

Total No. of Questions: 6

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Enrollment No.....



Faculty of Engineering
End Sem (Odd) Examination Dec-2022
EE3CO30 Analog Electronics

Programme: B.Tech.

Branch/Specialisation: EE

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1
- i. With respect to base, emitter is always _____ biased. 1
(a) Backward (b) Forward (c) Reverse (d) Transverse
 - ii. Three terminals on a FET are _____. 1
(a) Drain, source and gate
(b) Drain, collector and gate
(c) Emitter, collector and base
(d) Source, emitter and collector
 - iii. Colpitts oscillator uses _____ feedback for oscillation. 1
(a) Negative (b) Positive (c) Zero (d) No
 - iv. The ratio of output current by input voltage is known as _____. 1
_____.
(a) Voltage amplification (b) Transconductance
(c) Current amplification (d) None of these
 - v. Which of the following is characteristic of ideal Op-Amp? 1
(a) Infinite open loop gain (b) Zero noise
(c) Infinite input impedance (d) All of these
 - vi. The CMRR of an ideal Op-Amp is _____. 1
(a) Low (b) Zero (c) High (d) Infinite
 - vii. Active filter circuits are made up of _____. 1
(a) Transformer and RL circuit
(b) RLC circuit
(c) Op-Amp and RLC circuit
(d) None of these

P.T.O.

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	viii.	Specific features of an Instrumentation amplifier are _____. (a) Low noise (b) High gain accuracy (c) Low thermal drift (d) All of these	1
	ix.	A monostable 555 timer has _____ stable state. (a) 0 (b) 3 (c) 1 (d) 5	1
	x.	The output impedance of the voltage regulator is _____. (a) Very large (b) Very small (c) High (d) None of these	1
Q.2	i.	Define alpha(α) and beta(β) of a transistor. Write the relation between them.	2
	ii.	What is transistor biasing? What are the different methods of transistor biasing?	3
	iii.	Write comparison between BJT and FET. Sketch and explain the drain characteristic of MOSFET.	5
OR	iv.	Which configuration among CC, CE, and CB is most used in amplifier Circuits? Draw its circuit diagram. Sketch the input and output characteristics of common emitter configurations. Properly indicate all the regions in the characteristics.	5
Q.3	i.	What is a push pull amplifier? Draw the circuit diagram of class A and class B push pull amplifier.	3
	ii.	What is criterion for oscillator? Explain Colpitts and Hartley oscillator with circuit diagram.	7
OR	iii.	What is power amplifier? Explain class A, class B and class C amplifier.	7
Q.4	i.	Define Op-Amp related terms mentioned below: (a) PSRR (b) CMRR (c) Input offset current (d) Output offset voltage	4
	ii.	What is an Op-Amp? What are the ideal characteristics of an ideal Op-Amp? Draw the equivalent circuit of an ideal Op-Amp mentioning all the terminal names.	6
OR	iii.	Draw the non-inverting and inverting amplifier circuits of an Op-Amp in close loop configuration. Find the expression for closed loop gain in both circuits.	6

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Q.5	i.	What is a sample and hold(S/H) circuit? What is the use of S/H circuit?	2
	ii.	What are four main types of filters? Briefly write about band pass and band reject filters.	3
	iii.	Draw integrator and differentiator circuits and derive the expressions for their output voltage. Draw the output waveforms in each case.	5
OR	iv.	Explain Schmitt trigger with suitable circuit diagram and waveforms. Briefly write, how we can use Schmitt trigger circuit as a sine wave to square wave converter.	5
Q.6		Attempt any two:	
	i.	Draw the block diagram of the 3 pin IC voltage regulator with explanation. Write a comparison between LM78XX and LM317 voltage regulators.	5
	ii.	What is a multivibrator? Briefly write about all the three types of multivibrators and their applications.	5
	iii.	What is an SMPS? Draw the block diagram of SMPS and briefly explain it. Mention the advantages and applications of SMPS.	5

Marking Scheme
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Q.1	i.	(b) Forward	1 Mark	1
	ii.	(a) Drain, source and gate	1 Mark	1
	iii.	(b) Positive	1 Mark	1
	iv.	(b) Transconductance	1 Mark	1
	v.	(d) All of these	1 Mark	1
	vi.	(b) Zero	1 Mark	1
	vii.	(c) Op-Amp and RLC circuit	1 Mark	1
	viii.	(d) All of these	1 Mark	1
	ix.	(c) 1	1 Mark	1
	x.	(b) Very small	1 Mark	1
Q.2	i.	Both definition true	1 Mark	2
		Relation true	1 Mark	
	ii.	Transistor biasing	1 Mark	3
		3 methods of transistor biasing	2 Marks	
	iii.	Comparison of BJT and FET	2 Marks	5
		Sketch of drain characteristic of MOSFET	1 Mark	
		Explanation of drain characteristics	2 Marks	
	OR iv.	CE configuration is most used	1 Mark	5
		CE configuration circuit diagram	1 Mark	
		Draw input characteristics	1 Mark	
		Draw output characteristics	1 Mark	
		Regions mentioned in the characteristics.	1 Mark	
Q.3	i.	Push pull amplifier	1 Mark	3
		Circuit diagram of class A	1 Mark	
		Circuit diagram of class B	1 Mark	
	ii.	Criterion for oscillator	1 Mark	7
		Explain Colpitts oscillator with circuit diagram	3 Marks	
		Explain Hartley oscillator with circuit diagram	3 Marks	
	OR iii.	Power amplifier	1 Mark	7
		Explain class A amplifier	2 Marks	
		Explain Class B amplifier	2 Marks	
		Explain Class C amplifier	2 Marks	

Q.4	i.	(a) PSRR	1 Mark	4
		(b) CMRR	1 Mark	
		(c) Input offset current	1 Mark	
		(d) Output offset voltage	1 Mark	
	ii.	Op-Amp definition	1 Mark	6
		Characteristics of an ideal Op-Amp	3 Marks	
		Equivalent circuit of an ideal Op-Amp	2 Marks	
	OR iii.	Non-inverting amplifier circuits in close loop	1 Mark	6
		Inverting amplifier circuits in close loop	1 Mark	
		Non-inverting gain expression	2 Marks	
		Inverting gain expression	2 Marks	
Q.5	i.	Definition of sample and hold(S/H) circuit	1 Mark	2
		Use of S/H circuit	1 Mark	
	ii.	Four types of filters	1 Mark	3
		Band pass filters	1 Mark	
		Band reject filters	1 Mark	
	iii.	Integrator and differentiator circuits diagram	2 Marks	5
		Output voltage expressions for both	2 Marks	
		Both output waveforms	1 Mark	
	OR iv.	Schmitt trigger circuit diagram	1 Mark	5
		Necessary waveforms	1 Mark	
		Explanation of Schmitt trigger	1 Mark	
		Sine wave to square wave converter explanation	2 Marks	
Q.6	Attempt any two:			
	i.	Block diagram of IC voltage regulator	1 Marks	5
		Its explanation	2 Marks	
		Comparison between LM78XX and LM317	2 Marks	
	ii.	Multivibrator definition	1 Mark	5
		Three types of multivibrators	3 Marks	
		Applications of multivibrators	1 Mark	
	iii.	SMPS definition	1 Mark	5
		Block diagram of SMPS	1 Mark	
		Explanation	1 Mark	
		Advantages of SMP	1 Mark	
	Applications of SMP		1 Mark	
