

University of Mumbai
Examinations Commencing from 17th May 2022

Program: SEM IV C Scheme

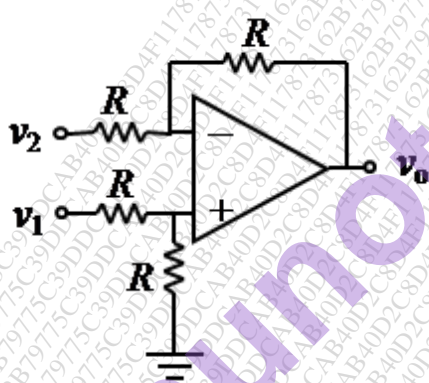
Curriculum Scheme: C Scheme R-2019

Examination: SE Semester IV

Course Code: ECC403 and Course Name: Linear Integrated Circuits

Time: 2-hour 30 minutes

Max. Marks: 80

Q1. (2 Marks Each)	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The input stage of operational amplifier is
Option A:	Common Emitter Amplifier
Option B:	Dual Input Balanced output Differential Amplifier
Option C:	Common Base Amplifier
Option D:	Common Collector Amplifier
2.	For the difference amplifier shown below, the output voltage is given by 
Option A:	$v_o = v_1 + v_2$
Option B:	$v_o = v_1 - v_2$
Option C:	$v_o = -v_1 + v_2$
Option D:	$v_o = -(v_1 + v_2)$
3.	A current to voltage converter converts
Option A:	Input current to proportional output voltage.
Option B:	Input current to proportional output current.
Option C:	Input voltage to proportional output voltage.
Option D:	Input voltage to proportional output current.
4.	For a Wein Bridge oscillator, the RC networks in the feedback circuit have values of their resistances $R = 3.3 \text{ k}\Omega$ and capacitances $C = 0.047 \text{ }\mu\text{F}$,
Option A:	Its frequency of oscillation is $\approx 1 \text{ kHz}$
Option B:	Its frequency of oscillation is $\approx 3.030 \text{ kHz}$
Option C:	Its frequency of oscillation is $\approx 3.3 \text{ kHz}$
Option D:	Its frequency of oscillation is $\approx 480 \text{ Hz}$
5.	An Inverting Schmitt trigger employs

Option A:	Only Negative feedback
Option B:	Only Positive feedback
Option C:	Both Negative and Positive feedback
Option D:	No feedback
6.	A square waveform having ON time equal to its OFF time is fed as input to an integrator. The resulting output of the integrator is called
Option A:	Triangular waveform
Option B:	Sawtooth waveform
Option C:	Inverted Square waveform
Option D:	Sine waveform
7.	The output pulse width of a monostable multivibrator using IC 555 where R and C are the external components is
Option A:	RC
Option B:	1.1 RC
Option C:	$(2/3) RC$
Option D:	$(1/3) RC$
8.	Role of Pin-7 of IC 555
Option A:	Control Voltage
Option B:	Reset
Option C:	Output
Option D:	Discharge
9.	For High voltage-High current type of voltage regulator using IC 723, output voltage and output currents respectively have the following correct values.
Option A:	Less than 7 V, greater than 150 mA
Option B:	Less than 7 V, less than 150 mA
Option C:	7 to 37 V, greater than 150 mA
Option D:	7 to 37 V, less than 150 mA
10.	For a Phase Locked Loop which of the following is true?
Option A:	Lock in range > Capture range
Option B:	Lock in range < Capture range
Option C:	Lock in range = Capture range
Option D:	Lock in range = half of Capture range

Q2 (10 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	Design a second order high pass Butterworth filter for cut off frequency of 1 kHz.	
B	With the help of a neat diagram explain the working of R C phase shift oscillator using op amp. Derive the expression for its frequency of oscillation.	
C	With help of neat circuit diagram, input and output waveforms, and voltage transfer characteristics explain the working of a non- inverting Schmitt trigger.	

Q3 (10 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	With the help of functional block diagram explain the working of PLL IC 565.	
B	Design an astable multivibrator using IC 555 for frequency 1 kHz & duty cycle 50%. Assume C = 0.1μF.	
C	Draw a neat circuit of an instrumentation Amplifier using 3-Op-Amps & Derive its output equation.	

Q4 (10 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	With the help of a neat circuit diagram and waveforms at relevant points in the circuit, explain the working of a square and triangular waveform generator. Derive the frequency of oscillation of the generator.	
B	Design a circuit using op-amp to perform $V_o = 2V_2 - 3V_1$, where V_1 and V_2 are inputs.	
C	Design a voltage regulator using IC 723 to deliver an output voltage of 15 V and load current upto 1.5 A.	