

[Total No. of Questions: 12]

[Total No. of Printed Pages: 4]

UNIVERSITY OF PUNE

[4364]-146

B. E. (E & TC) Examination - 2013

Advanced Power Electronics (2003 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instructions:

- 1 *Answer 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 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

- | | | | |
|-----|---|--|----|
| Q.1 | A | Explain single phase dual converter with respect to its circuit diagram, operation and necessary waveforms. | 10 |
| | B | Draw and explain the necessity of static and dynamic equalizing circuit for series connected SCRs. Derive relations used for determining the values of shunt resistor R and capacitor C in this circuit. | 8 |

OR

- | | | | |
|-----|---|---|----|
| Q.2 | A | A three phase full converter is feeding a load having continuous and ripple free current. Draw the circuit diagram and waveforms for the following if firing angle is $\pi/3$. | 10 |
|-----|---|---|----|

- i) Phase voltage

		ii) Load voltage	
		iii) Load current	
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 waveform across.	8
		i) Each converter.	
		ii) Load	
		iii) Reactor.	
Q. 3	A	With the help of 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	With the help of circuit diagram explain the circuit of boost inverter circuit with analysis.	8
OR			
Q. 4	A	Explain need of voltage control and harmonic reductions in inverters. State the advantages and disadvantages of a voltage control scheme.	8
	B	State the operating principle of CSI. Explain the operation of single phase capacitor commutated CSI with necessary waveforms.	8
Q. 5	A	With the help of neat circuit diagram and associated waveforms, explain the operation of class E resonant inverters.	8
	B	Compare linear, switched mode and Resonant converters.	8
OR			
Q. 6	A	Explain operation of ZVS converter with the help of neat diagram and waveform for inductor current and capacitor voltage.	8
	B	What are different types of power improvement techniques? Explain with circuit diagram and waveforms working of SAC technique.	8
SECTION II			
Q. 7	A	What are the effects of discontinuous armature for DC motor drive.	6

- B The speed of separately excited DC motor is controlled by 1 Φ full converter. The field current is controlled by a full converter and field current is set to the maximum possible value. The ac supply voltage is 1- Φ , 230V, 50 Hz, the armature resistance $R_a=0.50\Omega$, field resistance $R_f=345 \Omega$, voltage constant is 0.7 V/A rad/sec. If the delay angle of armature converter is 45° and armature current is 55 A. determine 10
- i) Torque developed.
 - ii) The speed
 - iii) Supply Power factor.
- Assume the armature and field current to be continuous and ripple free.
- OR**
- Q. 8 A Draw and explain the power circuit of semiconverter feeding a separately excited DC motor. Explain with typical voltage and current waveforms, the operation in both continuous armature current and discontinuous armature current mode. 10
- B Compare AC and DC servomotor with reference to 6
- i) Power ii) Operation iii) Efficiency
 - iv) Stability and v) Maintenance
- Q. 9 A What are ac drives? Explain with principle and operation, working of 1 Φ speed control techniques of induction motor. Comment on T_q -speed characteristics. 10
- B Explain with neat diagram the operation of scherbius system. State what for it is used and its advantages. 8
- OR**
- Q. 10 A With the help of a circuit diagram and relevant waveforms, explain the operation of a 3 Φ full-wave brushless DC motor drive. 10
- B Explain the following speed control methods for an induction motor. 8
- i) Stator voltage control ii) Rotor resistance control
- Q. 11 A What is the need of energy audit? Explain in brief. 8

B Explain terms voltage sag and voltage swell. Explain the sources which cause the sag and swell. 8

OR

Q. 12 A What are the different types of parameters that decide the quality of power? 8

B What is power quality? Why it is required? Explain different types of power line disturbances 8

[Total No. of Questions: 12]

[Total No. of Printed Pages: 3]

UNIVERSITY OF PUNE

[4364]-147

B. E. (E & TC) Examination - 2013

Advance Digital Signal Processing (2008 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instructions:

- 1 Answer 3 questions from Section I and 3 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 Black figures to the right indicate full marks.
- 5 Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
- 7 Assume suitable data, if necessary.

SECTION - I

- | | | | |
|-----------|---|--|----|
| Q.1 | A | Explain the need of filtering in decimation and interpolation operation | 8 |
| | B | A signal $x(n)$ at a sampling frequency of 2.048 kHz is to be decimated by a factor of 32 to yield a signal at a sampling frequency of 64Hz. The signal band of interest extends from 0 to 30Hz. The anti aliasing digital filter should satisfy the following specifications.
Passband deviation : 0.01 db
Stopband deviation : 80 db
Passband : 0-30 Hz.
Stopband : >32 Hz.
Design a suitable three stage decimator | 10 |
| OR | | | |
| Q.2 | A | Explain sampling rate conversion by a non-integer factor | 8 |
| | B | With the help of suitable example, explain the interpolation process, using polyphase filter structure | 10 |
| Q.3 | A | What is an adaptive filter, and explain its need in digital signal processing. How, adaptive filter can be used for noise cancellation? | 8 |
| | B | Derive the basic LMS algorithm from Wiener filter and write the algorithm. | 8 |
| OR | | | |
| Q.4 | A | How adaptive filter is used to cancel echos in long distance telephony? | 8 |
| | B | Explain, how system identification can be done with the help of adaptive filter | 8 |
| Q.5 | A | Define (i) AR Process (ii) MA Process (iii) ARMA Process. | 6 |

B Explain what do you understand by homomorphic processing of speech signal 8

B.E. (E & TC)
Examination - 2013
(2003 Pattern)
Electronic Product Design

Total No. of Questions : 12
[Time : 3 Hours]

[Total No. of Printed Pages :3]
[Max. Marks : 100]

