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RN-7401

B. E. - IV (Sem. VII) (Electrical) Examination

May / June – 2010

Electrical Instrumentation

Time : Hours] [Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. 4 (Sem. 7) (Electrical)**

Name of the Subject :

☛ **Electrical Instrumentation**

☛ Subject Code No. : **7 4 0 1** ☛ Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Attempt all the questions.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.

SECTION - I

1 (a) Answer the following questions : **5**

(1) Why do we convert any quantity being measured digitally into time or frequency first ?
(2) What is ratio matric measurement ?
(3) What is driver in case of digital measurement ?
(4) State sampling theorem.
(5) What is quantization ?

(b) State "True" or "False" for the following sentences. **5**

(1) VTC is a part of ADC.
(2) Quantization error decreases with decrease in step size.
(3) Digital instruments have better accuracy compared to analog ones.
(4) Dual slope VTC is less affected by noise compared to single slope VTC.
(5) DAC is used in direct type ADCs.

(c) (1) Discuss digital ramp type ADC employing DAC with block diagram. **5**

(2) Discuss basic block diagram of digital measurement. **5**

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2 (a) Write a brief note on 'optical encoders'. **10**

(b) Explain Q-factor meter. **6**

OR

2 (a) Compare various types of ADCS. **6**

(b) Discuss successive approximation type ADC in detail. **10**

3 Attempt any two : **14**

(1) Write a short note on 'Time period measurement'.

(2) Discuss ratio metric measurement technique.

(3) What are the limitations of single slope VTC ? How are they eliminated in dual slope VTC ? Discuss.

SECTION - II

4 (a) Answer the following questions : **5**

(1) What is modulation ?

(2) Define CMRR.

(3) What is 'Phase modulation' ?

(4) Which DAC has got better accuracy ? Why ?

(5) List various pulse code formats used in digital signal transmission.

(b) State 'True' or 'False' of the following sentences : **5**

(1) Digital to analog conversion needs higher order hold.

(2) Oscillators use positive feed back.

(3) Instrumentation amplifier should have very high CMRR.

(4) FM has got more bandwidth compared to FM transmission.

(5) R-2R ladder type DACs have lesser accuracy compared to binary weighted ladder type DAC.

(c) List properties of a good instrumentation amplifier. **10**
Derive expression for gain of an instrumentation amplifier realized using 3-op amps.

5 (a) Explain any one digital to analog converter. **6**

(b) Explain advantages of digital signal processing. **6**

OR

5 (a) Explain various modulation techniques used in digital signal transmission. **8**

(b) Discuss in brief sample and hold circuits. **4**

6 Attempt 'any three' : **18**

(1) Discuss function generators.

(2) Write a short note on optical isolation technique.

(3) Discuss in brief functions of a good telemetry system and discuss time division multiplexing.

(4) Discuss : Hartley's oscillator.
