Reg. No._____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, JANUARY 2017

Course Code**: CS207**

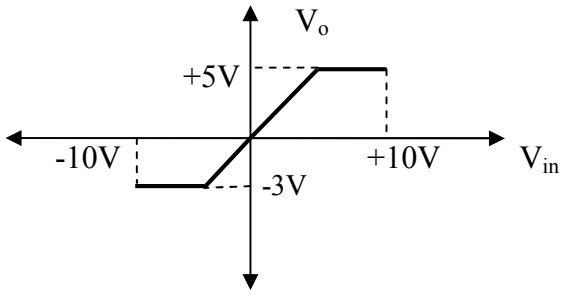
Course Name**: ELECTRONIC DEVICES AND CIRCUITS (CS)**

Max. Marks 100 Duration: 3Hours

PART A

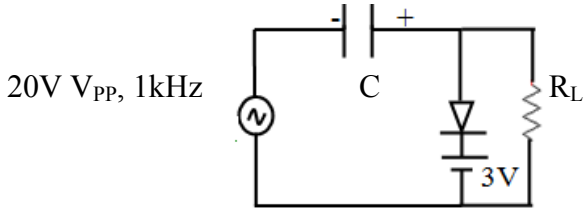
(Answer ANY THREE questions)

1. Assuming voltage drop across the diode as 0.6V, design a diode shunt clipper with transfer characteristics as shown in the following diagram.



(4)

2. Assuming voltage drop across the diode as 0.6V, sketch the output waveform and voltage transfer characteristics of the following circuit.



(4)

3. Compare the properties of FET over BJT. (4)
4. Explain the functional diagram of LM723. (4)

PART B

(Answer ANY TWO questions)

5. With neat sketches explain the construction, principle of operation, and characteristics of an n-channel enhancement MOSFET. (9)
6. (i)What are the necessary conditions for an RC circuit to be a differentiator? (2)
   (ii)Explain the working of an RC differentiator circuit for a square wave input with period T.Sketchits output waveform for $RC \gg T$,$RC \ll T$ and $RC = T$. (7)
7. (i) Explain the working of a simple series voltage regulator using transistor. (5)
   (ii)Discuss about simple sweep circuit using transistor. (4)

PART C

(Answer ANY THREE questions)

8. State and explain Barkhausen criteria for sustained oscillation. (4)
9. Explain the effect of cascading on amplifier's gain and bandwidth. (4)
10. Briefly describe the working of a Hartley oscillator. (4)
11. Explain the effect of negative feedback on amplifier. (4)

PART D

(Answer ANY TWO questions)

12. (i) With neat diagram,explain the working principle of Wien bridge oscillator using BJT. (5)

    (ii)Derive the expression for the frequency of oscillation of Wien bridge oscillator using BJT. (4)
13. (i) Sketch and explain the frequency response of an RC coupled amplifier (4)

    (ii) With neat diagram,explain the working of astable multivirator using BJT. (5)
14. (i)Explain Potential divider biasing for a transistor in Common Emitter configuration with necessary equations. (4)

    (ii) A transistor with h_{FEmin}= 50 is to be used in the potential divider bias configuration in Common emitter mode with V_{CC}=18V,V_{BE}=0.7V R_1=33 kΩ,R_2= 12 kΩ, R_E= 1kΩ ,R_C= 1.2kΩ and. Calculate biasing current I_C,I_B,I_E and voltages Vc,V_E,V_{CE}. (5)

PART E

(Answer ANY FOUR questions)

15. (i) List out the ideal characteristics of an OP-AMP. What are their typical values for IC741 OP-AMP. (5)

    (ii)With neat diagram,explain the working and transfer characteristics of a non-inverting Schmitt trigger using OP-AMP. (5)
16. (i) With necessary equations explain the working of an integrator circuit using OP-AMP for a square wave input with period T. (5)

