**

b) A robotic manipulator of RRR type is at position (40, 60, –40) degrees initially. It is required to reach the position (90, 0, 0) degrees. Assume that the joints have maximum acceleration / deaccelaration of (50, 100, 150) degrees / sec^2 and maximum velocities of (20, 40, 50) degrees / sec. Calculate the travel time for each joint using slew motion. **[8]**

Q9) a) Draw a sketch of robot vision system & explain. **[8]**

b) Discuss different segmentation algorithms used in robot vision system. **[8]**

OR

Q10) a) Explain the term Intelligent Sensor. How it is useful in robotics? **[8]**

b) Describe the object recognition technique in robotics. **[8]**

Q11) a) What is nanorobot? Discuss its applications. **[8]**

b) Discuss the functional relationship between the actuating element and the signal transduction unit of MEMS as microsensor & microactuator. **[8]**

OR

Q12) Write notes on- **[16]**

a) Nanorobots in Medical applications.

b) MEMS & Microsystems.

c) Robot Intelligence.

d) Task Planning.

P1207   **[3564]-197**

B.E. (E&Tc)
VLSI DESIGN (404217)
(2003 Course)

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

Instructions :

1)   Answer three questions from Section-I and three questions from Section-II.
2)   Answers to the two sections should be written in separate answer books.
3)   Neat diagrams must be drawn wherever necessary.
4)   Assume suitable data, if necessary.

SECTION - I

Q1) a)   Design, write VHDL code and test bench for realization of EX-NOR gate functionality using 2:1 multiplexer.   **[9]**

b)   Differentiate: **[9]**

   i)   Synchroneous reset Vs Asynchroneous reset.
   ii)   Signal Vs Variable.
   iii) Inertial delay Vs Transport delay.

<div align="center">OR</div>

Q2) a)   Write VHDL code and test bench to perform tabulate operation for mode M and output Y and Z, where A is 3-bit binary input data.   **[12]**

M	Function
0	$Y = A^2 + 16$
1	$Z = A * 03$

b)   Explain with example : (i) Delta delay (ii) Transport delay (iii) Inertial delay.   **[6]**

Q3) For following RTL shown in fig (3-a) design FSM and write VHDL code and test bench.   **[16]**

Fig (3-a)
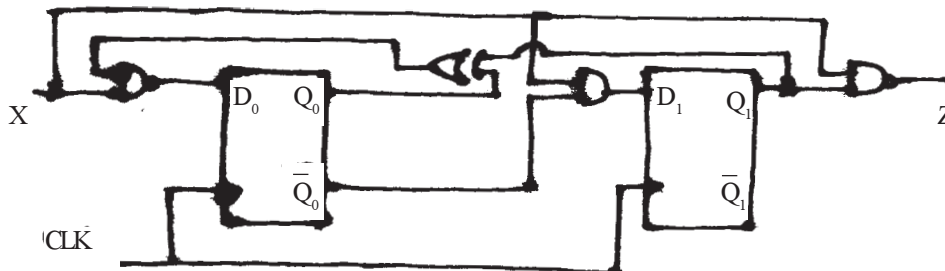
Q4) Draw FSM for   **[16]**

    a)   JK Flip Flop

    b)   SR Flip Flop

Write VHDL code for both FSM along with their test bench which will cover all conditions.

Q5) a)   Explain antifusable FPGA architecture?   **[8]**

    b)   Differentiate FPGA Vs ASIC.   **[8]**

Q6) a)   Explain selection criteria for FPGA design.   **[8]**

    b)   Explain with neat schematic generic CPLD architecture.   **[8]**

SECTION - II

Q7) a)   Draw neat schematic diagram for SRAM layout showing placement of SRAM cell, Row decoder, column decoder, read circuit. Write circuit and buffers.   **[9]**

    b)   Explain the term: **[9]**

        i)   Global routing.

        ii)   Switch box routing.

        iii)   Power distribution.

Q8) a)   Explain with waveform that how much clock skew between CLK1 and CLK2 can be tolerated in following circuit shown in fig (8-a) when (i) CLK1 delayed after CLK2

        (ii) CLK2 delayed after CLK1.   **[9]**

Fig. (8-a)

    b)   What are the problems in one phase clock? Explain the concept of two phase clock with example.   **[9]**

Q9) a)   Explain in detail static and dynamic pow dissipation. What are main components which make power dissipation in CMOS circuit?   **[8]**

    b)   Design CMOS logic gates for $Y = \overline{A}B + A\overline{B}$. Calculated area needed on chip.   **[8]**

<div align="center">OR</div>

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

      i)   Body effect.

      ii)   Transmission gate.

  b)   Why NAND is prefered over NOR? Why pull up are designed from PMOS and pull down network from NMOS?   **[8]**

*Q11)*a)   Differentiate: **[8]**

      i)   White Box Vs Black Box testing.

      ii)   Partial scan Vs Full scan.

  b)   What are objectives of boundary scan technique? Draw state diagram for TAP controller.   **[8]**

<div align="center">OR</div>

*Q12)*a)   Explain why model faults? Explain different fault model with schematics?