Instructions :

- (1) *Answer 03 question from each section.*
 - (2) *Answers to the two sections should be written in separate answer-books.*
 - (3) *Figures to the right indicate full marks.*
 - (4) *Use of Electronic packet calculator is allowed.*
 - (5) *Neat diagrams must be drawn whenever necessary.*
 - (6) *Assume suitable data, if necessary.*
 - (7) *Attempt not more than six question of which at least three question must be from each section.*
-

Section I

- Q1. (a) With the help of block schematic explain in brief the 'concept of product development. (08)
- (b) Draw bathtub curve indicating all its regions and explain significance of each region. (06)
- (c) Classify electronic product on the basis of temperature range, reliability and cost. (04)

OR

- Q2. (a) What are product requirements? Explain with appropriate examples. (08)
- (b) In context with reliability of an electronic product explain the following terms: i) MTTF ii) MTBF iii) MTTR (06)
- (c) What is the need of Decoupling capacitor in digital circuits? Where it should be placed? (04)

- Q3. (a) Draw a sketch of front panel of a laboratory function generator and explain how ergonomic and aesthetic design considerations are taken care of the same?(08)
- (b) For 35 micron copper clad laminate, what will be the value of resistance of 1mm side and 20cm long track (Assume resistivity of copper is 1.724×10^{-6} ohm-

cm). For the same clad of copper, what will be the inductance of 20cm long track on PCB having width 0.7mm. (08)

OR

Q4. (a) Explain the mechanism of generation and prevention methods for the following phenomena in High-speed PCB designs:

i) Cross-talk ii) Reflections. (08)

(b) Estimate the parasitic capacitance of two 0.15cm wide tracks on opposite face of double sided PCB each with a track length of 14cm. The thickness of PCB laminate is 1.6mm and relative permittivity is 4.2. (08)

Q5. (a) What are the important precautions specially to be taken for Analog Circuit and Digital circuit PCB Design? Explain with proper examples. (08)

(b) What is 'Signal Integrity'? What are the issue to be considered while ensuring signal signal integrity in high-speed design? (08)

OR

Q6. (a) What is Bare board testing? Explain in brief the commonly used method of bare board testing. (08)

(b) Explain the use and limitations of the following:

i) operating point Analysis

ii) AC Analysis. (08)

Section II

Q7. (a) With the help of real life microprocessor based product justify how all the recommended steps in a software development are implemented. (10)

(b) List various chips packages. Also explain with proper example the function of Heat Sink. (08)

OR

Q8. (a) Explain the different stages in software development at which bugs may enter. List the common bugs and how to overcome these bugs. (10)

(b) Write short notes on:

i) wave soldering ii) Assemblers (08)

Q9.(a) What is CE marking? What is the need of CE Marking? What are the different objectives of CE Marking? (08)

(b) In context of Digital Storage Oscilloscope (DSO), Explain the significance

of the following specifications:

- i) memory depth ii) sampling rate iii) type of sampling rate iv) band width(08)

OR

Q10. (a) Explain different temperature tests that should be carried out on an industrial process Controller. Indicate different parameters associated with these tests. (08)

(b) Specify with justification of choice of environment tests to be carried out on the following products:

- i) CNC Machine ii) Vacuum cleaner. (08)

Q11. (a) Explain the importance of shielded room when EMI /EMC tests are conducted. (08)

(b) write short notes on:

- i) In-circuit Emulator ii) Modular Programming. (08)

OR

Q12. (a) List various PCB documents. Explain one in brief with suitable example (08)

(b) In product documentation, explain the importance and typical contents of following documents/ drawings.

- i) Bill of Material ii) Interconnection diagram. (08)

UNIVERSITY OF PUNE
[4364]-144
B. E. (E&TC) Examination 2013
VLSI DESIGN
(2003 Course)

[Total No. of Questions:12]
[Time : 3 Hours]

[Total No. of Printed pages :2]
[Max. Marks : 100]

Instructions :

- (1) *Answers any 3 questions from each section*
 - (2) *Answers to the two Sections should be written in separate answer-books*
 - (3) *Neat diagram 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

- Q.1 a) Explain VLSI design flow in detail. [8]
b) Explain various types of modeling techniques used in VHDL along with its example. [8]

OR

- Q.2 a) What do you mean by synthesizable and non synthesizable statement? [8]
Give example of synthesizable statement and draw the hardware inferred?
b) Differentiate between functions and procedures. [4]
c) Differentiate between signal and variable. [4]
- Q.3 a) Write a VHDL code for Moore machine which detects the sequence 1010. [8]
b) Differentiate between Mealy and Moore machine model. [8]

OR

- Q.4 a) Draw FSM and write code for JK flip flop. [8]
b) What is metastability? What are the solutions to avoid? [8]
- Q.5 a) Differentiate between FPGA and CPLD. [8]
b) Draw and explain architecture of FPGA. Explore configurable logic block and I/O block. [10]

OR

- Q.6 a) Compare SRAM and Antifuse FPGA [4]
 b) What is the difference between logic implemented in CPLD and FPGA. [8]
 c) What do you mean by .jed, .edif, .sdf, .xnf, .ucf, .vhd. [6]

SECTION II

- Q.7 a) What is the need of clock distribution networks? Explain in detail [9]
 clock distribution networks.
 b) Write a note on Power distribution and Power optimization. [9]

OR

- Q.8 a) Explain clock skew and clock jitter. [9]
 b) Explain the importance of integrity and EMI immune chip design? [9]

- Q.9 a) Design CMOS logic for $Y = \overline{(W + XY)(Z + U)}$ [8]
 b) A CMOS circuit consumes 40 mw when idle and 410 mw when operated [8]
 AT $F=1$ MH z and and $V_{cc} = 5V$.
 i) How much power does it use at $f=500$ KHz and $V_{cc} = 5V$?
 ii) How much power dose it use at $f=100$ KHz and $V_{cc} = 1V$?

