

<b>Scheme of Valuation/Answer Key</b> (Scheme of evaluation (marks in brackets) and answers of problems/key) <b>Total Pages:2</b>			
<b>APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY</b> THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018			
<b>Course Code: EE203</b>			
<b>Course Name: ANALOG ELECTRONICS CIRCUITS</b>			
Max. Marks: 100			Duration: 3 Hours
<b>PART A</b>			
<i>Answer all questions, each carries 5 marks.</i>			Marks
1		Circuit of a simple zener voltage regulator –( 1 mark) $I_L = 24\text{mA}$ (1 mark) $R_{S\text{max}} = (V_{\text{max}} - V_Z) / (I_{Z\text{min}} + I_L) = 88\Omega$ (1 mark) $R_{S\text{min}} = (V_{\text{min}} - V_Z) / (I_{Z\text{max}} + I_L) = 57.6\Omega$ (1 mark) $R_{S\text{min}} \leq R_s \leq R_{S\text{max}}$ (1 mark)	(5)
2		Frequency response characteristics of RC coupled amplifier ( 2 marks) Reasons behind its shape- 3 regions – (3 marks)	(5)
3		Negative feedback Merits – (4 mark) Negative feedback Demerits – (1 marks)	(5)
4		Ideal Op-Amps –( 2.5 marks) Practical Op-Amps- (2.5 marks)	(5)
5		Circuit of an inverting amplifier –(2 marks ) Derivation-(2 marks) Final expression –(1mark)	(5)
6		Schmitt trigger circuit –(2 marks), Equations-(1mark) $V_{UT} = 4.58\text{ V}$ (1 mark) $V_{LT} = 3\text{ V}$ (1 mark)	(5)
7		OP-Amp square wave generator Circuit- (2 marks), Waveform(1 mark), Explanation – (2 marks)	(5)
8		OP-Amp crystal oscillator Circuit- (2 marks), Explanation – 3 marks	(5)
<b>PART B</b>			
<i>Answer any twofull questions, each carries 10 marks.</i>			
9	a)	h parameter small signal low frequency model for BJT – (4 marks)	(4)
	b)	Current gain-(1.5 marks), Input impedance -(1.5 marks ), voltage gain-(1.5 marks) Output impedance (1.5 marks )	(6)

10	a)	Small signal model of FET with explanation –( 4 marks )	(4)
	b)	Equations –(2 marks ) $V_{TH} = 3.81 \text{ V}$ $R_{TH} = 17.35\text{k}\Omega$ (1 mark) $I_{B(Q)} = 39.6 \mu\text{A}$ (1 mark) $I_{C(Q)} = 1.98 \text{ mA}$ (1mark) $V_{CE(Q)} = 4.5 \text{ V}$ (1 mark) Note: In this case approximate method will not give accurate result. ( $\beta R_E < 10 R_2$ ). Maximum marks for analysis by approximate method – (2 marks)	(6)
11		Construction (2marks ), biasing (2marks), operation (2marks) , Drain characteristics (2marks) and transfer characteristics (2marks) of JFET	(10)
<b>PART C</b>			
<i>Answer any two full questions, each carries 10 marks.</i>			
12	a)	Class A transformer coupled amplifier circuit & explanation –( 4 marks) Derivation of maximum overall efficiency- (4marks)	(8)
	b)	Advantages and disadvantages – (2 marks)	(2)
13	a)	Different types of multistage amplifiers - (5 marks)	(5)
	b)	Colpitt's Oscillator Circuit diagram (2 marks), explanation(2 marks), frequency of oscillation(1 marks)- (5 marks)	(5)
14	a)	Definition ( 2 marks each) i)CMRR    ii)Slew rate    iii) Input bias current    (iv) Input offset voltage	(8)
	b)	Typical values of above parameters for 741 IC- (2 marks)	(2)
<b>PART D</b>			
<i>Answer any two full questions, each carries 10 marks.</i>			
15	a)	Op-Amp integrator circuit (1.5marks), working and output voltage expression (1.5marks) Differentiator circuit (1.5 marks), working and output voltage expression (1.5marks)	(6)
	b)	Circuit diagram and explanation(2), Design explanation (2),	(4)
16	a)	Features of instrumentation amplifier (2 marks) Circuit diagram ( 2 marks ) and Derivation of output voltage – (2 marks)	(6)
	b)	Designs with $f = 1/2\pi RC$ , $R_3/R_4 = 2$ ( 4 marks)	(4)
17		Internal circuit diagram of IC555 (3 marks) Astable multivibrator circuit and operation (3 marks) Waveform(1 mark), Derivation –(3 marks)	(10)
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