Question Paper

Exam Date & Time: 16-Dec-2022 (02:30 PM - 05:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER B.TECH END SEMESTER EXAMINATIONS, DEC 2022

ANALOG ELECTRONICS [BME 2151]

Marks: 50

Duration: 180 mins.

Α

Answer all the questions.

Instructions to Candidates:

1. Answer ALL questions.

- 2. Missing data may be suitably assumed.
- 3. Draw neat and relevant diagrams wherever necessary.
- 1) Making use of an NPN Silicon BJT design a switch for an input signal varying between 0V and +5V. The (2) transistor and circuit specifications are: $\beta_{dc} = 120$, $b_{c(sat)} = 14$ mA and $V_{CC} = +18$ V.

A)

- B) How do you fix the operating point of a BJT using fixed bias? Explain. What are the advantages and (4) drawbacks of the circuit?
- C) How do you compensate for bias in a BJT against temperature using different techniques? Explain. (4)
- 2) Making use of graphical method determine I_{DQ} , V_{GSQ} , and then V_D , V_S , V_{DS} and V_{DG} of the network shown below. (4) Specifications of the active device are: $I_{DSS} = 8mA$ and $V_P = -4V$.

A)

V_{DD} = 18V



+9V



B) Analyze the following amplifier circuit for input impedance, output impedance and voltage gain with (4) feedback.

C)

A)

4)

 V_{DD}



C)	How negative feedback modifies the characteristics of an amplifier? Explain.	(2)
	What are the conditions to be satisfied for producing sustained oscillations? Explain.	(2)
A)		
B)	Design a JFET based RC-Phase shift oscillator for producing sustained oscillations of frequency 3KHz. Assume a capacitance of 1.0nF for the feedback network and the active device specifications are: $g_m = 5$ mS and $y_{os} = 0.25$ mS.	(4)
C)	Analyze Class-A power amplifier for:	(4)
	(i) A.C output power	
	(ii) Efficiency	

And suggest a method to improve the efficiency of the amplifier.

5)

-----End-----

Page 4 of 4