OR

- Q.10 a) Why should V_T of MOSFET be minimized? What are the methods to [8]
 minimize V_T ?
 b) Explain static, dynamic and short circuit power dissipation in CMOS? [8]
- Q.11 a) What is boundary scan? Explain with the help of block diagram. [8]
 b) What is controllability and observability? [8]

OR

- Q.12 a) What is JTAG? [4]
 b) What is design for testability (DFT)? [4]
 c) What are the different faults? Explain in detail. [8]

UNIVERSITY OF PUNE
[4364]-141
B. E.(Electronics & Telecomm.)Examination - 2013
COMPUTER NETWORK
(2003 Pattern)

[Total No. of Questions:]
[Time : 3 Hours]

[Total No. of Printed Pages :2]
[Max. Marks : 100]

Instructions :

- (1) *Ans any 3 question from each question from each section*
 - (2) *Answer 3 question from section I and 3 question 3 from section II*
 - (3) *Answers to the **two sections** should be written in **separate answer-books**.*
 - (4) *All question carry equal marks*
 - (5) *Black figures to the right indicate full marks.*
 - (6) *Neat diagrams must be drawn wherever necessary.*
 - (7) *Use of logarithmic tables, slide rule, Mollier charts, electronics pocket calculator is allowed.*
 - (8) *Assume suitable data, if necessary.*
 - (9) *Your answers will be valued as a whole.*
-

SECTION-I

- Q1 a) Draw OSI reference model & explain the design issues. [8]
b) Explain the headers added of various layers of OSI [8]

OR

- Q2 a) State and explain the advantages & disadvantages of various network [8]
Topologies.
b) Compare various transmission Media used for computer network [8]
Q3 a) Compare circuit, message & packet switching [8]
b) What do you mean by cable TV? How it can be used for data [8]
communication. Explain

OR

- Q4 a) Compare TDM, FDM, SDM & WDM. [8]
b) Compare MEO & GEO [8]

UNIVERSITY OF PUNE

[4364-145]

B.E.(E & TC) Examination 2013

EMBEDDED SYSTEM DESIGN

(2003 Course)

Elective (404218)

Time-Three hours

Maximum Marks-100

[Total No. of Question=12]

[Total no. of printed pages= 3]

Instructions:

- (1) Answer three questions from section-I and three questions from section-II .
 - (2) Answer to the TWO sections should be written in separate answer books
 - (3) Neat diagrams must be drawn whenever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume Suitable data if Necessary.
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-

SECTION-I

Q.1 (a) What is Design Metric. Explain the following Design Metric.

- | | |
|--------------|----------------------|
| (i) Power | (ii) Maintainability |
| (iii) Safety | (iv) NRE Cost |

What is market window and why it is so important for products to reach the market early in this window? (10)

(b) Explain the following communication protocols and compare them, (8)

- (i) Bluetooth
- (ii) IrDA

OR

Q.2 (a) Explain physical layer and data link layer of CAN and MODBUS communication. Also compare them. (10)

(b) Explain IEEE 802.11 and compare with GPRS. (8)

Q.3 (a) Why RISC is most preferred choice in embedded system? (8)

(b) What are Network processors? Explain the use of Network in embedded system. (8)

OR

Q.4 (a) Explain in detail Hardware & Software architecture in embedded system. (8)

(b) Explain how shared data problem when interrupt service routine is executed? Explain how this can be avoided. (8)

Q.5 (a) Explain in detail difference between Task, Process & Thread. (8)

(b) What is semaphore? Why multiple semaphores to be used more carefully? (8)

OR

Q.6 (a) Explain the different tools for the development of embedded system? (8)

(b) Explain in details the device driver for μ C/OS-II. (8)

SECTION-II

Q.7 (a) What are different scheduling algorithms used in general? Explain basic scheduling policy of RTOS. (8)

(b) Differentiate General purpose OS (GPOS) and RTOS with reference to following. (8)

(i) Timing Services

(ii) Memory Management

(iii) Task Management

(iv) Inter-task communication

OR

Q.8 (a) Explain following inter process communication primitives. (8)

(i) Message Queue

(ii)Mailbox

(iii)Pipes

(iv)Events

(b)Explain the features of RT Linux and difference as compare to Vxworks. (8)

Q.9 (a)Describe the activities to be performed in each phase of embedded system development. (8)

(b)What are the features of μ COS?List any four services offered by μ COS? (8)

OR

Q.10 (a)Explain the following function of μ COS-II. (8)

(i)OSENTER_CRITICAL()

(ii)OS Init()

(iii)OS IntEnter()

(iv)OS MBOX Post()

(b)What are the basic approaches of RTOS?Explain in Brief? (8)

Q.11 (a)With respect to block diagram ,memory,processor,explain smart card design. (9)

(b)Explain with neat diagram of an Adaptive Cruise Control system in car. (9)

OR

Q.12 With respect to block diagram,processor memory,inter processor communication,algorithms and software architecture explain design of digital camera. (18)

UNIVERSITY OF PUNE

[4364]-148

B. E. (E & TC) Examination - 2013
ARTIFICIAL NEURAL NETWORKS
(2003 Pattern)

[Time : 3 Hours]

[Max. Marks : 100]

[Total No. of Questions : 12]

[Total No. of Printed Pages :2]

Instructions :

- (1) Answer **any three** questions from each section.
- (2) Answers three questions from **Sections I** and three questions from **Section II**.
- (3) Answers to the **two sections** should be written in **separate answer-books**.
- (4) Neat diagrams must be drawn wherever necessary.
- (5) Black figures to the right indicate full marks.