    (ii) What do you mean by differential amplifier? With neat sketches, explain the working of an open loop OP-AMP differential amplifier. (5)
17. (i) Explain the working of Summing amplifier and subtractor circuit using OP-AMP. (3)

    (ii)Design a summing amplifier circuit using OP-AMP to yield $V_0 = -V_1 + 2V_2 - 3V_3$. (2)

18. (i) With neat functional diagram explain the working of monostable multivibrator using IC555 timer. (7)

    (ii) Design a monostable multivibrator using IC 555 timer for a pulse period of 1 ms. (3)

19. (i) Drawthe circuit diagram and frequency response of a first order low pass butterworth filter using OP-AMP and explain its working and. (6)

    (ii) Design a first order butterworth LPF using OP-AMP for a cut off frequency of 2kHz with a pass band gain of 2. (4)

20. (i)Explain the working principle of a R-2R ladder type DAC. (6)

    (ii)A 4-bit R-2R ladder type DAC having R= 10 kΩ and V_R= 10 V. Find its resolution and output voltage for an input 1101. (4)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, JULY 2017

CS207: ELECTRONIC DEVICES AND CIRCUITS (CS)

Max. Marks: 100 Duration : 3 Hours.

PART A

Answer All questions.

1. Explain the following waveforms: (3)
   a) Ramp
   b) Step
   c) Square
2. Draw and explain the circuit diagram for RC differentiator. (3)
3. Compare BJT and FET. (3)
4. Explain Zener voltage regulators. (3)

PART B

Answer any 2 questions.

5. Explain the following with examples (9)
   a) clipper circuits.
   b) clamper circuits.
6. With the neat sketches and waveforms explain Enhancement type N channel MOSFET. (9)
7. With the neat sketch explain (9)
   a) voltage doubler
   b) voltage tripler

PART C

Answer All questions.

8. What is mean by operating point of a transistor? (3)
9. Explain about the effect of negative feedback on Bandwidth. (3)
10. What is the criterion for oscillation? (3)
11. Draw the circuit diagram for bistable multivibrator and give a simple explanation? (3)

PART D

Answer any 2 questions.

12. Explain voltage divider bias? (9)
13. With a neat circuit diagram and relevant waveforms and equations, Explain and analyze Hartley Oscillators. (9)
14. Explain Monostable multivibrators with circuit and waveforms and obtain design Equations. (9)

PART E

Answer any 4 questions.

15. Explain any 3 applications of an opamp. (10)
16. Explain Weinbridge oscillator using opamp. (10)
17. Explain Sample and hold circuit. (10)
18. Using 555 timer, Explain the operation of monostable multivibrator with necessary waveforms. (10)
19. Explain the following: (10)
    a) Flash type ADC
    b) Successive approximation type ADC
20. Explain the concept of Binary weighted resistor DAC. What are its drawbacks? In a 10 bit DAC, Reference voltage is given as 15v. Find analog output for digital input of 1011011001. (10)

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Total Pages: 2

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: CS207

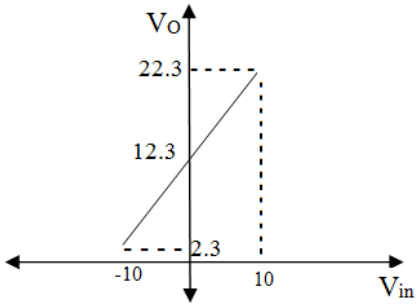
Course Name: ELECTRONIC DEVICES AND CIRCUITS (CS)

Max. Marks: 100 Duration: 3 Hours

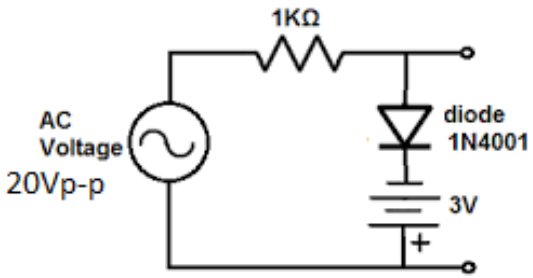
PART A

Answer all questions, each carries 3 marks.

