

E

08000CS207122001

Pages: 3

Reg No.: \_\_\_\_\_ Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Third Semester B.Tech Degree (S,FE) Examination January 2022 (2015 Scheme)

**Course Code: CS207**

**Course Name: Electronic Devices & Circuits**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 3 marks.*

Marks

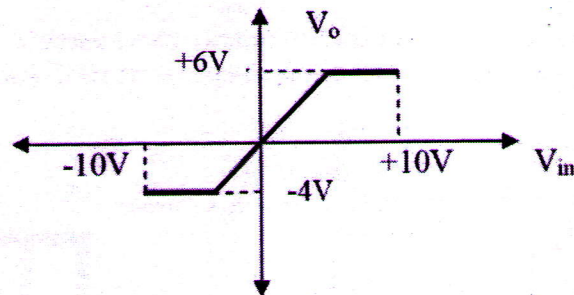
- |   |   |     |
|---|---|-----|
| 1 | Describe the operation of biased clipper and combination clipper.     | (3) |
| 2 | Draw drain characteristics of JFET and explain how JFET works as VVR. | (3) |
| 3 | Derive the condition for a good differentiator.                       | (3) |
| 4 | What are the different types of MOSFET based on mode of operation.    | (3) |

**PART B**

*Answer any two full questions, each carries 9 marks.*

- |   |   |     |
|---|---|-----|
| 5 | a) Design a loaded 5V Zener regulator for a load current of 50 mA. Input voltage is 10 V dc. Assume that Zener knee current is 5 mA.  | (4) |
|   | b) Design a low voltage regulator circuit using IC 723 to give an output voltage of 5V.   | (5) |
| 6 | a) Describe the operation of transistorized series voltage regulator and also define load regulation in a voltage regulator.  | (5) |
|   | b) Draw & explain a circuit to generate an output voltage of, $V_o = 3 V_{in}$ .  | (4) |
| 7 | a) A 1 KHz square wave is integrated using RC integrator first and then differentiated by RC differentiator. Draw the waveforms at<br>a) Output of Integrator<br>b) Output of differentiator. | (4) |
|   | b) Assuming voltage drop across the diode as 0.6V, Design a diode shunt clipper with transfer characteristics as shown in the following diagram.  | (5) |

08000CS207122001



### PART C

Answer all questions, each carries 3 marks.

- 8 In a transistor circuit, load resistance is  $5K\Omega$  and quiescent current is  $2mA$ . (3)  
Determine the operating point when the battery voltage is  $V_{cc} = 12V$ .
- 9 Differentiate Oscillator from Amplifier. (3)
- 10 Describe the effect of cascading in gain and bandwidth of amplifier. (3)
- 11 Which circuit is known as 'free running oscillator'? Why? (3)

### PART D

Answer any two full questions, each carries 9 marks.

- 12 a) With necessary equations explain the design of potential divider biasing for a transistor in Common Emitter configuration. (4)  
b) Draw the circuit diagram of a bi-stable multivibrator using transistors and explain its working. (5)
- 13 a) Design an RC Coupled Amplifier using transistors with the following specifications : (6)  
 $V_{cc} = 12V$  dc,  $I_c = 3mA$ ,  $h_{fe} = 100$ , Lower cut off frequency =  $100Hz$ , Upper cut off frequency =  $100KHz$ .  
b) Explain the working of a crystal oscillator with necessary diagrams. (3)
- 14 a) Draw the circuit diagram and explain the working of a common source MOSFET amplifier. (4)  
b) Draw the circuit diagram and explain the working of Wien bridge oscillator for an output frequency of  $6KHz$ . (5)

08000CS207122001

**PART E**

*Answer any four full questions, each carries 10 marks.*

- 15 a) List important specifications of A/D or D/A Converters. (4)  
b) Design a Summing amplifier and subtractor circuit using OP-Amp for two inputs. (6)
- 16 a) Give the ideal characteristics of an OP-Amp. What are their typical values for IC741 OP-Amp. (5)  
b) Draw the figure of an operational amplifier integrator and prove that the output is proportional to integral of the input. (5)
- 17 a) Design a Wien bridge oscillator circuit using OP-Amp for a frequency of oscillation, 2KHz. (5)  
b) With the help of necessary figures, explain about fastest type ADC. (5)
- 18 a) Draw the block schematic of Successive Approximation type analog to digital converter and explain its working. (5)  
b) Design an Astable Multivibrator using IC 555 for a frequency of 1 KHz and a duty cycle of 40% (5)
- 19 a) Realise an active first order high pass filters using OP-Amps for a lower cut off frequency of 3 KHz and a pass band gain of 3. (5)  
b) Design a regenerative comparator circuit with  $UTP = 2V$  and  $LTP = -3V$ . Assume input voltage is 10Vpp. Also mention Hysteresis window. (5)
- 20 a) Describe: (1) Slew rate, (2) CMRR, (3) Offset voltage (4) Offset current (4)  
b) Describe the working of a binary weighted D/A Converter, with necessary diagrams. What are its limitations? (6)

\*\*\*\*