SECTION I

- Q1) a) Describe some attractive features of biological neural network that make it superior to the most sophisticated Artificial Intelligence computer system for pattern recognition. [6]
b) What is meant by topology of artificial neural networks? Give some basic topological structure of ANN? [4]
c) Explain the difference between short term memory and long term memory with reference to dynamics model. [6]
- OR**
- Q2) a) What is noise – saturation dilemma in activation dynamics? [6]
b) State few activation function which are used in signal layer and multilayer net to calculate the output. [4]
c) Explain the distinction between stability and convergence? [6]
- Q3) a) Draw the architecture of adaline net? Explain the training algorithm of an adeline net? [8]
b) Why a single layer of perceptron cannot be used linearly inseparable problem? Give two example of linearly inseparable problem? [8]
- OR**
- Q4) a) Explain how a pattern classification problem leads to radial basis function network. [8]
b) What is modular architecture in neural network? How modular architecture useful for classification of large number of CV segment. [8]

- Q5) a) How to perform following tasks by Boltzmann machine [8]
 i) Pattern completion
 ii) Pattern association
 b) What is meant by capacity of a stochastic neural network? How does it vary for different temperature? [8]

OR

- Q6) a) What is the Hopfield model of neural network? Explain difference between discrete and continuous Hopfield models in terms of energy landscape and stable states. [8]
 b) Distinguish between auto association, pattern storage and pattern environment storage task. Give example of each task. [8]

SECTION II

- Q7) a) What is a self- organization network? What are salient features of the Kohonen's self-organizing algorithm? [8]
 b) What are three competitive learning laws? Explain. [8]

OR

- Q8) a) What is principle component analysis of Hebbian learning? Explain [8]
 b) What is temporal associative memory? What are its limitations in recalling a sequence of temporal patterns? [8]

- Q9) a) Explain the principle of neocognitron for pattern variability task? [8]
 b) What is an associate memory? What are requirements of an associate memory? [8]

OR

- Q10) a) How neural network can be used in the problem of hand written digit recognition. [8]
 b) Explain the step in the solution of general optimization problem by a neural n/w. [8]

- Q11) a) Explain the architecture of Hamming network. Give the steps used to find out hamming distance using Hamming network. [6]
 b) Explain the difficulties in the solution of travelling salesman problem by a feedback neural network [8]
 c) What are some recent trends in neural networks? [4]

OR

- Q12) Write short notes on (any three) [18]
 i) Simulated annealing
 ii) models of neuron
 iii) Application of ANN in decision making
 iv) ART

UNIVERSITY OF PUNE

[4364]-149

B. E. (E & TC) Examination - 2013

ROBOTICS & INDUSTRIAL
AUTOMATION
(2003 Pattern)

[Time : 3 Hours]

[Max. Marks : 100]

[Total No. of Questions : 12]

[Total No. of Printed Pages :2]

Instructions :

- (1) Attempt Section I : Q1 or Q2, Q3 or Q4, Q5 or Q6 and Section II: Q7 or Q8, Q9 or Q10, Q11 or Q12
- (2) Answers to the **two sections** should be written in **separate answer-books**.
- (3) Black figures to the right indicate full marks.
- (4) Neat diagrams must be drawn wherever necessary.
- (5) Use of electronic pocket calculator is allowed.
- (6) Assume suitable data, if necessary.

SECTION I

- Q1) a) State and explain specifications of a Robot with suitable examples. [10]
b) Draw & explain cylindrical robot. Compare its work envelop with cartesian robot. [08]

OR

- Q2) a) Explain the following terms: [10]
1) Work envelope 2) Spatial Resolution 3) Degrees of freedom
4) Compliance 5) Repeatability
b) State and explain components of a Robot System. [08]
- Q3) a) Explain the Direct approach for obtaining Inverse Solution. [08]
b) What do you mean by D-H representation? Explain D-H Algorithm. [08]

OR

- Q4) a) Discuss the design aspects of grippers. [08]
b) Draw a neat diagram of wrist manipulator and explain yaw – pitch & roll. [08]
- Q5) a) Explain different types of Joints and End- Effectors. [08]
b) What is the need of actuator in Robotic system? State its types. Explain anyone. [08]

OR

- Q6) a) Draw the diagram of Optical Proximity Sensor. Explain its working principle and state applications. [08]
b) Draw the diagram of Acceleration Sensor. Explain its working principle and state applications. [08]

SECTION II

- Q7) a) Define Trajectory of a robot. State advantages and disadvantages of defining trajectory using work –space co–ordinates and joint – space coordinates. [10]
b) What is a Fuzzy system? Explain the role of fuzzy controller in Robot System. [08]

OR

- Q8) a) Explain Jacobian in terms of D-H matrix. [10]
b) Explain different types of motions used in motion planning of Robot. [08]
Q9) a) Draw and explain block diagram of a Machine Vision System. [08]
b) State and explain the techniques used for object recognition in Robot Vision System. [08]

OR

- Q10) a) Explain different classes of imaging components in a machine vision system. [08]
b) Explain following techniques used in Robot Vision [08]
i) Thresholding .
ii) Region growing.
iii) Edge detection.
iv) Template matching.
Q11) a) Describe the term “ Nanorobots”. State its applications. [08]
b) Explain working principles of MEMS. [08]

OR

- Q12) Write notes on- [16]
a) SCARA robot
b) Rotary to Linear Motion Conversion
c) Teach Pendent
d) Screw Transformation

[Total No. of Questions: 12]

[Total No. of Printed Pages: 2]

UNIVERSITY OF PUNE

[4364]-150

B. E. (E & TC) Examination - 2013

ELECTRONICS MEASUREMENT SYSTEMS (2003 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instructions