		Marks
1	Design a clamper circuit to get the following transfer characteristics, assuming voltage drop across the diode s 0.7V.	(3)



2	Draw the output waveform of the following circuit, assuming voltage drop across the diode is 0.7V.	(3)



3	Compare linear regulator with switching regulator.	(3)
4	Compare FET with BJT	(3)

PART B

Answer any two full questions, each carries 9 marks.

5	a)	With neat sketches explain the principle and working of RC integrator circuit.	(5)
	b)	Explain the response of an RC integrator circuit for a for a square wave input.	(4)
6	a)	With neat sketches explain the working of n-channel JFET.	(5)
	b)	Draw the characteristics of n-channel JFET	(4)
7	a)	Draw and explain a circuit whose output voltage is three times as that of input voltage.	(5)
	b)	Discuss about simple zener shunt voltage regulator with the help of circuit diagram.	(4)

PART C

Answer all questions, each carries 3 marks.

8	Define stability factor. Write down the expression for stability factor S.	(3)
9	Compare positive feedback with negative feedback.	(3)

10 What is meant by sustained oscillation? What are thecriteria's for obtaining sustained oscillations? (3)

11 An astable multivibrator having R_1= 2KΩ,R_2=20KΩ and C_1=0.01μF, C_2=0.05μF. Determine the period and frequency of oscillation. (3)

PART D

Answer any two full questions, each carries 9 marks.

12 a) With the help of circuit diagram explain the working of RC coupled amplifier. (5)

b) Draw and explain the frequency response of RC coupled amplifier. (4)

13 a) With neat diagram explain the working of Hartley oscillator using BJT. (4)

b) Derive the expression for frequency of oscillation and loop gain of a Hartley oscillator using BJT. (5)

14 a) Explain the effect of negative feedback on amplifiers. (5)

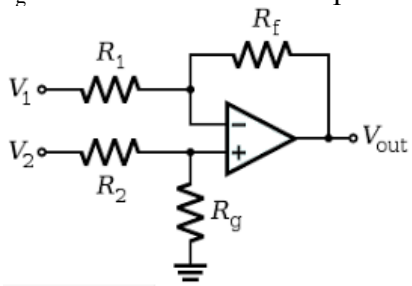
b) With neat diagram explain the working of monostable multivibrator using BJT (4)

PART E

Answer any four full questions, each carries 10 marks.

15 a) With neat diagram explain the working and hysteresis curve of a non inverting Schmitt trigger using op amp. (6)

b) The difference amplifier shown in the figure having R_1=R_2=5KΩ,R_F=10KΩ,R_g=1kΩ. Calculate the output voltage. (4)



16 a) Explain RC differentiator circuit using op amp. (4)

b) With the help of diagram explain a three input inverting summing amplifier. (4)

c) Realize a circuit to obtain Vo= -$2V_1$+$3V_2$+$4V_3$using operational amplifier.Use minimum value of resistance as 10KΩ. (2)

17 a) With neat diagram explain the working of wien bridge oscillator using op-amp. (5)

b) Derive the expression for frequency of oscillation of Wien bridge oscillator using op-amp. (5)

18 a) Explain the working principle of a successive approximation type ADC. (5)

b) A 4-bit R-2R ladder type DAC having R= 10 KΩ and V_R = 10V. Find its resolutionand output voltage for an input 1101. (5)

19 a) Drawthe circuit diagram and frequency response of a second order high pass butterworth filter using OP-AMP and explain its working. (5)

b) Design a first order butterworth LPF using OP-AMP for a high cut of frequency of 1KHz and passband gain is 2.Give the design steps and draw the frequency response. (Assume C=0.01μF) (5)

