2511E639

Candidate's Seat No :_____

B.Sc. Sem-5 Examination
CC 301
Electronics
November 2021

Time : 2-00 Hours]

[Max. Marks : 50

Instructions: (1) All questions in Section-I carry equal marks
(2) Attempt any <u>Three</u> questions in <u>Section – I.</u>
(3) Question – 1 in section – II is compulsory

<u>SECTION - I</u>

Q-1	(A)	Discuss about transfer characteristics of an Op-Amp.	(7)
	(B)	Draw the circuit diagram of Emitter coupled differential amplifier along with its low frequency small signal equivalent circuit and derive the equation for closed loop voltage gain.	(7)
Q-2	(A)	Explain the 'current mirror' method to improve CMRR of the differential amplifier.	(7)
	(B)	In the basic differential amplifier circuit, $R_C = 2$ kΩ; $R_E = 4.3$ kΩ, $V_{CC} = IV_{EE}I = 5$ V; $\beta_0 = 200$, $V_{BE} = 0.7$ V. Determine the values of quiescent currents and voltages I_{BQ}, I_{CQ}, V_{O1}, V_{O2}, V_{CEQ} for both inputs V_1 and V_2 grounded.	(7)
Q-3	(A)	Draw the circuit of a grounded load voltage to current converter using Op-Amp. Explain its working.	(7)
	(B)	Explain with suitable diagram: Half-wave rectifier using Op-Amp.	(7)
Q-4	(A)	Discuss in brief the application of Op-Amp as non-inverting summing amplifier.	(7)
	(B)	Draw positive peak detector circuit using Op-Amp. Explain its working with suitable wave forms.	(7)
Q-5	(A)	Draw the block diagram of series IC voltage regulator. Explain voltage reference block using Zener diode and how it is compensated by base-emitter diodes of transistors.	(7)
	(B)	Write a short note on 3-Terminal positive IC voltage regulator.	(7)
Q-6	(A)	Discuss about regulator protection techniques.	(7)
	(B)	Discuss positive voltage regulator using IC μA 723 using fold-back current limiting circuit.	(7)
Q-7	(A)	Explain operation of switching regulator using LM 105.	(7)
	(B)	For buck-type switching regulator, draw the waveform of switching voltage, inductor voltage, capacitor voltage and derive the equation for ripple voltage.	(7)
Q-8	(A)	Explain the operation of free running switching regulator.	(7)
	(B)	For buck-type switching regulator derive the equation for minimum load current and critical inductance.	(7)

<u>SECTION - II</u>

Q-9		Answer following in brief (Any Eight):	(8)
	1	What is virtual ground for Op-Amp?	
	2	Full form of CMRR is _____.	
	3	The CMRR is measured in _____ unit.	
	4	Define: Common mode signal.	
	5	Scale changer circuit using Op-Amp is also known as _____.	
	6	_____ circuit is known as transconductance amplifier.	
	7	What is instrumentation amplifier?	
	8	What is the advantage of Op-Amp rectifier circuit over simple diode rectifier circuit?	
	9	Write any one advantage of IC voltage regulator over discrete component regulator.	
	10	Mention the purpose of 'voltage reference' used in IC regulators.	
	11	What is the output voltage of regulator IC 7812?	
	12	A 4-terminal IC regulator is superior to the 3-terminal IC regulator. Give reason.	
	13	What is the purpose of switching mode operation in switching regulators?	
	14	What is the full form of SMPS?	
	15	LM 305 is _____ voltage regulator, whereas LM 304 is _____ voltage regulator.	
	16	What is mean by boost type regulator?	