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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

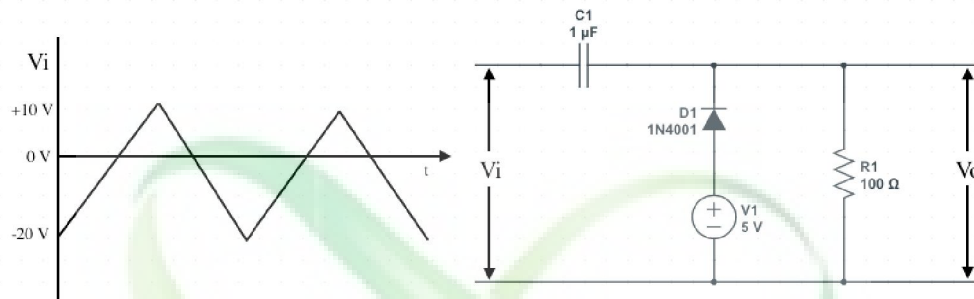
Duration: 3 Hours

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 differentiates a square signal. Draw the input and output waveforms. (4)
- b) Design a good differentiator circuit for a square wave signal with $V_{pp} = 10V$ 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 an N-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)

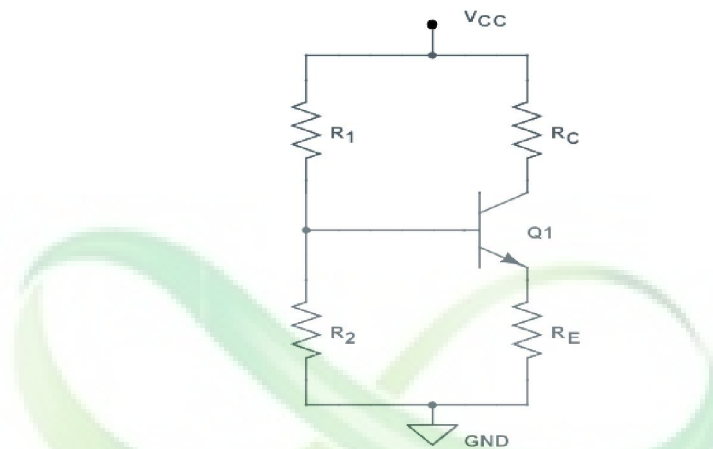
PART C

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 classifications 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 $V_{CC} = 20\text{ V}$, $R_C = 1.5\text{k}\Omega$, which is operated at Q-point ($V_{CE} = 8\text{V}$, $I_C = 4\text{mA}$). If $h_{FE} (\beta) = 100$, find R_1 , R_2 and R_E . Assume $V_{BE} = 0.7\text{ V}$ (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-amp and 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)