20 a) With neat diagram explain the working of IC555 timer. (5)

b) Design an astablemultivibrator using IC 555 timer for a frequency of 1KHz and a duty cycle of 70%.Assume c=0.1μF. (5)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: CS207

Course Name: ELECTRONIC DEVICES AND CIRCUITS (CS)

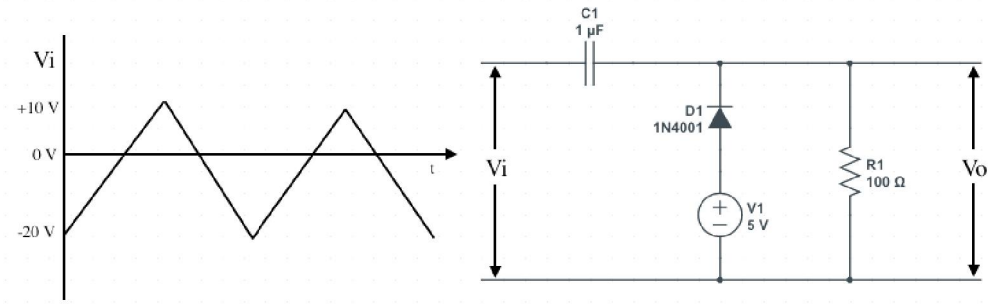
Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks Marks

1 Draw the circuit diagram of a voltage tripler circuit and mark the polarity and value of the voltages across each capacitor in the circuit. (3)

2 For the given input waveform and circuit, draw the output waveform and the transfer characteristics. Assume the cut-in voltage of the diode to be 0.6 V. (3)



3 What is line regulation and load regulation in the context of a voltage regulator. (3)

4 Compare between FET and BJT. (3)

PART B

Answer any two full questions, each carries 9 marks

5 a) Draw the circuit of an RC differentiator and explain how it differentiate a square signal. Draw the input and output waveforms. (4)

b) Design a good differentiator circuit for a square wave signal with Vpp = 10V and frequency 10 KHz. (5)
Also draw the input and the output waveforms.

6 With neat sketches, explain the construction, principle of operation, and characteristics of anN-channel enhancement MOSFET. (9)

7 Draw the circuit diagram of a transistorised series voltage regulator and explain how regulation is achieved. Also improve this circuit by introducing over current protection in it. (9)

PART C

Answer all questions, each carries 3 marks

8 Name the three non-sinusoidal oscillators. Do any of them have memory? Justify your answer. (3)

9 What are the classification of amplifiers. (3)

10 Explain the effect of negative feedback on the gain of the amplifier. (3)

11 State and explain Barkhausen criteria for sustained oscillation. (3)

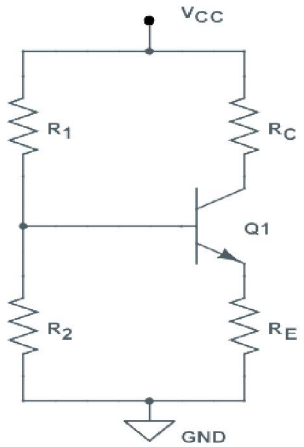
PART D

Answer any two full questions, each carries 9 marks

12 Draw the circuit of an RC coupled amplifier and explain the function of each element. Sketch the frequency response and write the reasons for gain reduction in both ends. (9)

13 Draw the circuit of an astable multivibrator using transistors and explain its working with a sketch of the waveforms at the collector and base terminals of both the transistors. (9)

14 Consider a self-biasing circuit shown in figure below with V_{CC} = 20 V, R_C = 1.5kΩ, which is operated at Q-point (V_{CE} = 8V, I_C = 4mA). If h_{FE} (β) = 100, find R_1, R_2 and R_E. Assume V_{BE}=0.7 V (9)



PART E

Answer any four full questions, each carries 10 marks

15 a) Draw and explain the functional blocks that constitute an Op-Amp (5)

b) Draw the circuit diagram of a 3-input summing amplifier using Op-Amp and explain its working with supporting derivations. (5)

