Total No. of Questions : 12]

P769

SEAT No. :

[4458]-571

[Total No. of Pages : 4

B.E. (Electronics & Telecommunication) (Semester - I)
ELECTRONIC PRODUCT DESIGN
(2008 Course)

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

Instructions to the candidates:

1) Answer 3 questions from Section - I and 3 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) Assume suitable data, if necessary.

SECTION - I

Q1) a) Compare consumer, industrial & military products on the basis of reliability, cost to the performance ratio, temperature range. **[6]**

b) Calculate MTBF & reliability for 10,000 Hrs, if the total F.R. $= 2.5 \times 10^{-6}$, also State the laws of reliability. **[8]**

c) Define MTTR & MTTF with reference to electronic products. **[4]**

OR

Q2) a) With the help of block diagram, explain different stages of an electronic product development. **[4]**

b) Explain the bath tub curve for reliability indicating all its regions. **[4]**

c) What are reliable soldering practices. Explain different soldering techniques. **[6]**

d) Explain typical IEC standards of EMC. **[4]**

Q3) a) Draw error model of op-amp and explain all the parameters need to be considered in error budget analysis. **[8]**

b) Explain any one application of Data acquisition system using ADC MAX 11046 (Hint: Typical power-grid monitoring or Typical motor-control systems.) **[8]**

OR

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Q4) a) Write a short note on: Error Budget Analysis with reference to Instrumentation amplifier. **[4]**

b) Explain following analog interface ADC & DAC parameters: **[6]**

   i) Absolute error

   ii) Integral nonlinearity (INL)

   iii) Differential nonlinearity (DNL)

c) Explain the role of signal conditioning circuits in Data Acquisition System. Illustrate your answer with suitable examples. **[6]**

Q5) a) List various types of touch screens. Explain the Principles of any four types. **[8]**

b) Design a four channel temperature scanner using AD7817 with any Microcontroller and explain. **[8]**

   i) Method of channel selection.

   ii) Procedure to set alarm using over temperature register for 45°C

OR

Q6) a) Give the overview of the following buses and protocols with interface diagrams. **[8]**

   i) RS-232

   ii) RS-485

   iii) 12C

   iv) SPI

b) Write short notes on the following terms with reference to commercial electronics. **[8]**

   i) Flex Ray

   ii) Local Interconnected Network

   iii) Controller Area Network

   iv) Domestic Digital Bus (D2B)

SECTION - II

Q7) a) What are power on self tests for the hardware diagnostics? **[6]**

b) Explain different approaches in development of application software for electronic product. Also mention drivers & stubs in block diagrams.**[12]**

OR

Q8) a) What are the factors affecting choice between assembly language & high level language like C or C++. **[6]**

b) An 8 channel ADC reads temperature from a transducer. This physical data is to be logged in the system memory and same is to be displayed on 6 digit, 7 segment LCD Display. **[12]**

   i) List all the steps necessary steps to develop the software for this system.

   ii) Draw flow chart for acquiring data and displaying it on 6 digit 7 seg. LCD display.

   iii) Give documentation details of this system.

Q9) a) What are the objectives of CE marking? Explain at least four CE Testing standards. **[6]**

b) Consider a 0.35 mm wide conductor of 10cm length. Find the resistance of conductor if standard copper foil of 35 um thickness is used. (Resistivity of cu. 1.72×10^{-6} ohmcm) **[4]**

c) What are the important precautions specially to be taken for analog circuit and digital circuit PCB design? Explain with proper examples. **[6]**

OR

Q10) a) Estimate the parasitic Capacitance of two 1.5 mm wide tracks on opposite face of double sided PCB, each with a track of 18 cm. The PCB laminate thickness is 1.6 mm & its relative permittivity is 4.2. (Permittivity of free space is 8.854×10^{-12} f/m) **[4]**

b) Explain the mechanism of generation & prevention methods for the following phenomena in high speed PCB design.: Cross talk, Reflections, Ground bounce, terminations. **[8]**

c) What are the issues to be considered in ensuring the Signal integrity in high speed circuits? **[4]**

Q11) a) Calculate the path loss for a radio link operating at 2.4 GHz at the distance
of 500m. **[6]**

b) Explain the significance & principle of a typical Convolutional &
Rectangular Interleaver. **[10]**

OR

Q12) a) Design a hypothetical experiment to measure path loss (Ls) at frequencies
f1 = 30 MHz & f2 = 60 MHz, when the distance between the transmitter
& receiver is 50 km. Find the effective area of the receiving antenna and
calculate path loss in decibels for each case. **[10]**

b) State the important features of digitally controlled equalizer. **[6]**

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