- 1 Answers to the two sections should be written in separate answer books.
- 2 Figures to the right indicate full marks.
- 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.
- 6 Answer any three questions from Section I and any three questions from Section II

SECTION –I

- Q.1 A) Explain in brief, the static characteristics of measuring instruments. [6]
B) State and explain various methods used for resistance measurement. [10]
- OR
- Q.2 A) With the help of neat block diagram, explain the operation of vector voltmeter. [8]
B) State & explain some important specification of commercially available digital LCR-Q meter. [8]
- Q.3 A) Describe various levels of standards used in measurement. [8]
B) The following reading are obtained for measurement of inductor 47.1,47.3, 48.5,48.3,47.4,47.5,48.2,48.4,47.9,48.6 mH .Calculate [8]
i) Arithmetic mean ii) Average deviation
iii) Standard deviation iv) Probable error
- OR
- Q.4 A) Explain the following terms with respect to digital universal counter. [8]
i) Gating error ii) Time base error iii) Trigger level error
- B) With the necessary block diagram, Explain how the time period is measured using Universal counter. When the period measurement is preferred over frequency measurement? Explain. [8]
- Q.5 A) What is delayed sweep in CRO? When it is used? Explain the delayed [8]

sweep technique used in CRO.

- B) With the neat block diagram explain the working of Dual Trace Oscilloscope. Also explain alternate mode and chop mode used CRO. [10]

OR

- Q. 6 A) With neat block diagram explain the principle of operation of Digital Storage Oscilloscope. [11]
B) Compare between dual beam and dual trace CRO. [7]

SECTION II

- Q. 7 A) With the help of neat diagram, Explain the principle of operation of Frequency Selective Wave analyzer. Also state its applications. [12]
B) Differentiate between Wave analyzer and THD analyzer. Calculate distribution for following observations. [6]
i) $D_2 = 1\%$
ii) $D_3 = 3\%$
iii) $D_4 = 2\%$

OR

- Q. 8 A) Draw the block diagram of Real time Spectrum Analyzer & explain its operation. Also state its advantages & disadvantages. [10]
B) Draw and explain the block diagram of Logic Analyzer. Also state its application. [8]

- Q. 9 A) State various measurements required for testing of receivers. Explain SINAD sensitivity set up. [8]
B) Explain in brief the technique of s-parameter using network analyzer. [8]

OR

- Q.10 A) With the neat diagram explain network analyzer measurement system [8]
B) Explain how VNA can be used for [8]
i) Transmission measurement.
ii) Reflection measurements.

- Q.11 A) With the neat diagram explain ATE setup for measurement of 100 Watt Audio amplifier. [8]
B) With the neat diagram explain the computer controlled system used for testing the radio receiver. [8]

OR

- Q. 12 A) Give the classification of Virtual Instruments and explain each in brief. [8]
B) Explain the features of LABVIEW. [8]

[Total No. of Questions: 12]

[Total No. of Printed Pages: 2]

UNIVERSITY OF PUNE

[4364]-151

B. E. (E & T.C) Examination - 2013

Telecommunication Network & Management (2003 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instructions:

- 1 *Answers to the two sections should be written in separate answer-books.*
- 2 *Neat diagrams must be drawn wherever necessary.*
- 3 *Black 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

- | | | | |
|-----------|---|--|----|
| Q.1 | A | State & explain the difference between packet switching & circuit switching with block schematic | 8 |
| | B | Explain in detail the telecom network operations & maintenance | 10 |
| OR | | | |
| Q.2 | A | How computer Telecommunication network are represented in the form of layers? What is the need of representing computer network in the form of layers? Describe OSI reference model in detail mentioning the functions of each layer. Describe how these layers are used for communication between two uses. | 18 |
| Q. 3 | A | What are the different types of networks? Explain any two of them in brief with architecture. | 8 |
| | B | State & explain the major components of network in detail. | 8 |
| OR | | | |
| Q. 4 | A | Explain the ISDN protocol architecture. | 8 |
| | B | Explain the SS7 Protocol Architecture. | 8 |
| Q. 5 | A | Draw a simple SONET network & explain various SONET devices used in it. | 8 |

B With an appropriate example explain the operation of virtual path switch & virtual path connection switch used in ATM. 8

OR

Q. 6 A What is meant by WLL? Explain the advantages of WLL over wired Technology & specify the standards used for WLL. 8

B What are the types & typical uses of Leased Lines? Explain. 8

SECTION II

Q. 7 A What are various types of routing methods? Explain them in detail. 16

OR

Q. 8 A Explain TMN Building Blocks & TMN cube. 8

B Explain in brief the various Network attacks & protection mechanisms in detail. 8

Q. 9 Write short notes on:

A Delay & jitter in Networks 8

B Band width & crosstalk in Networks 8

OR

Q. 10 A Explain ATM cell header format. 8

B Explain congestion control in Frame Relay & how it is resolved? Compare frame relay over X.25 services 8

Q. 11 A What layer is responsible for providing QOS ? How that layer provides QOS? 9

B Explain SNMP protocol in detail. 9

OR

Q. 12 Write short notes on Any three: 18

A LAN, MAN, WAN

B Broadband cable Modem

C Wi-Max

D Digital Subscriber lines(DSL)

E Flooding Algorithm.

[Total No. of Questions: 12]

[Total No. of Printed Pages:3]

UNIVERSITY OF PUNE

[4364]-152

B. E.(E & TC) Examination - 2013

OPTICAL AND MICROWAVE COMMUNICATION (2008 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instructions:

- 1 Answer 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 answer-books.
- 3 Neat diagrams must be drawn wherever necessary.
- 4 Black figures to the right indicate full marks.
- 5 Assume suitable data, if necessary.

