CVM UNIVERSITY
M.Sc. (INSTRUMENTATION & CONTROL) Semester-I Examination-2021
Monday, 01st March – 2021
02:00 PM to 04:00 PM
101390107 INSTRUMENTATION OF PROCESSING CIRCUITS

Total Marks: 60

Note: (1) Attempt all questions.
(2) Figures to the right indicate marks.

Q. 1 **(a)** Answer the following multiple choice questions. **(08)**

(1) For an ideal comparator, what should be the value of the response time?
  a) Zero b) Unity c) Infinite d) Unpredictable

(2) Input Impedance of Practical Op-Amp is
  a) Zero b) Very High c) Infinite d) Low

(3) In Dead Zone Circuit, V = +15 V, mR = 30 kohm and R = 10 kohm so what is the value of reference voltage?
  a) 5 V b) 15 V c) 20 V d) 10 V

(4) What happens when the operating frequency of an op-amp increase?
  a) Gain and phase shift of amplifier decreases
  b) Phase shift between output and input signal decrease
  c) Gain of the amplifier decrease
  d) None of the mentioned

(5) Flat- flat filter is also known as :
  a) Bessel b) Chebyshev c) Cauer d) Butterworth

(6) The cut off frequency occurs at attenuation of
  a) 0 dB b) 3dB c) 10 dB d) 0.5 dB

(7) Which amplifier provides twice output swing as that of LM380 amplifier?
  a) Hybrid power amplifier
  b) Monolithic power audio amplifier
  c) Dual power amplifier
  d) Bridge power audio amplifier

(8) PLL first stage is:
  a) VCO b) LPF c) Phase Detector d) None of the above

(b) Answer the following (Fill in the blanks and True or False) **(08)**

(1) Zero crossing detector circuit plays a crucial role in conversion of input sine wave into a perfect _____ at its output.

(2) Design a three channel inverting amplifier. The gains for each channel will be -10,-5 and -2 respectively and R1 = 100 Kohm.
So value of R2 = _____ Kohm and R3 = _____ Kohm

(3) The slew rate for a 741 is 0.5 V/microsecond. You can get an undistorted sine-wave output voltage of (a) 10 v peak, (b) 1 V peak At _____ and _____ maximum frequency respectively.

(4) The common-mode gain is Very Low and ideally Zero.(True or False)

(5) The minimum difference between two discrete values that can be distinguished by measuring device is _____.

(6) The ratio between the modulating signal voltage and the carrier voltage is called modulating signal Frequency. (True or False)

(7) The ratio of resonant frequency to bandwidth is called _____.

(8) _____filter produces a predictable phase shift characteristic in all frequencies.

Q.2   Attempt **any six** of the following.   **(12)**

(1) Explain any one application of Zero-Crossing Detector.
(2) Give an account of Audio Mixer.
(3) Explain the Phase Shifter circuit.
(4) Explain DC Voltmeter.
(5) Explain Phase angle detection.
(6) Draw the Block diagram of Phase-Locked Loop.
(7) Write advantages of Active filter over Passive filter.
(8) Write application of NE/SE 566 and ICL8038.

Q. 3   Describe any two practical application of Voltage level detector   **(08)**

OR

Q.3   Explain Multi-channel amplifier & Window Detector   **(08)**

Q. 4   Explain Instrumentation amplifier and its applications.   **(08)**

OR

Q. 4   With appropriate circuit and waveform explain AC to DC Converter.   **(08)**

Q. 5   Explain Sample & Hold Circuit. An S/H amplifier with an aperture time uncertainty of 50 ns is connected to an 8-bit ADC. Find the highest-frequency sine wave that can be digitized within an error of 1 LSB.   **(08)**

OR

Q. 5   Explain Amplitude Modulation & Demodulation Circuit and Frequency Shifting   **(08)**

Q. 6   Draw neat diagram of low pass filter circuit and frequency response curve. Write steps to design -60dB/ decade low pass Butterworth filter and determine the values of C1, C2 and R for a cut off frequency of 1 KHz where C3 = 0.01uF.   **(08)**

OR

Q. 6   Draw neat diagram of high pass filter circuit and frequency response curve for a 20 dB/decade slope and write the design procedure. If C = 0.002uF and f = 10KHz, Calculate R.   **(08)**

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