

Total No. of Questions: 6

Total No. of Printed Pages:3

Enrollment No.....



Faculty of Engineering
End Sem (Odd) Examination Dec-2019
EE3CO23 / EX3CO23 Analog Electronics
Programme: B.Tech. Branch/Specialisation: EE/EX

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. | In a BJT, Largest current flow occurs | 1 |
| | | (a) In the emitter (b) In the collector | |
| | | (c) In the base (d) Through CB junction | |
| | ii. | The FET operates on | 1 |
| | | (a) Majority Carriers only | |
| | | (b) Minority Carriers Only | |
| | | (c) Positively Charged ions only | |
| | | (d) None of these | |
| | iii. | Hartley oscillator is commonly used in | 1 |
| | | (a) Radio receivers (b) Radio transmitters | |
| | | (c) TV receivers (d) None of these | |
| | iv. | Maximum class A signal can be obtained when Q-point is | 1 |
| | | (a) Under the ac load line | |
| | | (b) Above the ac load line | |
| | | (c) At the right of the ac load line | |
| | | (d) At the centre of the ac load line | |
| | v. | Since input resistance of an ideal Op-amp is infinite | 1 |
| | | (a) Its output resistance is zero | |
| | | (b) Its output is independent of load resistance | |
| | | (c) Its input current is zero | |
| | | (d) It become a current controlled device | |
| | vi. | The unity gain frequency of an Op-amp is equal to | 1 |
| | | (a) 10^3 Hz (b) 10^6 Hz (c) 10^2 Hz (d) 10 Hz | |

P.T.O.

[2]

vii.	The Op-amp comparator circuit uses (a) Positive Feedback (b) Negative feedback (c) Regenerative feedback (d) No feedback	1
viii.	Basic active filter is the combination of (a) RC circuit and transformer (b) Schmitt trigger and op amp (c) RC circuit and op amp (d) None of these	1
ix.	A bistable multivibrator (a) Has two stable states (b) Has one stable states (c) Oscillates between two stable states without any trigger pulse (d) Is used for generating square wave	1
x.	In an astable multivibrator (a) $\beta=1$ (b) $\beta A=1$ (c) $\beta>1$ (d) $\beta<1$	1
Q.2	i. Explain the following, in terms of transistor (a) Maximum Collector Current (b) Maximum power dissipation (c) Maximum output voltage (d) The pinch off Voltage ii. Give the comparison between BJT & FET. iii. Explain the construction of n-channel enhancement type of MOSFET, also brief the idea of formation of channel with a suitable diagram.	2 3 5
OR	iv. Give the analysis of BJT amplifier, using h-parameter model	5
Q.3	i. Give the significance of multistage amplifier. ii. Draw neatly configuration of push-pull amplifier and explain its working. Derive an expression for its efficiency?	4 6
OR	iii. A Hartley Oscillator is designed with $L_1=2\text{mH}$, $L_2=20\text{ }\mu\text{H}$ and a variable capacitance. Determine the range of capacitance values, if the frequency oscillation is varied between 950 and 2050 KHz.	6
Q.4	i. Draw an Op-amp whose output is $(V_1 + V_2 + V_3 + V_4) A_f$.	2

[3]

	ii.	Define the common mode rejection ratio (CMRR) and explain the significance of a relatively large value of CMRR.	3
	iii.	Draw the inverting amplifier circuits of an Op-amp in close loop configuration. Obtain the expression for the closed loop gain in these circuits.	5
OR	iv.	Explain how a basic inverting amplifier configuration of an Op-amp is used as the following Circuits (a) Sign Changer (b) Scale Changer.	5
Q.5	i.	What is an instrumentation amplifier?	2
	ii.	What are the four main types of filters? Briefly Explain with figures.	8
OR	iii.	Explain the working of R-C phase shift oscillator with help of suitable considerations.	8
Q.6		Attempt any two:	
	i.	What is multivibrator? Explain the difference between the three types of multivibrators?	5
	ii.	Explain the operation of an IC555 as an astable multivibrator?	5
	iii.	Write a short note on SMPS.	5

Marking Scheme
EE3CO23 / EX3CO23 Analog Electronics

Q.1	i.	In a BJT, Largest current flow occurs		1	OR	iii.	Determine the range of capacitance values		6
		(a) In the emitter					3 marks for each	(3 marks * 2)	
	ii.	The FET operates on		1					
		(a) Majority Carriers only							
	iii.	Hartley oscillator is commonly used in		1					
		(a) Radio receivers							
	iv.	Maximum class A signal can be obtained when Q-point is		1					
		(d) At the centre of the ac load line							
	v.	Since input resistance of an ideal Op-amp is infinite		1					
		(c) Its input current is zero							
Q.2	vi.	The unity gain frequency of an Op-amp is equal to		1	OR	iv.	Explain how a basic inverting amplifier configuration of an Op-amp is used as the following Circuits		5
		(b) 10^6 Hz					(a) Sign Changer	2.5 marks	
	vii.	The Op-amp comparator circuit uses		1			(b) Scale Changer	2.5 marks	
		(d) No feedback							
	viii.	Basic active filter is the combination of		1					
		(c) RC circuit and op amp							
	ix.	A bistable multivibrator		1					
		(a) Has two stable states							
	x.	In an astable multivibrator		1					
		(a) $\beta=1$							
Q.3	i.	Explain the following, in terms of transistor		2	Q.4	i.	Circuit diagram		2
		0.5 mark for each term	(0.5 mark * 4)			ii.	Define the common mode rejection ratio (CMRR)	1.5 marks	3
	ii.	Comparison between BJT & FET		3			Significance of a relatively large value of CMRR	1.5 marks	
		1 mark for each difference	(1 mark * 3)			iii.	Circuit diagram	2 marks	5
OR	iii.	n-channel enhancement type of MOSFET		5	OR		Expression	3 marks	
		Construction	2.5 marks						
		Formation of channel with diagram	2.5 marks			iv.	Explain how a basic inverting amplifier configuration of an Op-amp is used as the following Circuits		5
	iv.	Analysis of BJT amplifier, using h-parameter model	2.5 marks	5			(a) Sign Changer	2.5 marks	
Q.4		Explanation	2.5 marks		Q.5		(b) Scale Changer	2.5 marks	
						i.	Definition of instrumentation amplifier		2
						ii.	Four main types of filters		8
							Each filter with figure 2 marks for each	(2 marks * 4)	
Q.5					OR	iii.	Working of R-C phase shift oscillator	3 marks	8
							Diagram	2 marks	
							Considerations	3 marks	
Q.6					Q.6		Attempt any two:		
						i.	Definition of multivibrator	2 marks	5
							Difference b/w the three types of multivibrators	3 marks	
						ii.	Operation of an IC555 as an astable multivibrator		5
OR					Q.6		Circuit diagram	2 marks	
							Explanation	3 marks	
						iii.	SMPS		5
							Circuit diagram	1 mark	
Q.3					Q.6		Working	3 marks	
							Waveforms	1 mark	
Q.3	i.	Significance of multistage amplifier.		4	Q.6				
	ii.	Configuration of push-pull amplifier		6					
		Diagram	2 marks						
		Working	2 marks						
Q.3		Expression for its efficiency	2 marks		Q.6				
