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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech Degree Examination December 2021 (2019 scheme)

Course Code: RAT203

Course Name: ELECTRONIC DEVICES AND CIRCUITS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions. Each question carries 3 marks Marks

1 Design a clippling circuit to clip a sine wave at ±4V. (3)

2 Briefly explain the working of zener shunt voltage regulator. (3)

3 Explain how FET will function as a switch. (3)

4 Draw the hybrid pi model of BJT amplifier. (3)

5 Differentiate between positive and negative feedback. (3)

6 What is cross over distortion? How it can be eliminated? (3)

7 What is the working principle of an oscillator? (3)

8 Compare an ideal op-amp and practical op-amp. (3)

9 Draw and explain the working of a basic integrator circuit using op-amp. (3)

10 Define lock range and capture range of PLL. (3)

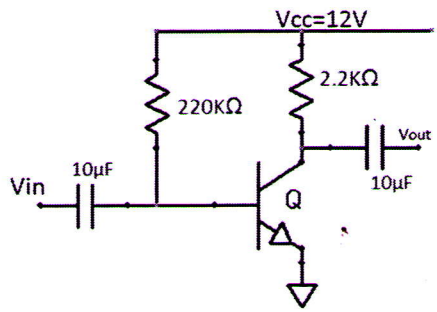
PART B

Answer any one full question from each module. Each question carries 14 marks

Module 1

11 a Explain bias compensation using diode and thermistor (6)

b Calculate the input resistance, output resistance and voltage gain for the circuit shown using h parameter model. (8)



12 a Sketch and explain the circuit of a double ended clipper using ideal PN diodes which limits the output between ±6V for an input of ±10V.Also draw the transfer characteristics. (7)

	b	For the fixed bias circuit, V_{CC}=10V, R_B=50KΩ, R_C=500Ω, find the operating point and locate the operating point on the dc load line. Assume silicon transistor with β=50 and V_{BE}=0.7V	(7)

Module 2

13	a	With the aid of drain and transfer characteristics, explain the working of n-channel enhancement MOSFET	(8)
	b	For a JFET using voltage divider bias,R_1=12KΩ, R_2=4KΩ, R_D=500Ω, Rs=1KΩ.Calculate the voltage at i)the gate ii)the source iii)the drain iv)from drain to source.	(6)
14	a	Discuss the low frequency analysis of FET common source amplifier.	(8)
	b	What is Miller's theorem. Explain the significance of Miller effect capacitance.	(6)

Module 3

15	a	Compare RC coupled and transformer coupled amplifers.	(6)
	b	Explain the effect of negative feedback on gain, input impedance, output impedance and bandwidth of an amplifier.	(8)
16	a	Discuss the basic feedback topologies with respect to gain, input impedance and output impedance.	(8)
	b	Discuss the operation of series fed class A power amplifier. Write the conversion efficiency.	(6)

Module 4

17	a	With a neat circuit diagram, explain the working of Hartley oscillator. Also derive an expression for frequency of oscillation.	(8)
	b	Explain the working of a non-inverting amplifier using op-amp. Derive the expression for closed loop voltage gain.	(6)
18	a	Draw the equivalent circuit of ideal and practical op-amp.	(4)
	b	Define(i)Input bias current (ii)Slew rate (iii) Input offset voltage (iv) CMRR	(6)
	c	Explain the working principle of crystal oscillator.	(4)

Module 5

19	a	Draw and explain the working of instrumentation amplifier .Also derive the expression for gain.	(7)
	b	Write short note on 78XX and 79XX voltage regulators.	(3)
	c	Explain the effect of slew rate on waveform generation.	(4)
20	a	Explain the working of Astable multivibrator using 555 Timer IC with relevant waveforms and functional diagram	(8)
	b	With a neat functional diagram, explain the operation of IC 723.	(6)

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