SECTION - I

Q.1 Solve the following

18

- i) What are the advantages and the drawbacks of fiber optic communications and satellite communications?
- ii) List four basic components of a fibers and explain their functions.
- iii) Assume the light is travelling from one layer of silica whose refractive index is 1.47 to another layer of silica whose refractive index is 1.45. Find the range of angles at which total internal reflection takes place.
- iv) Suppose a laser diode material's energy gap equals 0.8052 eV. Calculate the wavelength at which this laser diode would radiate?
- v) How many photons per second emanate from a laser diode radiating at 1300 nm if its power is 1 mW?
- vi) The sensitivity of a photo diode is 0.65 A/W and its saturation power is 2 m W. Calculate the photocurrent if the received power is a) 1m W b) 2m W c) 3 m W.

OR

Q.2 Solve the following questions:

18

- i) A single mode fiber has following parameters: numerical aperture = 0.125 and relative refractive index = 0.36%. Calculate the refractive index of the core.
- ii) Light travels within a cladding faster than it does within a core. State TRUE or FLASE with reason
- iii) With reference to optical sources, define and explain the meaning of internal quantum efficiency and external quantum efficiency.
- iv) Which semiconductor materials are used in fabrication of LED &? Why?
- v) Calculate the responsivity of a silicon photo diode if its

quantum efficiency is 90%.

vi) List the advantages of p-i-n photo diode over p-n photo diode.

- Q. 3 A A graded-index fiber has the following characteristics: $NA=0.200$, $d_{\text{core}}=50 \mu\text{m}$ and $\lambda = 1300 \text{ nm}$. Calculate the number of modes carried by this fiber. What power is carried by the fiber's cladding? 8
- B Draw a neat block diagram of OTDR. Explain the principle, concept and applications of OTDR. 8

OR

- Q. 4 A Compute the pulse spread caused by chromatic dispersion if a fiber has a zero-dispersion wavelength at 1312 nm, a zero-dispersion slope of $0.090 \text{ ps/nm}^2 \cdot \text{Km}$, a length of 100 km, and operates at 1310 nm. The laser diodes spectral width is 1nm. 8
- B List three major causes of attenuation in an optical fiber and explain their mechanisms. 8

- Q. 5 A A fiber link includes five splices at 0.02 dB/splice, four connectors at 0.2 dB / connector, transmitter power of -10 dBm, and receiver sensitivity of -30 dBm. Perform power budget analysis and compute the length of the link that would be allowed if a single mode fiber cable with attenuation of 0.3 dB/km is used and the required power margin is 3 dB? 8
- B State the principle of operation of semiconductor optical amplifier (SOA). Compare SOA performance with doped fiber amplifiers. 8

OR

- Q. 6 A A local data link is to be installed having the following characteristics: maximum bit rate, 16 Mbit/s; installation length, 2000 m; operating wavelength, 850 nm, rise time of the light wave equipment, 4 ns, and LED spectral width, 20 nm. The modal bandwidth-length product in the fiber's data sheet is 160 MHz.km and the chromatic-dispersion parameter at 80 nm is 0.1 ns/nm.km . Apply rise-time budgeting and state whether multimode 62.5/125 μm fiber support the required bit rate? 8
- B State and explain the system requirements in detail for point-to-point optical fiber links. 8

SECTION II

- Q. 7 A Determine the cut off wavelength for the dominant mode in a rectangular waveguide of breadth 10 cms. For a 2.5 GHz signal propagated in this wavelength, the velocity and phase velocity and phase velocity. 6
- B Explain the working of E- Plane and H-Plane Tees. 6
- C Explain the working of ferrite isolator with a neat diagram. 6

[Total No. of Questions: 12]

[Total No. of Printed Pages: 3]

UNIVERSITY OF PUNE
[4364]-153
B.E. (E&TC) Examination - 2013
Advanced Communication System
(2003 Course)(404225)

[Time: 3 Hours]

[Max. Marks: 100]

Instructions:

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

SECTION - I

- Q.1 A Discuss the usage of optical amplifier in long distance communication. [08]
Show the arrangements for preamplifier & power amplifier configurations on the link
- B The source used on the long distance link launches 0.1mW power. The [08]
output power received at the other end of the fiber is 0.001mW. If the
fiber has the loss of 0.4dB/km, determine the length of optical fiber
link. Note the receiver sensitivity is 0.0009mW.
- OR**
- Q.2 A What are full forms for SONET and SDH? [02]
B What are the optical carrier bandwidths and bit rates for OC-1, OC-3, [10]
OC-12, OC-24, OC-48, OC-96, and OC-192? Also write their
counterpart designations in SDH.
- C Define coupling ratio and excess loss for 2x2 couplers. [04]
- Q.3 A What are CWDM and DWDM techniques? Explain with appropriate [08]
example the usefulness in communication for these techniques
- B State different types of optical amplifiers and explain, in detail any one [08]
type of semiconductor optical amplifier.
- OR**
- Q.4 Prepare optical link power budget when a DFB LASER launches a [16]
power of 5×10^{-4} W. The receiver has sensitivity -50dBm (or 1×10^{-8}
W)

- 1) BPSK modulation
- 2) QPSK modulation
- 3) 8 PSK modulation

- Q. 9 A Define and explain the following terms in detail. [08]
 i) Effective Isotropic Radiated Power
 ii) Carrier to Noise ratio
- B Consider that the satellite communication receiver operating at 4 GHz. [10]
 The receiver has the following gains and noise temperatures:
 $T_{in} = 25k$ $G_{RF} = 23DB$
 $T_{RF} = 50k$ $G_{IF} = 30DB$
 $T_{IF} = 1000 K$ $T_M = 500K$
 Calculate the system Noise Temperature. Assume that the mixer used is lossless mixer.

