SEM II Choice Base INST & CONT **Paper / Subject Code: 34501 / Electronics Systems Design** / MAY 2019

Duration 3 Hours **[Total Marks : 80]**

Note : 1. Question No. **1** is **compulsory**.

2. Attempt any **three** questions from remaining **five** questions.

3. Assume suitable data if necessary.

Q. 1 Answer the following: 20

a) Compare weighted resistor and R-2R ladder network DACs.

b) Explain need and methods for RF shielding.

c) Explain working and advantages of chopper stabilized amplifier.

d) Explain performance parameters of sample and hold circuit.

Q.2 a) Explain the need and methods used to improve dynamic range of instrumentation amplifier 10

b) Explain important parameters in analog comparator circuit and explain need of hysteresis in comparators. 10

Q. 3 a) Discuss briefly the issues associated with power management of electronic circuits. 10

b) Explain important considerations in design and fabrication of high speed circuits. 10

Q.4 a) Explain voltage to frequency converter circuit 10

b) Explain switched capacitor filter 10

Q.5 a) Explain working of flash ADC. 10

b) What do you understand by mixed signal processing circuits and explain problems associated with its design. 10

Q.6 Write short notes on the following - 20

a) DC to DC converter

b) Analog Multiplexer.

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Sem- II | Paper / Subject Code: 34502 / State Estimation & Stochastic Process | May-2019

T & CONT. | choice based .

Q. P. Code: 39605

Time : 3 Hours **Marks : 80**

Please check whether you have got the right question paper

1. Question No.1 is compulsory
2. **Attempt any three questions out of the remaining five questions.**
3. **Assume suitable data wherever necessary.**

Q. 1 Explain Briefly 20

a) Monte Carlo Method
b) Probability Space
c) Sigma field
d) Random phased cosine
e) Fractional integral

Q. 2 a) What do you mean by Probability density function? Given pdf of a random variable, explain how mean and variance can be obtained? 10

b) Explain the Stochastic Characteristics of any one continuous random variable and its relation with mean and variance. 10

Q. 3 Differentiate between 20

a) Gaussian Noise and Shot Noise
b) Unscented Kalman filter and Particle filter

Q. 4 a) What is autocorrelation as applied to random processes. Explain any one application. 10

b) What is conditional probability? Explain the concept of covariance, correlation and independence, as applied to random variables. 10

Q. 5 a) Obtain 0.8^{th} derivative of unity using gamma function. 10

b) Derive the equation of kalman filter using the concept of conditional Gaussian density. 10

Q. 6 Write short notes on 20

a) Random Walk
b) Extended Kalman filter

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(Time:3 Hours) **Total Marks:80**

Note:

1. **Question No.1 is compulsory**
2. **Solve any THREE questions out of remaining FIVE questions.**
3. **Figure to the right indicate full marks.**
4. **Assume suitable data if required.**

Q1) Answer the following –(Any FOUR) (20)

a) Compare H1 and HSE.

b) Explain partially decoupled controller using ratio method.

c) Explain the selection criteria of the field bus power supply.

d) Explain intrinsic safety with its significance.

e) Write a note on ALARP.

Q 2) a) Explain the architecture of foundation filed bus in detail. (10)

b) Explain the procedure of PLC sizing. (10)

Q 3) a) Explain the methods of SIL determination. (10)

b) Select the appropriate control loop configuration for the following input- output relationship (10)

$$Y1(s) = 5\frac{e^{-s}}{(10s+1)}\ \overline{m1}\ + \frac{2}{(s+1)}\ \overline{m2}$$

$$Y2(s) = \frac{-4}{(s+1)(2s+1)}\ \overline{m1}\ + \frac{1}{(2s+1)}\ \overline{m2}$$

Q 4) a) Write a note on SCADA (10)

b) Explain RGA and derive its equation. (10)

Q 5) a) Write short notes on: (10)

i) HPT ii) DART

b) Determine the steady state effect of multiple stage evaporator. (10)

Q 6) Write short notes on **(any Two)** (20)

a) Constraint Controllers

b) PLC-HMI interfacing

c) Profibus

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Choice Based

Duration 3 Hours **[Total Marks: 80]**

Note : 1. Question No. **1** is **compulsory**.

2. Attempt any **three** questions from remaining **five** questions.

3. Assume suitable data if necessary.

Q. 1 a) Explain various Modes of a multichannel analyzer. 05

b) Explain advantages of liquid scintillation detector over solid scintillation detectors. 05

c) Explain working and advantages of HPGE detector. 05

d) Explain why low conversion time is required in nuclear ADC. 05

Q. 2 a) . Explain working of Multichannel analyzer with block diagram. 10

b) Explain working of Wilkinson ADC. Explain sources of errors and limitations of Wilkinson ADC 10

Q.3 a) Explain how coincidence detection technique helps to reduce effect of noise. Explain one use of this technique with block diagram. 10

b) Explain various counting interferences in Liquid Scintillation counting 10

Q.4 a) Explain need and working of Charge to Digital convertor with circuit diagram 10

b) Explain need and working of Trigger system in astrophysics experiments. 10

Q.5 a) Explain working of Gamma camera with block diagram. 10

b) Explain In core and out of core instrumentation for nuclear reactors 10

Q.6 Write short notes on any **two** of the following - 20

a) Channel profile of nuclear ADC.

c) Gatti's Sliding scale technique.

b). Various methods of neutron detection

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Sem-II / Paper / Subject Code: 34414 / ElectiveII: Research Methodology. / May-2019

e based / EXTC / INFT / INST & CONT.

(Three Hours) **Total Marks: 80**

Instructions:

- Attempt any four questions out of six questions
- Assume suitable data wherever necessary
- Figures to the right indicate full marks.

Q.1 Answer any Four. 20

a. Role of SPSS in data analysis
b. Foot notes and Bibliography
c. Importance of t-tests
d. Descriptive statistics
e. Testing of hypothesis
f. Non-parametric tests

Q.2 a. What is the research methodology? Explain the steps in scientific research process. Briefly explain about literature review. 10

b. State the sources of research problem. How a problem is identified? Enumerate the criteria for the selection of a problem. 10

Q.3 a. Explain the concept of attitude scale. Explain the Likert's scale to measure data attitude. 10

b. Explain Quantitative vs. Qualitative type of research. Explain Post Facto research and Motivation in research. 10

Q.4 a. Explain critically interpretation and Organization of the data. 10

b. Hypothesis is a statement which involves a relationship of variable. Enumerate the types of variables included in stating a hypothesis. 10

Q.5 a. What are the characteristics of research? What are the factors affecting research design? 10

b. "A systematic bias results from errors in the sampling procedures". What do you mean by such a systematic bias? Describe the important causes responsible for such a bias. 10

Q.6 a. What are the differences between observation and interviewing as methods of data collection? Explain with two specific examples of situations where either observation or interviewing would be more appropriate. 10

b. You have been asked to research setting up of a roadside hotel. Design a questionnaire to find out the prospects of proceeding with the venture. 10

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