                                                                            [8]

  b)   Explain DFT in detail. How it can be categorized? Where it is useful?**[8]**

<div align="center">□□□</div>

P1252

[3564]-41

B.E. (E&TC)
MICROWAVE ENGINEERING
(1997 Course) (Elective-II)

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 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) What is a 'Smith Chart'? Explain the significance. State their properties.**[8]**

     b) Draw and explain the working of an E-H plane Tee. Explain why it is also called as Magic Tee. **[8]**

Q2) a) With the aid of a suitable diagram, explain the operation of a three port Circulator. List the necessity of using it in microwave bench. **[8]**

     b) List various types of attenuators. Explain any one of them in detail. **[8]**

Q3) a) Explain how a microwave bend works? What are the design factors in order to achieve necessary bends in the case of E-Plane and H-Plane? Draw neat diagram and explain. **[8]**

     b) What are the design parameters of a micro-strip antenna? List their advantages over the conventional antennas. **[8]**

Q4) a) What are the limitations of the microwave tubes over the conventional tubes? Compare the O-type tubes with M-Type tubes. **[8]**

     b) What is a Directional Coupler? Explain any two of its applications in detail. **[8]**

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

    a)   Microwave amplifier.

    b)   Half wave dipole antenna.

    c)   Cavity Resonator.

    d)   Parametric amplifier.

    e)   Isolator & Circulator.

SECTION - II

Q6) a)   Compare : MASER Vs LASER. **[8]**

    b)   Draw the functional diagram of a typical Microwave communication system used as repeater and explain its working. **[8]**

Q7) a)   Explain the basic functions of search radars and tracking radars. Discuss the various scanning and tracking methods. **[8]**

    b)   Write notes on 'Doppler effect' and 'Blind Speeds' in Radar. **[8]**

Q8) a)   By means of construction details and Applegate diagram, explain the operation of a Two Cavity Klystron Amplifier. Elaborate its applications. **[8]**

    b)   Explain the operation of a 'Varactor diode'. Discuss the constructional details, equivalent circuit and figure of merit. Mention its applications.**[8]**

Q9) a)   What are Tunnel diodes? Explain the construction, performance characteristics and applications. **[8]**

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

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

    a)   Horn Antenna.

    b)   Applications of Radars.

    c)   Microwaves in Astronomy.

    d)   Microwave Antennae.

    e)   Reflex Klystron.

□□□

P1271

[3564]-39

B.E. (E&TC)

FIBER OPTIC COMMUNICATION (404191)

(1997 Course) (Elective-II)

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

Instructions :

  1) *Answer any <u>Three</u> 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) *Assume suitable data, if necessary.*

<u>SECTION - I</u>

Q1) Answer the following : (Any 4)   **[16]**

  a) State the advantages of fiber optic communication over other communication techniques.

  b) Define index profile and explain the various types of index profile fibers.

  c) State the requirements of optical sources and detectors used for optical fibers.

  d) What is dispersion? Explain the various types of dispersions that occur in optical fibers.

  e) Explain the various modes of propagation of EM waves.

Q2) a) The NA for a fiber is 0.352. The fiber has a core diameter of 50 μm and is used at a wavelength of 800 nm. Determine the (i) V-number and (ii) the number of modes supported by the fiber with step index profile (iii) If the fiber is a graded index fiber with $\alpha = 2$ and NA(0) = 0.352, determine the number of modes supported by this fiber. (iv) Comment on the results.   **[8]**

  b) Solve :   **[8]**

  i)   Calculate the Fresnel loss at each glass-air interface where $n_1 = 1.45$ and $n_2 = 1.0$.

  ii) An LED with fiber pigtail of diameter 62.5 μm couples optical power into a 50 μm GI core.

  Calculate the coupling loss.

