0304N47   Candidate's Seat No :_____

B.Sc Semester-6 Examination
CC 307
Electronics

Time : 2-30 Hours]   April-2024   [Max. Marks : 70

Instructions: (1) Symbols used here have their usual meanings.
(2) Figures to the right indicate marks.

Q-1 (i) Write a short-note on op-amp differentiator. Draw sine and square waves and their differentiated forms.   (7)

(ii) Explain op-amp zero-crossing detector as an application of comparator.   (7)

OR

(i) For the log amplifier using op-amp, prove that the output voltage is proportional to the logarithm of the input voltage.   (7)

(ii) Write a short-note on antilog amplifier using op-amp.   (7)

Q-2 (i) Draw the schematic block diagram of the PLL. Explain function of each block in detail.   (7)

(ii) Describe the edge triggered phase detector using IC CD4001.   (7)

OR

(i) Differentiate between passive and active low pass filter. In PLL, explain the importance of the low pass filter.   (7)

(ii) Explain Lock-in range, Capture range and Pull-in time of the PLL.   (7)

Q-3 (i) Explain the construction and working of an SCR.   (7)

(ii) Explain the terms break-over voltage, holding current, PRV and forward current rating as used in connection with SCR analysis.   (7)

OR

(i) Write a short note on SCR half wave rectifier.   (7)

(ii) What is Crowbar circuit? Explain the application of an SCR in the Crowbar circuit.   (7)

Q-4 (i) Draw the V-I characteristics of TRIAC. Explain the first and third quadrant curves.   (7)

(ii) Discuss the construction of TRIAC in detail.   (7)

OR

(i) Write a short note on UJT relaxation oscillator.   (7)

(ii) In a UJT relaxation oscillator, the value of R_{BB} is 5 kΩ and intrinsic stand of ratio η =0.6 at I_E=0, Calculate the value of R_{B2}.   (7)

Q-5 Attempt any <u>seven out of twelve.</u>   (14)

(1) What is the problem faced by log amplifier using single op-amp?

(2) For a lossy integrator circuit, the component values R1 = 10 kΩ, R_F = 100 kΩ, C_F = 10 nF, determine the lower frequency limit of integration.

(3) Draw the waveforms of an op-amp integrator output for the square wave input.

(4) Write the full form of PLL.

(5) Write the full form of VCO.

(6) The free running frequency of a PLL is 300 kHz and the bandwidth of low pass filter is 10 kHz. Will the PLL acquire lock for an input signal of 320 kHz?

(7) An SCR has a circuit fusing rating of 50A^2s. The device is being used in a circuit where it could be subjected to a 100A surge. Determine the maximum allowable duration of such a surge.

(8) Three terminals of an SCR are _____, _____ and _____.

(9) An SCR in a circuit is subjected to a 50 Amp surge that lasts for 12 ms. Determine whether or not this surge will destroy the device. Given that circuit fusing rating is 90A^2s.

(10) Draw the symbol of TRIAC.

(11) Differentiate between DIAC and TRANSISTOR.

(12) Enlist any two TRIAC applications.

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