Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

Course Code: CS207

Course Name: ELECTRONIC DEVICES AND CIRCUITS

Max. Marks: 100 Duration: 3 Hours

PART A

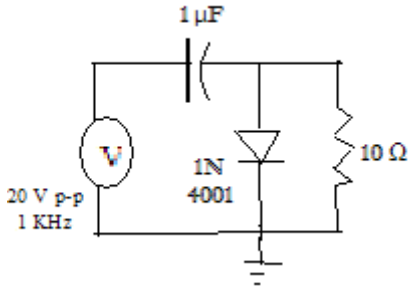
Answer all questions, each carries 3 marks. Marks

1 Trace the response of a RC differentiator circuit to square wave input for the designed frequency and justify circuit action. Also plot the Lissajous pattern for a sinusoidal input (3)

2 Design a circuit to obtain 10V peak to peak trapezoidal waveform from 230 V mains (3)

3 Design a loaded 5V zener regulator for a load current of 20 mA. Input voltage is 12 V dc. Assume that zener knee current is 5 mA. (3)

4 Verify whether the following circuit will work as a clamper (3)



PART B

Answer any two full questions, each carries 9 marks.

5 a) Draw and explain the circuit of a voltage tripler. (5)

b) With the help of relevant characteristics curve, verify whether a FET can be used as a resistance (4)

6 a) Draw and explain the transistorised sweep circuit using a normally on transistor switch (4)

b) Draw and explain the circuit of a series voltage regulator using transistors. Show how fold back current limiting can be implemented in the circuit. (5)

7 a) Design a circuit using passive components to convert a 1 KHz triangular wave to a square wave (3)

b) With the help of a block diagram, explain the working of an SMPS (6)

PART C

Answer all questions, each carries 3 marks.

8 The output of a transistor based RC coupled amplifier appears clipped during both half cycles. Identify possible issues and suggest solutions. (3)

9 What are the different feedback arrangements used in amplifiers and oscillators (3)

10 Sketch and explain a common source MOSFET amplifier (3)

11 Explain the working of a crystal oscillator (3)

PART D

Answer any two full questions, each carries 9 marks.

12 Design an RC Coupled Amplifier using transistors with the following specifications : (9)

V_{cc} = 10 V dc, I_c = 2 mA, h_{fe} = 100, Lower cut off frequency = 100 Hz, Upper cut off frequency = 100 KHz.

Justify the shape of the frequency response curve.

13 Sketch and explain a Wein Bridge Oscillator using transistors. Examine how Barkhausen criteria is satisfied in this circuit (9)

14 With neat sketches and relevant waveforms, explain the working of an Astable Multivibrator using transistors. For the circuit if $\frac{R1}{R2} = \frac{1}{m}$ and $\frac{C1}{C2} = \frac{1}{n}$ where R1, R2, C1 and C2 denote timing components as usual, prove that the duty cycle of the output waveform is $\frac{1}{1+mn}$ (9)

PART E

Answer any four full questions, each carries10 marks.

15 a) Compare ideal and actual parameters of an OPAMP (4)

b) Draw and explain the circuit of a summing amplifier using OPAMPs. Realise $Y(t) = 5 + 3 \sin \omega t - 6 \cos \omega t$ using IC 741 (6)

16 a) Sketch and explain an OPAMP integrator. Realise an active integrator using IC741 for a frequency of 2 KHz (6)

b) Compare active and passive filters (4)

17 a) Draw and explain a sample and hold circuit. Cite a few of its applications (7)

b) Quote a few practical applications of OPAMPS (3)

18	a)	With neat sketches, explain a differential amplifier	(6)
	b)	Compare binary weighted and R-2R ladder D/A Converters	(4)
19	a)	Realise an active first order high pass filters using OPAMPS for a lower cut off frequency of 1 KHz and a pass band gain of 2	(5)
	b)	Sketch and explain the circuit of a monostable multivibrator using IC 555	(5)
20	a)	Explain the circuit of a Wein Bridge Oscillator using OPAMPS	(5)
	b)	Design an Astable Multivibrator using IC 555 for a frequency of 1 KHz and a duty cycle of 60%	(5)

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