

III B.Tech. I Semester Supplementary Examinations, May -2005

ELECTRONIC EQUIPMENT DESIGN

**(Common to Electronics & Instrumentation Engineering and
Instrumentation & Control Engineering)**

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) What do you mean by MTTF, MTBF and Mean life.
(b) Derive the interrelationships between the above terms.
2. Differentiate between logic timing analyzer and logic state analyzer. Give the details of the controls in a typical logic analyzer.
3. (a) Explain the working of an electronic counter with a block diagram.
(b) Explain any two applications of electronic counters.
4. (a) What is meant by conductively coupled interference? How does it affect the readings of the instrument? How can this be eliminated?
(b) When both temperature and pressure changes, how is the instrument's performance affected? How can they be eliminated?
5. Write about PCB layout check related
 - (a) General Consideration
 - (b) Mechanical considerations
 - (c) Electrical considerations.
6. Sketch the geometry of a screen fabric and explain about Monofile polyester fabrics and stainless steel fabrics.
7. (a) What are the specifications of Pulse transformers?
(b) List and explain the characteristics of insulating materials.
(c) Explain the method of testing Audio and Pulse transformers.
8. (a) Explain the various tests specified for IF and RF transformers and coils.
(b) For RF transformers how is voltage transfer ratio determined and tested.
(c) What is meant by Pulsactor and explain its roles in the transformers.

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1. (a) Explain in detail the mortality curve.
(b) Briefly explain the theories relating to mortality and dynamic models.
2. (a) Draw the functional block diagram of 723 regulator. Derive the expression for its output voltage.
(b) Explain the current limiting feature of 723 regulator.
3. What is an electronic counter? Explain the five modes of operation in detail.
4. (a) What is meant by vibration pump? Explain its working in brief with a neat diagram.
(b) Explain with graphs and diagram how thermal fatigue affects the performance of instruments.
5. Write about how Electromagnetic interference occurs in digital PCB.
6. Explain the following Immersion plating.
 - (a) Tin Immersion plating.
 - (b) Immersion plating of Gold and Rising.
7. (a) Define Curie point and give its typical values for three ferromagnetic materials.
(b) Why is heat treatment necessary for Ferromagnetic materials ?
(c) Mention three materials used for ferrites and give their applications.
8. (a) Explain the design of a General purpose Pulse Transformer with the following specifications Pulse duration = 0.2ms, Pulse period = 1 ms, Pulse amplitude = 5V, Allowable Tilt at the load < 15%, Source resistance = 75 Ohms, Load resistance = 1 kOhms, Transformation ratio = 2.
(b) List the properties of the winding wires.

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1. (a) What do you mean by MTTF, MTBF and Mean life.
(b) Derive the interrelationships between the above terms.
2. (a) With a neat circuit diagram explain the operation of an Electronic relay.
(b) Discuss one industrial application of it.
3. Explain the operation of electronic weighing system with neat block diagram.
4. (a) What are the various rules of guarding techniques? Explain with diagrams.
(b) Discuss in brief the various rules of noise reduction in the instruments.
5. (a) Write about component placing and mounting in PCB.
(b) Explain about cooling requirements and packaged density related to PCB.
6. (a) Briefly discuss different trends in etching machine designs.
(b) Briefly compare the different Etchants.
7. (a) Draw the schematic diagram of full-wave single-phase magnetic amplifier circuit and explain its working principle.
(b) How can a magnetic amplifier be used to maintain the speed of a shunt motor constant, under varying load conditions? Draw the circuit diagram also.
8. Explain the following testing methods for testing inductors and transformers
 - (a) Ohmmeter testing
 - (b) Voltmeter testing
 - (c) Resonance method of testing.

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1. (a) Discuss briefly the various methods used to test the final design.
(b) Discuss briefly the various RAID levels with respect to reliability.
2. (a) Design an adjustable regulator (3v to 28v) with short circuit current limit of 60mA using 723 regulator.
(b) Explain the limitations of linear voltage regulator.
3. Draw the block diagram of digital frequency meter with a gate control. Explain its operation with necessary waveforms.
4. (a) What is meant by capacitive, inductive and electromagnetic interferences? Explain in brief about each of them.
(b) What is shielding? What do single shielding and double shielding mean?
5. Write about PCB layout check related
 - (a) General Consideration
 - (b) Mechanical considerations
 - (c) Electrical considerations.
6. Sketch the geometry of a screen fabric and explain about Monofile polyester fabrics and stainless steel fabrics.
7. (a) Explain the methods of reducing leakage inductance and distributed capacitance in the coil windings of a transformer.
(b) List the requirements of windings of a transformer.
(c) List and explain the quality requirements of a transformer.
8. Explain the following testing methods for testing inductors and transformers
 - (a) Ohmmeter testing
 - (b) Voltmeter testing
 - (c) Resonance method of testing.