16 a) Sketch the circuit of an integrator circuit using Op-Amp and prove that the integration happens on the input signal. (5)

b) Draw the circuit of a Schmitt trigger using Op-ampand explain its hysteresis curve. (5)

17 Explain the terms gain, bandwidth, slew rate, CMRR and offset voltage in the context of an Op-Amp. (10)

18 a) Design and draw a first order low pass filter using Op-Amp, with higher cut off frequency of 2GHz and pass band gain of 2. (5)

b) With a neat block diagram explain successive approximation type A/D convertor. (5)

19 With neat functional diagram explain the working of an astable multivibrator using IC555 timer. Also write the expression for the time period. (10)

20 a) Draw and explain R-2R ladder type D/A convertor circuit. (5)

b) Draw the circuit diagram of a simple sample and hold circuit and explain the necessity of this circuit in A to D conversion. (5)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CS207

Course Name: ELECTRONIC DEVICES AND CIRCUITS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks. Marks

1 Draw the circuit of a RC differentiator and write its design equation. Also draw its output waveform for a 1KHz square wave input. (3)

2 Compare the features of BJT with FET. (3)

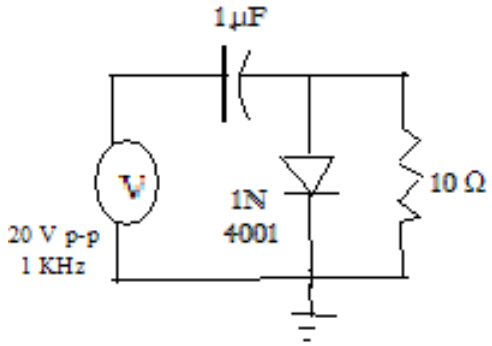
3 What is line regulation and load regulation? Explain with equation for percentage of regulation (3)

4 Draw a sweep circuit with transistor acting as a switch. (3)

PART B

Answer any two full questions, each carries9 marks.

a) (6)



What is the function of above circuit? ,

What will happen:

(i) if polarity of diode is changed.

(ii) if a reference voltage of (-3 volts) is connected in series with the diode.

(iii) Plot output wave forms in all cases.

b) Explain working of a voltage Tripler with the help of relevant circuit (3)

6 a) Give the necessity of Current fold back and current limit protection. Explain with circuit and graphs. (9)

7 a) Draw the structure of depletion mode MOSFET and explain its operation with characteristics. (7)

b) Distinguish between enhancement and depletion mode MOSFETs (2)

PART C

Answer all questions, each carries 3 marks.

8 Give the importance of biasing in transistors? Mention significance of (3)

operating point.

9		What is the effect of cascading in gain and bandwidth of Amplifier?	(3)
10		What are the conditions for getting sustained oscillations?	(3)
11		Mention the difference between positive and negative feedback? Give one application of each.	(3)

PART D

Answer any two full questions, each carries 9 marks.

12		Voltage divider biasing is most widely used one in amplifiers. Why? Explain with the help of required equations and circuit.	(9)
13	a)	Design a Hartley oscillator to generate a frequency of 150KHz.	(5)
	b)	Draw the circuit of RC coupled amplifier and explain the function of each component.	(4)
14		With circuit diagram and design equations explain the working of a monostable multivibrator	(9)

PART E

Answer any four full questions, each carries 10 marks.