OR

- Q. 10 A Explain following terms with appropriate Expressions (any two) [10]
 1) Path loss
 2) Noise figure and Noise Temperature
 3) G/T ratio for earth stations
- B Derive step by step downlink equation for the satellite system for [08]
 determining the power received P_r , at the earth station. Parameters given are
 i) P_t - Transmitted power of satellite.
 ii) G_r, G_t – Transmit, Receive antenna gain
 iii) L_t, L_r :- losses associated in the waveguides at transmit and receive ends
 iv) 'd' is slant distance of satellite from the earth station
 v) 'f_d' is downlink frequency used in the system.

- Q. 11 A Compare various multiple access techniques with respect to their [08]
 parameters and performance characteristics.
- B Explain the following terms with respect to VSAT [08]
 i) Link budget
 ii) Free space path loss
 iii) Edge of coverage loss

OR

- Q. 12 A Draw and explain various network implementations of VSAT [08]
 B Explain with a neat diagram the TDMA frame structure used for [08]
 satellite communication

[Total No. of Questions: 12]

[Total No. of Printed Pages: 2]

UNIVERSITY OF PUNE

[4364]-154

B. E. (E & TC) Examination - 2013

DIGITAL IMAGE PROCESSING (2003 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instructions:

- 1 Answer three question from each section
 - 2 Neat diagrams must be drawn wherever necessary.
 - 3 Assume suitable data, if necessary.
-
-

SECTION - I

- | | | | |
|-----------|---|--|----|
| Q.1 | A | Explain Mach band effect. | 18 |
| | B | Distinguish between mask processing and point processing. | |
| | C | When we enter in cinema hall, for short period we are not able to see anything, but with some time we can see the things inside. Explain the reason. | |
| OR | | | |
| Q.2 | A | Explain- 'Simultaneous contrast effect' | 18 |
| | B | What is salt & pepper noise? How we can remove it. | |
| | C | Compare human eye photoreceptors 'rods' and 'cones'. | |
| Q. 3 | A | Explain how image enhancement can be done by power law transformation. | 08 |
| | B | Explain what histogram equalization is. Why it is required? | 08 |
| OR | | | |
| Q. 4 | A | Explain effect of quantization on quality of image. | 08 |
| | B | What is unsharp masking? State its application. | 08 |
| Q. 5 | A | Give forward and inverse transform equations, properties and applications of two dimensional DCT. | 08 |
| | B | Calculate DCT of the given 2 x 2 matrix. Show that DCT transform preserves signal energy. | 08 |

[Total No. of Questions: 12]

[Total No. of Printed Pages: 2]

UNIVERSITY OF PUNE

[4364]-155

B. E. (E & TC) Examination - 2013

Bio Medical Engineering(2003 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instruction:

- 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

- Q.1 A Explain ECG machine as typical example of man-machine interface. 8
B Explain 8
- (i) Accuracy
 - (ii) Hysteresis
 - (iii) Precision
 - (iv) Resolution

OR

- Q.2 A Define 6
i) Bio-electrode
ii) Electrode offset voltage
iii) Half Cell Potential
B With neat diagram explain properties & applications of 10
i) Glass Micro Electrodes
ii) Fiber optical temperature sensors

- Q.3 A State the voltage range and frequency range of bio-signals of ECG and 8
EMG. State the electrodes used for measurement.
B With neat diagram explain the operation of bio-signal amplifier. 8

OR

- Q.4 A Draw a neat diagram and explain different controls and Indications on an 8
ECG Machine
B With a neat diagram explain the cardio-vascular system and blood 8

circulation along with different heart valves.

- Q. 5 A Explain how leakage currents are generated in bio-medical instruments? What are the safety thresholds? 8
B Explain PC based Intelligent Bio-medical system 10
- OR**
- Q. 6 A Explain with block diagram the principle and working of DC De-fibrillator. Calculate the energy stored in 10 F Capacitor that is charged to 1800 v DC. 10
B Explain necessity and functioning of Pace Maker Discuss different types of batteries & their life used in Pace Maker. 8
- SECTION II**
- Q. 7 A Explain blood pH measurement. What is the range of pH in a healthy human being? 8
B With the help of diagram, explain the blood oxygen measurement system. 8
- OR**
- Q. 8 A Compare operation of flame photo meter with spectrophotometer with respect to blood analysis. 8
B Explain the working, features and applications of X- Y Recorder in Bio-Medical field. 8
- Q. 9 A Explain the parade mode of Non-fed CRO. How it is different from normal CRO? 8
B Explain 21 Electrode EEG signal measurement method. 8
- OR**
- Q. 10 A Compare Auto analyzer with Blood Cell Counter. 8
B How WBC's and RBC's are separated in blood Cell Counter? 8
- Q. 11 A With a neat diagram explain the operation of X-Ray machine. State the frequency range & supply voltage of X-Ray Tube. 10
B What is MRI Scanning? What are the differences between MRI and CT scan? 8
- OR**
- Q. 12 A What are different types of lasers used in medical applications? Explain HeNe laser with state diagram. 10
B How LASER is used in diabetic retinopathy? 8

[Total No. of Questions: 12]

[Total No. of Printed Pages: 2]

UNIVERSITY OF PUNE

[4364]-156

B. E. (E & TC) Examination - 2013

(Audio Video Engineering)(Elective-II)(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 Figures to the right indicate full marks.
- 5 Assume suitable data, if necessary.
- 6 Use of logarithmic tables, electronics pocket calculator is allowed

