Reg No.:_____ Name:_____

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Third Semester B.Tech (Minor) Degree Examination December 2021 (2020 admission)

**Course Code: ECT281**

**Course Name: ELECTRONIC CIRCUITS**

Max. Marks: 100 Duration: 3 Hours

**PART A**

***Answer all questions. Each question carries 3 marks*** Marks

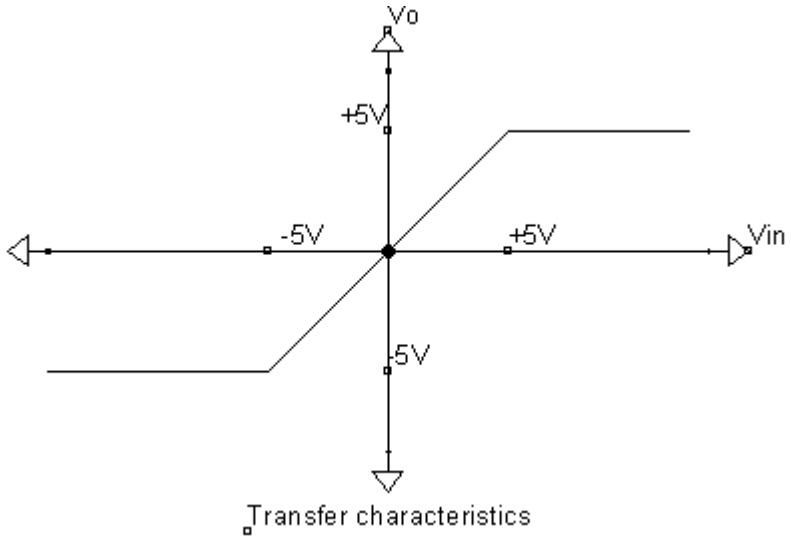
| | | | |
|---|---|---|---|
| 1 | | Define operating point of BJT. What do you mean by stabilization of operating point? | (3) |
| 2 | | Explain the working of biased positive clamper with battery voltage $V_B$= +5V and Vin=10sinωt. | (3) |
| 3 | | Which are the different classifications of amplifier? | (3) |
| 4 | | Distinguish between enhancement type and depletion type MOSFET. | (3) |
| 5 | | Design a 5V, 250mA regulated dc power supply using 3-pin regulator IC, unregulated dc input voltage is 8V. | (3) |
| 6 | | What are the necessary conditions for sustained oscillation? | (3) |
| 7 | | Design an op-amp circuit to implement the function $V_0$= -100Vin. | (3) |
| 8 | | Define slew rate? What effect does it have in the performance of an operational amplifier? | (3) |
| 9 | | List four important specifications of ADC. | (3) |
| 10 | | Which type of ADC is the fastest in operation? Justify your answer. | (3) |

**PART B**

***Answer any one full question from each module. Each question carries 14 marks***

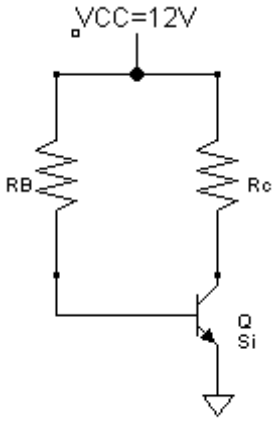
**Module 1**

| | | | |
|---|---|---|---|
| 11 | a) | With circuits and equations show that an RC circuit can act as a differentiator and an integrator. | (7) |
| | b) | Identify the circuit which shows the given transfer characteristics and explain its working with the help of circuit diagram and necessary waveforms, with Vin=10Sinωt. | (7) |




OR

12 a) In a fixed bias circuit VCC=12V,$V_{CEQ}$=6V, βdc=100, $Ic_Q$=2mA.Calculate the value of $R_C$ & $R_B$, Draw the dc load line. (7)




b) Design an integrator circuit to integrate 5kHz square wave with $V_{PP}$=20V. (7)

**Module 2**

13 a) Describe the construction, working principle and characteristics of Enhancement type MOSFET. (7)

b) What is meant by frequency response of an RC coupled amplifier? Also discuss the upper cut-off frequency, lower cut-off frequency and bandwidth. (7)

OR

14 a) Explain how the number of stages influences the voltage gain, cutoff frequency and bandwidth in multistage amplifier. (10)

b) What is the principle of feedback amplifier? (4)

**Module 3**

| | | | |
|---|---|---|---|
| 15 | a) | Explain the working of crystal oscillator. | (7) |
| | b) | Design a Hartley oscillator to generate 600KHz sine wave. | (7) |

OR

| | | | |
|---|---|---|---|
| 16 | a) | Design a Zener voltage regulator such that Vin=10V and Vout=5.1V,current required for the zener to operate properly(Iz)=10mA and current through load=30mA | (7) |
| | b) | Draw the block diagram of SMPS and explain the function of each block. | (7) |

**Module 4**

| | | | |
|---|---|---|---|
| 17 | a) | Compare characteristics of ideal and practical op-amp (IC741). | (6) |
| | b) | What are the features of Instrumentation amplifier? Derive the voltage gain of instrumentation amplifier with three op-amps. | (8) |

OR

| | | | |
|---|---|---|---|
| 18 | a) | Design the following circuits using op-amp.<br>i)Summing Amplifier with four input voltages ii)Subtractor iii)Integrator to integrate 10KHz sinusoidal wave with 5V amplitude. | (7) |
| | b) | Define the following characteristics of op-amp.<br>i) Open loop voltage gain ii) Bandwidth iii) Slew rate iv) CMRR | (7) |

**Module 5**

| | | | |
|---|---|---|---|
| 19 | a) | Design a 2-bit binary flash ADC and explain the working. | (10) |
| | b) | What is the drawback of flash ADC? | (4) |

OR

| | | | |
|---|---|---|---|
| 20 | a) | Explain the working principle of R-2R DAC with circuit. In a 4-bit DAC reference voltage is given as 10V. Find the analog output voltage for digital input of 1111. | (10) |
| | b) | List four important specification of DAC. | (4) |

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