Q3) a) Calculate the allowed misalignment for a MMSI fiber, if each type of error is allowed to contribute 0.25 dB of loss. The fiber has a core radius of 50 μm and NA = 0.24. **[8]**

b) Explain the various types of losses in optical fibers. Also show with a neat diagram, the various loss mechanisms, graphically, that contribute to the overall fiber alternation. **[8]**

Q4) a) Explain the term modulation in fiber optic system. State the various modulation techniques in fiber optic systems. Explain one of the modulation technique. **[8]**

b) "Laser diodes provide more problems to the circuit designers." What are these problems? How do they affect the operation? **[8]**

Q5) a) A photo detector has a load resistor of 50 Ω and the optical power absorbed by the detector is 1 μw. The detector has a quantum efficiency of 1% at the operating wavelength of 800 nm. Calculate the voltage across the load and the detected current. **[8]**

b) Calculate the received optical power, the detected signal power and current, the thermal noise, shot noise and the SNR from the following data:

The system is having an LED of 12 mw (emitted power) at 850 nm, a fiber cable of 20 dB of loss and a PIN photo detector of responsivity of 0.45 A/W. The dark current is 2 nA. The load resistance is 50 Ω, the bandwidth of the receiver is 10 MHz and the system temperature is 27°C. In addition to the fiber attenuation, other system losses are 14 dB power reduction due to source coupling together with 10 dB loss due to splices and connectors. **[10]**

SECTION - II

Q6) a) An optical fiber has following data: **[8]**

Core radius: 25 μm; n_1 = 1.48; Δ = 0.01 and is operating at λ = 1320 nm.

i) Calculate the value of V and the number of modes that propagate in the fiber.

ii) What percent of optical power flows in the core and cladding?

iii) If Δ is modified to a new value $Δ_1$ = 0.003, how many modes will the fiber support and what fraction of the optical power flows in the core and cladding?

iv) Comment on the results.

b) Estimate the critical radius of curvature at which large bending losses occur in the SM fiber with following data: **[8]**

Core diameter 8 μm; n_1 = 1.5; Δ = 0.3% and operating at 1550 nm.

Q7) a) Explain with the help of a flowchart the design procedure for a fiber optic receiver. **[8]**

b) Explain with neat diagram WDM technique. Explain its need, requirements and applications. **[8]**

Q8) a) Explain the various methods used for the measurement of attenuation of fiber. State merits and demerits of each of these methods. **[8]**

b) What is coherent optical fiber communication? Explain the principle of coherent detection. Compare coherent and direct detection performance. **[8]**

Q9) a) Explain EDFA architecture with neat diagram / diagrams. **[8]**

b) An EDFA power amplifier produces Ps, out = 27 dBm for an input level of 2 dBm at 1542 nm. **[8]**
   i) Find the amplifier gain.
   ii) What is the minimum pump power required?

Q10) a) What are Integrated optic fiber communication systems? State the advantages of integrated optics and their applications. **[8]**

b) The fiber optic communication link with two connectors and five splices in the link has following setup characteristics: **[10]**
   - Power transmitted is 0 dBm.
   - APD sensitivity is - 57 dBm.
   - Port losses at transmitter and receiver 6 dB each.
   - Connector losses : 1 dB each.
   - Splice losses : 0.5 dB each
   - Fiber loss coefficient is 2 dB/km.
   - Safety margin to be provided is 6 dB.
   - Fiber Dispersion is $\Delta t = 0.505$ ns/km.
   - Maximum bit rate for given error rate, B = 35 M bits/sec.
   Determine :
   i) Loss limited fiber length.
   ii) Maximum bandwidth for loss limited length.
   iii) Dispersion limited fiber length.
   iv) Comment on the result.

□□□

P1326   **[3564]-36**

B.E. (Electronics and Telecommunications/Electronics)
INFORMATION TECHNOLOGY
(1997 Course) (Elective - I)

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

Instructions to the candidates :

1) *Answers 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) What are the different design metrics used in embedded system design?**[8]**

b) Explain in detail different application areas of Embedded System. **[10]**

Q2) a) What is real time operating system (RTOS)? Distinguish between RTOS and desktop operating systems like windows. **[8]**

b) Define interrupt latency. What are the different ways to reduce interrupt latency. **[8]**

Q3) a) With suitable diagram, explain working of an internal modem. **[8]**

b) What are the different modem commands? **[8]**

Q4) a) Draw and explain software architecture of an embedded systems. **[8]**

b) What is scheduler? Explain in brief different scheduling mechanisms?**[8]**

Q5) a) Draw block diagram and explain CD ROM electronics. **[8]**

b) What is share data problem? Explain share data problem with suitable example. **[8]**

SECTION - II

Q6) a) Compare wired and wireless transmission media used in networking?**[8]**

b) Draw and explain TCP/IP model. **[10]**

Q7) a) Draw the block diagram and explain the functions of each block of Ethernet card. **[8]**

b) Explain .WAV file format. **[8]**

Q8) a) Along with important features list different graphic file formats. **[8]**

b) Calculate the file size of audio file when recorded with stereo, 8 kHz sampling rate for 1 minute. What will be the file size if saved with .WAV extension? **[8]**

Q9) a) Compare different DSL techniques. **[8]**

b) Calculate the size of BMP file if the image is color, 8 bits / pixel and having 1024 x 1024 pixels height and width. **[8]**

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

   a) SNMP.
   b) Semaphores.
   c) Message mailboxes and queues.
   d) Satellite networks.
   e) Memory management in RTOS.
   f) Multimedia Applications.

