Q.P. Code :13162

[Time: Three Hours]   [Marks:80]

Please check whether you have got the right question paper.

N.B: 1. Question no.1 is compulsory
        2. Solve any three out of remaining
        3. Assume suitable data wherever necessary and draw diagrams

Q.1   Solve any five.   20
a) Define (i) CMRR; (ii) Slew rate; (iii) Offset voltage (iv) Input Bias current
b) Implement (i) V0= 2V1+V2 (ii) VO=dvin/dt using opamp uA741.
c) For the following circuit identify type of filter and find cutoff frequency
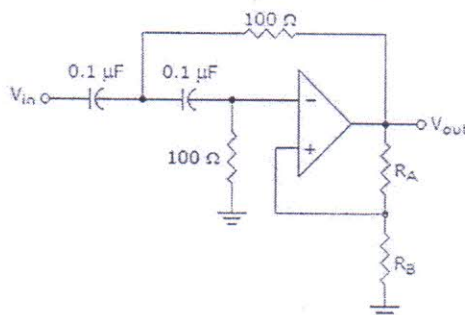
d) Describe performance parameters of DAC.
e) Draw functional block diagram of IC 555
f) What are various protection circuits used for Voltage regulators?

Q.2 a) Derive expression for Av for Non-Inverting amplifier. Design this amplifier for Av=15.   10
      b) What is window detector? Explain with proper waveforms.   10

Q.3 a) Explain with necessary diagrams and waveforms the principle of operation of a Monostable   10
           multivibrator using OP-AMP.
      b) Explain Schmitt Trigger circuit. Design same for UTP and LTP= $\pm 2V$ 10

Q.4 a) Explain with necessary diagrams the operation of a triangular wave generator using OPAMP.   10
      b) Explain with a functional block diagram the principle of operation of 723 regulator. What are   10
           the important characteristics of this voltage regulator IC?

Q.5 a) Explain with proper circuit diagram the principle of operation of dual slope converter.   10
      b) Explain working of Astable multivibrator using IC 555   10

Q.6   Write short notes on all.   20
        a. Log-Antilog Amplifier
        b. Instrumentation amplifier and it's applications
        c. Precision Rectifiers
        d. PLL 565 and its applications

Time : 3 Hours   Marks: 80

N.B.
1) Question number ONE is compulsory.
2) Attempt any THREE questions from remaining questions.
3) All questions carry equal marks.

Q1
    a) What is random variable? Explain mean and variance   5
    b) Compare QPSK and QASK   5
    c) Explain with block diagram Optimum Receiver   5
    e) Syndrome generator and decoder for linear block code   5

Q2 a) A communication system transmits 5 digits over a noisy channel with per digit error
       probability of 0.01. What is the probability that upto 2 digits will be in error? Also
       calculate mean and variance of the error. Use Binomial probability distribution.   10

    b) Explain Direct Sequence and Frequency Hop Spread Spectrum Techniques.   10

Q3 a) A DMS emits six messages m1, m2, m3, m4, m5 and m6 with probabilities
       0.30, 0.25, 0.15, 0.12, 0.10 and 0.08 respectively. Find
    1. Huffman code
    2. Average code word length
    3. Entropy of source
    4. Efficiency and redundancy of code.   10
    b) Compare Shannon Fano and Huffman Coding   10

Q4 a) Explain the necessity of line codes. State different types of line codes. Plot power spectral
       density of NRZ signal.   10
    b) Show that the duobinary signalling suffers from error propagation while precoded   10
       duobinary signalling doesnot. Explain with encoder and decoder block diagram and
       decoding logic

Q5 a) Draw block diagram of BPSK transmitter and receiver and explain. Sketch signal space
       diagram and PSD of BPSK.   10
    b) The generator polynomial of a (7,4) cyclic code is given by $G(D)=1+D+D^3$ Compute all   10
       the non-systematic code words.

Q6 Write short notes on following   20
    a) Central Limit Theorem
    b) Eye Pattern
    c) Gray Code
    d) Correlator

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