15	a)	What are the features of ideal op-amp?	(2)
	b)	With circuits and equations show that an op-amp can act as integrator , differentiator, adder, subtractor.	(8)
16	a)	Define: (1) Slew rate, (2) CMRR, (3) offset voltage (4) Offset current	(4*2=8)
	b)	What are their practical values for parameters of op-amp IC 741	(2)
17		With circuit , relevant equations and waveforms explain the working of a Schmit trigger	(10)
18	a)	Describe the working of a binary weighted D/A Converter, with example..	(3)
	b)	Draw the circuit and frequency response of active lowpass and high pass filters .Also draw the circuit of a second order active low pass filter	(7)
19	a)	Explain the working of any one type of ADC.	(8)
	b)	What are their importantspecifications?	(2)
20	a)	With functional block diagram, explain the working of 555 Timer IC.	(4)
	b)	Write design equations and pin out of 555 TIMER IC working as astable multivibratot to generate a wave form of 1KHz., with 50% duty cycle.	(6)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, MAY 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		Derive the input- output relationship of an RC integrator circuit.	(3)
2		Draw and explain the circuit of a 78XX IC based voltage regulator.	(3)
3		Design a loaded 5.1 V zener diode voltage regulator for a load current of 20 mA. Input voltage is 12 V dc. Assume that zener knee current is 5 mA.	(3)
4		Distinguish between (i) Series and Shunt Clippers (ii) Positive and Negative Clippers	(3)

PART B

Answer any two full questions, each carries 9 marks.

5	a)	Draw and explain the circuit of a voltage doubler.	(3)
	b)	With the help of characteristic curves, explain the principle of operation of a Junction Field Effect Transistor. Mark its regions of operation on the curve.	(6)
6	a)	Draw and explain the transistorised sweep circuit using a normally off transistor switch.	(4)
	b)	Draw and explain the circuit of a series voltage regulator.	(5)
7	a)	Design circuits using passive components to perform the following waveform conversions: (i) 2 KHz triangular wave to square wave (ii) 0.5 KHz square wave to triangular wave	(4)
	b)	Draw and explain the block diagram of SMPS.	(5)

PART C

Answer all questions, each carries 3 marks.

8		Explain thermal runaway in transistors.	(3)
9		Draw the circuit of a monostable multivibrator using transistors.	(3)
10		Compare BJT and FET.	(3)
11		State and explain Barkhausen Criteria.	(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} = 12 V dc, I_c = 2 mA, h_{fe} = 125, Lower cut off frequency = 100 Hz, Upper cut off frequency = 100 KHz.

13 a) What are the effects of cascading on the gain and bandwidth of transistor amplifier circuits. (3)

b) Sketch and explain a Wein Bridge Oscillator using transistors. Explain how conditions for sustained oscillations are satisfied in this circuit. (6)

14 With neat sketches and waveforms, explain the working of an Astable Multivibrator using transistors. (9)

PART E

Answer any four full questions, each carries 10 marks.

15 a) Draw and explain the circuit of a differential amplifier. (5)

b) 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)

16 a) Derive an expression for voltage gain of an inverting and non-inverting operational amplifier. (6)

b) Compare active and passive filters. (4)

17 a) Draw and explain a sample and hold circuit. Quote a few of its applications. (6)

b) Explain the terms CMRR and Slew Rate of an OPAMP. Also specify the typical values for IC 741. (4)

18 a) Draw and explain the circuit of a Schmitt Trigger using OPAMPS. Explain the terms UTP and LTP of a Schmitt Trigger. (6)

b) Compare binary weighted and R-2R ladder D/A Converters. (4)

19 a) Draw and explain the circuit of a summing amplifier using OPAMP. Realise $Y(t) = 5\ V_1 + 2\ V_2 - 4V_3$ where V_1, V_2 and V_3 are input magnitudes. (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 operation 2 KHz and a duty cycle 60%. (5)

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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

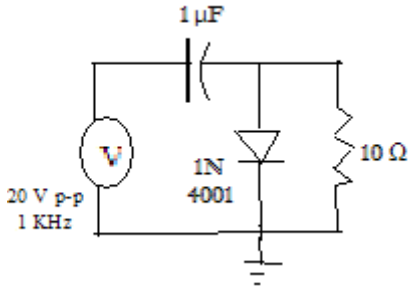
Answer all questions, each carries 3 marks. Marks

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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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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