

3E1494

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Total Printed Pages : **4****3E1494****B.Tech. (Sem. III) (Main/Back) Examination, January - 2012****Electronics & Comm.****3EC4 Electronics Measurements & Instrumentation****(Common for 3EC4 (M & B) and 3BM4 (Old Back Only))**Time : **3 Hours**][Total Marks : **80**[Min. Passing Marks : **24****Instructions to Candidates :**

Attempt any five questions selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. _____ Nil _____

2. _____ Nil _____

UNIT – I

- 1 (a) The following eight observations were recorded when measuring a voltage : 21.7, 22.0, 21.8, 22.1, 23.2, 22.6, 21.9 and 22.2 volt.
Find (i) Probable error of one reading.
(ii) Probable error of mean.

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- (b) Define the following for Gaussian distribution of data :
(i) Precision index.
(ii) Standard deviation of mean.

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OR

- 1 (a) Systematic errors can be classified as
(i) Instrumental errors.
(ii) Environmental errors.

Discuss the above types of errors giving suitable examples.
Explain the measures taken to minimize these errors.

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- (b) An underdamped galvanometer was energized 100 times under the same carefully controlled experimental conditions and the maximum deflection was read in each case. The readings were normally distributed about a mean value of 26.3 mm and had a probable error of 2.5 mm. How many of 100 readings would you estimate exceeded 30 mm ?

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UNIT - II

- 2 (a) Explain the construction and working principle of Digital voltmeter with neat sketch.

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- (b) How will you measure RF power and voltage ? What are the problems encountered in such measurements.

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OR

- 2 (a) Explain the block diagram of vector impedance meter and its applications.

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- (b) Define the following terms :-

(i) Shielding

(ii) Grounding

Discuss the techniques to protect the measuring instruments.

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UNIT - III

- 3 (a) A CRT has an anode voltage of 1500v and parallel deflecting plates 2.5 cm long and 4.5 mm apart. The screen is 28 cm from the centre of the plates. Find the input voltage required to deflect the beam through 3 cm. The input voltage is applied to the deflecting plates through amplifiers having an overall gain of 100.

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(b) Define the following of the CRO :-

- (i) Blanking circuit.
- (ii) z-axis modulation.

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OR

3 (a) Explain the construction and working of following CRO probes:

- (i) Direct probe
- (ii) Isolation probe.

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(b) Explain the working of free running and triggered mode CRO with suitable diagram.

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UNIT - IV

4 (a) Explain the block diagram of frequency synthesized signal generators.

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(b) What are the various applications of spectrum analyser in an electronic laboratory ? Explain in brief.

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OR

4 (a) What is meant by distortion factor ? How can distortion factor be measured.

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(b) Explain the working of Heterodyne wave with suitable diagram and its applications.

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UNIT - V

5 (a) What are different selection criteria for proper transducer. Explain the following characteristics of a transducers :-

- (i) input
- (ii) Transfer
- (iii) output

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- (b) What do you mean by 'seeback effect'. Explain the characteristics of various types of mermocouples.

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OR

- 5 (a) Derive an expression for the gauge factor of strain gauges. Differentiate the bonded and unbonded type strain gauges.

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- (b) Explain the various modes of operation of Piezo-electric transducers. Also, give applications of it.

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