Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third semester B.Tech degree examinations (S) September 2020

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		Draw a differentiator circuit and draw the input and output waveforms for square wave input.	(3)
2		Draw the input and output waveforms of a sweep circuit using a transistor as a switch. Sketch the relevant circuit diagram.	(3)
3		What are the different types of DC to DC converters.	(3)
4		Compare JFET with BJT.	(3)

PART B

Answer any two full questions, each carries 9 marks.

5	a)	Assuming suitable values, design an integrator circuit for a 1 KHz square wave. Draw the relevant waveforms and circuit with designed components.	(5)
	b)	Draw the circuit diagram of a three pin regulator for obtaining a 5V output.	(4)
6	a)	Draw the circuit of a transistor shunt regulator and explain its working.	(5)
	b)	Design a circuit to convert a bipolar signal to a signal having value between 0V and above, without change in wave shape.	(4)
7	a)	Draw the internal structure of IC723 and explain its working.	(5)
	b)	Draw the circuit of a voltage tripler and plot the waveforms.	(4)

PART C

Answer all questions, each carries 3 marks.

8		What is the significance of a load line in an amplifier?	(3)
9		Why are multistage amplifiers used? What are its drawbacks?	(3)
10		How does a crystal oscillator work? What are its advantages?	(3)
11		Draw the circuit of a RF tuneable oscillator and write the equation for finding its frequency of operation.	(3)

PART D

Answer any two full questions, each carries 9 marks.

12 a) Why is potential divider biasing more stable and independent of transistor characteristics than other biasing arrangements. (5)

b) Design a transistor based circuit for generating a square wave of 1KHz. (4)

13 a) Design an amplifier using self biasing for maximum output swing of approximately 10V and maximum collector current of 1 mA. Given β=100, V_{BE}=0.7V, draw the circuit using the designed components. (5)

b) Draw the circuit diagram of a monostable multivibrator and explain its working. (4)

14 a) Design a transistor based Wien bridge oscillator for an output frequency of 5 KHz. Draw the circuit using the designed components. (5)

b) Draw the circuit diagram of a common source MOSFET amplifier and explain its working. (4)

PART E

Answer any four full questions, each carries 10 marks.

15 a) With necessary figures, explain the concept of 'virtual ground' in an operational amplifier. (4)

b) Design a second order active low pass filter for 2.5 KHz, with a pass band gain of 4dB. Draw the circuit with the designed components. (6)

16 a) Compare the characteristics of an ideal operational amplifier with IC741. (5)

b) Design a first order active high pass filter for 3.3 KHz, with a pass band gain of 3dB. Draw the circuit with the designed components. (5)

17 a) Design a Schmitt trigger circuit using an operational amplifier when input voltage, $|V_{in}| > 3V$. Assume an op-amp power supply voltage of ±12 V. Draw the circuit diagram and relevant waveforms. (5)

b) Prove that a weighted resistor network can convert a digital signal to analog signal. What are the drawbacks of this converter? (5)

18 a) With the help of a circuit diagram and necessary equations, show how an operational amplifier can be used to find the difference between two voltages. (5)

b) With the help of necessary figures, explain the working of a 2 bit flash ADC. (5)

19	a)	Draw the figure of an operational amplifier differentiator and prove that the output is proportional to derivative of the input.	(5)
	b)	With the help of necessary figures, explain the working of a mono-stable multivibrator using IC555.	(5)
20	a)	Design a Wien bridge oscillator using an operational amplifier for 1.5 KHz. Draw the circuit diagram and relevant waveforms.	(5)
	b)	Draw the block schematic of a dual slope analog to digital converter and explain its working.	(5)

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