SECTION - I

- Q.1 A State CCIR B standards for monochrome TV. 8
B Distinguish between brightness and contrast 4
C What do you understand by persistence of vision and flicker? How flicker is removed? 6

OR

- Q.2 A Explain the working of Precision-In-Line Picture tube with constructional & functional details. 8
B Compare various display technologies used for colour TV 6
C Define the following terms: 4
i. Kell factor
ii. Aspect ratio
iii. Hue
iv. Saturation

- Q.3 A Draw the block diagram of Wobuloscope and explain its importance in TV alignment. 8
B Compare PAL, NTSC and SECAM colour TV system. 8

OR

- Q.4 A Explain with necessary block diagram, the working of IF modulated TV transmitter. 8
B Explain the working of colour TV receiver with suitable block schematic 8

- Q.5 A Explain with block schematic, the principle of operation of digital colour TV receiver 8
 B Compare digital standards for ATSC, DVB and ISDB 8
OR
- Q.6 A Discuss MPEG-2 video compression format. 8
 B Explain with neat block schematic, the MAC encoder and its format 8
- SECTION II**
- Q.7 A Discuss live coverage plan for international Cricket Match & explain how match is recorded with cameras located at different places and transmitted? 10
 B Discuss in short: 8
 i. CATV
 ii. Video on demand
- OR**
- Q.8 A State HDTV standards and describe compatibility problems in HDTV 8
 B Explain with neat block diagram the Direct Broadcasting Satellite TV. What is DTH TV? 10
- Q.9 A Explain the various DVD formats 8
 B Explain the principle of magnetic recording and reproduction with neat diagram. 8
 What is the relation-ship between gap width, tape-speed & frequency of audio signal?
- OR**
- Q.10 A Discuss various MPEG Audio compression formats used, indicating different specifications & parameters 8
 B Explain the working of DVD player with neat block diagram 8
- Q.11 A Explain the need of reverberation. State reverberation periods and factors on which reverberation time depends 8
 B Explain the Satellite Ratio Receiver with suitable block diagram. Discuss its applications 8
- OR**
- Q.12 A Explain the working of typical chord less microphone PA system. State the type of microphone used with its specifications 8
 B What are the requirements of a good auditorium for pleasant listening? Give salient features of acoustical design of an auditorium. 8

**B.E (Electronics & Telecommunication)
And Electronics**

2003 Course
4364-157/136

System Programming and Operating System

May 2013

Time: 3 Hours

Max. Marks : 100

Instructions:

- 1) Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section I and Solve 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) Black figures to the right indicate full marks.
- 4) Neat diagrams must be drawn wherever necessary.
- 5) Assume suitable data, if necessary.

Section I

Q.1 a) Define translator. Explain LEX & YACC tools. [8]

b) For the following 'C' statement

```
a=-b + c * -b + c
```

show the output of every phase of compiler. [8]

OR

Q.2 a) Differentiate between compiler and interpreter. [4]

b) What is linker? List Language processes development tools. [6]

c) What is role of Lexical analyzer? Write output of following by lexical analysis [6]

```
void main()
{
    inti,j=0;
    for(i=0;i<5;i++)
        printf("%d",&i);
}
```

Q.3 a) Explain with example different passing parameter methods for macro. [6]

b) Differentiate between macro & function. [4]

c) Draw flow chart of Pass I of assembler. [6]

OR

Q.4 a) What is assembler? Write algorithm for Pass II of Assembler. [8]

b) What is forward reference? How table of incomplete information is used for forward reference handling? [8]

Q.5 a) What is relocation? How relocation is handled in direct linking loader? [6]

b) Explain design of absolute loader. [6]

c) What is dynamic loading? How utilization of memory is done in dynamic loading? [6]

OR

Q.6 a) Explain basic function of loader. [4]

b) Explain BSS loader. [6]

c) Give ESD, RLD cards for both PGA & PGB. Also give the contents of GEST [8]

Relative Address		Source Program
0	PGA	START ENTRY PG1ENT1, PG1ENT2 EXTERN PG2ENT1, PG2
20	PGAENT1	
30	PGAENT2	
40		DC A(PGAENT2)
44		DC A(PGAENT1 + 15)
48		DC A(PGAENT2- PG1ENT1-3)
52		DC A(PGB)
56		DC A(PGBENT1+PGB- PGAENT1+4)
	END	
0	PGB	START ENTRY PGBENT1 EXTERN PGAENT1, PGAENT2
16	PGBENT1	
24		DC A(PGAENT2)
28		DC A(PGAENT1)
32		DC A(PGBENT2- PGBENT1-3)
	END	

Section II

Q.7 a) What is the meaning of the term busy waiting? What other kinds of waiting are there in an operating system? Can busy waiting be avoided altogether? [8]

b) Draw and explain the process state transition diagram. Explain the structure of PCB. [8]

OR

Q.8 a) Explain how deadlock detection and prevention is done? [8]

b) State and explain different operating system services in detail. [8]

Q.9 a) Explain the following terms: [6]

i) Compaction

ii) Thrashing

b) Compare and explain paging and segmentation. [6]

c) Differentiate the contiguous and non-contiguous memory allocation. [6]

OR

Q.10 a) Write a short note on virtual memory management. [6]

b) Explain the paging hardware with TLB with the help of suitable diagram. [6]

c) Explain key features of windows file system. [6]

Q.11 a) Explain mechanism and policies in file system and IOCS layers. Explain steps involved in I/O Operations. [8]

b) Based on what criterion I/O devices are classified? How I/O time of record is calculated? Explain Magnetic Tape and Magnetic Disk in short. [8]

OR

Q.12 a) What is device driver? Explain device driver for USB and parallel port. [6]

b) Write short note on Advanced I/O Programming [6]

c) Differentiate between serial port and parallel port. [4]