P1280 **[3564]-34**

B.E. (E & T/C)
VLSI DESIGN (Elective - I)
(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) a) Certain CMOS logic fetches average current of $1\mu A$ from supply of 3.3 volt. Capacitive load is 100 pF. Compute total dissipation if logic switches at 10 MHz. **[8]**

b) Derive the expression for Power Delay Product. What is its significance? **[8]**

Q2) a) Design CMOS logic for $F = AB + CDE$. Compute area on chip. **[8]**

b) What are the parameters involved in computing delay of CMOS logic? Explain in brief. **[8]**

Q3) Draw FSM state diagram and write VHDL code for divide by 5 counter. Also write test bench. **[16]**

Q4) a) What do you meant by synthesis? Explain synthesis process in detail.**[8]**

b) List advance tools used for synthesis & simulations. **[8]**

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

a) Synthesizable statements.

b) Moore & Mealy m/c.

c) Noise margin.

d) Architecture modelling techniques.

e) Attributes in VHDL.

SECTION - II

Q6) a) Write synthesizable VHDL code for one bit I/O buffer/latch. **[8]**

b) What are the rules in component instantiation? Explain with examples.**[8]**

Q7) a) What is multivalued logic? Explain in detail. **[8]**

b) Write VHDL code for D flipflop. How will you take care of set up & hold times? **[8]**

Q8) a) What is postponed process? Write VHDL code for suitable logic which involves postponed process? **[8]**

b) Explain any two synthesizable attributes in VHDL. **[8]**

Q9) Draw the architecture of CPLD in detail. Explore macrocell & interconnects.**[16]**

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

a) Design validation.

b) Synchronous & Asynchronous designs.

c) Mapping & Translation.

d) PLA.

e) Concurrent statements.

P1325

[3564]-33
B.E. (E&TC)
SYSTEM PROGRAMMING
(1997 Course) (Elective - I)

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 books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) What is system Software? Explain various component of system software in brief. **[8]**

b) Explain term stack and queue? State their Application in system programming. **[8]**

Q2) a) Explain how the following issues are tackled in a two pass assembler. **[8]**
i) Forward reference ii) Literals.

b) What are the different types of assembly language statements. Explain following assembler directives with examples. **[10]**
i) LTORG ii) ORIGIN iii) EQU iv) DS.

Q3) a) Given a program for hypothetical macro-assembler. Show the contents of MNT, MDT, Intermediate file and output file. **[8]**

       START
       AR 3,3
       MACRO Add a, b
       A 1, sa1
       A 2, sa2
       MEND
       SR 3,3
       Add D1, D2
       SR 2,2
       Add D2, D1
   D1 DC F'5'
   D2 DC F'10'
       END

b) Define and explain Nested Macro Expansion with example. **[8]**

P.T.O.

Q4) Compare the following :   **[16]**
  a)   Macro and Function
  b)   Phase and Pass
  c)   Compiler and Interpreter
  d)   Relocating loader and Direct Linking loader.

Q5) Define and explain following terms with suitable examples :   **[16]**
  a)   Expression tree
  b)   NFA and DFA
  c)   Infix to prefix conversion
  d)   Back patching.

SECTION - II

Q6) a)   What is the role of loader in language processing system? State the different types of loader. Explain absolute loader with merits and demerits.   **[8]**

  b)   Explain in detail the Direct linking loader.   **[8]**

Q7) a)   Explain various phases of the compiler with neat block diagram.   **[8]**

  b)   State the different kind of Intermediate code representation. Explain three address code for quadruple and triple with example.   **[8]**

Q8) a)   Define Operating System. Explain various functions of the Operating System.   **[8]**

  b)   Draw and explain the block diagram of Editor.   **[8]**

Q9) a)   Define DLL. Explain the need of DLL. State the advantages and disadvantages of DLL.   **[8]**

  b)   What is program relocation? How do you perform relocation.   **[8]**

Q10) Write short notes on any three.   **[18]**
  a)   Error listing by various phases of the compiler.
  b)   Linked list and their application.
  c)   Debugger.
  d)   Machine independent code Optimization.

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