University of Mumbai

Examinations Summer 2022

Time: 2hour 30 minutes Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Unity gain amplifier is a
Option A:	Difference amplifier
Option B:	Comparator
Option C:	Single ended
Option D:	Voltage follower
2.	A Schmitt trigger uses
Option A:	Positive feedback
Option B:	Negative feedback
Option C:	Compensating capacitors
Option D:	Pull up resistors
3.	The input applied to an Inverting amplifier is _____
Option A:	Equal to output
Option B:	Equal to Inverted output
Option C:	Not equal to output
Option D:	Output id equal to input
4.	At which state the phase-locked loop tracks any change in input frequency?
Option A:	Free running state
Option B:	Phase locked state
Option C:	Capture state
Option D:	Minor state
5.	Operational amplifier amplifies the following signals
Option A:	AC signals
Option B:	DC Signals
Option C:	Both AC and DC signals
Option D:	Noise
6.	What is the role of the comparators in the IC 555 circuit?
Option A:	to compare the output voltages to the internal voltage divider
Option B:	to compare the input voltages to the internal voltage divider
Option C:	to compare the output voltages to the external voltage divider
Option D:	to compare the input voltages to the external voltage divider
7.	What is the resolution of a digital-to-analog converter (DAC)?
Option A:	It is the comparison between the actual output of the converter and its expected output
Option B:	It is the deviation between the ideal straight-line output and the actual output of the converter
Option C:	It is the smallest analog output change that can occur as a result of an increment in the digital input.
Option D:	It is its ability to resolve between forward and reverse steps when sequenced over its entire range.

8.	What is IC 723?
Option A:	A voltage regulator
Option B:	A full-wave rectifier
Option C:	A half-wave rectifier
Option D:	A clipper
9.	In a first order low-pass filter what value of R is required if the filter has a cut-off frequency of 1 kHz and C=0.01 microF
Option A:	15.9 kΩ
Option B:	20 kΩ
Option C:	16.9 kΩ
Option D:	17.9 kΩ
10.	An inverting summing amplifier with gain 1 has three different input voltage: 1.2 V, 2.2 V and 3.2 V. Find the output voltage?
Option A:	6.6 V
Option B:	3.2 V
Option C:	1.2 V
Option D:	-6.6 V

Option 1

Q2 **(20 Marks)**	**Solve any Four out of Six5 marks each**
A	*Explain Non-Inverting comparator with suitable example.*
B	*Define following OPAMP parameters.* *1) C.M.R.R 2) Slew rate 3) Input offset voltage 4) Input bias current* *5) output resistance*
C	*Explain 78XX series voltage regulator*
D	*Write short note on V to I Converter*
E	*Explain log and antilog amplifier using opamp*
F	*Draw and explain RC phase shift oscillator using opamp*

Option 2

Q3 **(20 Marks)**	**Solve any Two Questions out of Three 10 marks each**
A	*Design a 2nd order KRC low pass filter with cut off frequency of f_0=1Khz & Q=5.*
B	*Design a differentiator to differentiate input signal that varies in frequency from 10 Hz to about 1 kHz.*
C	*Design voltage regulator using IC 723 for Vo=10V & I_L=200mA.*

Option 3

Q4. **(20 Marks)**	
A	**Solve any Two** **5 marks each**
i.	*Draw block diagram and explain function of each block of operational amplifier.*
ii.	*Explain precision half wave rectifier using opamp.*
iii.	Explain Instrumentation amplifier & its applications.
B	**Solve any One** **10 marks each**
i.	*Explain Schmitt Trigger circuit. Design same for UTP and LTP= ±2V*
ii.	*Explain dual slope ADC with its advantages & drawbacks.*