Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023

Semester : Semester III - 2021
Course Code : ECE2001
Course Name : Sem III - ECE2001 - Analog Electronics
Program : B.Tech. Electronics and Communication Engineering

Date : 5-JAN-2023
Time : 1.00PM - 4.00PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.

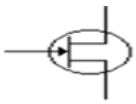
PART A

ANSWER ALL THE FIFTEEN QUESTIONS **15 X 2 = 30M**

1. What is meant by positive and negative feedback?

(CO4,CO5) [Knowledge]

2. Symbol shown in figure represents a _____.



(CO3,CO5) [Knowledge]

3. For sustained oscillation the hartley oscillator uses _____ feedback.

(CO4,CO5) [Knowledge]

4. a. The energy gap between the valence band and conduction band is about _____ .
b. A n type semiconductor is electrically _____.

(CO1,CO5,CO4) [Knowledge]

5. The phase difference between input and output voltages of CE amplifier is _____.

(CO5,CO2) [Knowledge]

6. The amplifier has a power gain of 100. Its dB gain is _____.

(CO4,CO1,CO2) [Knowledge]

7. The width of the base region will ---------- when the reverse bias voltage of collector base region is increased.

(CO1) [Knowledge]

8. In RC coupled amplifier, the voltage gain in the mid-region is _____ and the lower and upper cutoff frequencies of RC Coupled amplifier is called_____.

(CO1,CO2,CO4,CO3) [Knowledge]

9. On the output characteristics of BJT, show the region of operation of (i) an amplifier (ii) a switch.

(CO4,CO5,CO2) [Knowledge]

10. What is Bias? What is the need for biasing?

(CO5,CO4,CO2,CO1) [Knowledge]

11. Write two difference between BJT and FET?

(CO4,CO2) [Knowledge]

12. When the negative feedback is applied to an amplifier, its bandwidth _____.

(CO4,CO5) [Knowledge]

13. The phenomenon of feeding a portion of the output signal back to the input circuit is known as feedback. What is the minimum number of RC feedback network required for a RC Phase shift Oscilator network , what is the phase shift by each network.

(CO4,CO5,CO3) [Knowledge]

14. MOSFET stands for metal-oxide-semiconductor field-effect transistor.MOSFETs are of two types _____and _____ type.

(CO2,CO5,CO4,CO3,CO1) [Knowledge]

15. For an amplifier with feedback, the input and output impedance is high compared to the amplifier without feedback. Identify the amplifier in which the above mentioned feedback system is present.

(CO2,CO3,CO5,CO4,CO1) [Knowledge]

PART B

ANSWER ALL THE TWO QUESTIONS **2 X 15 = 30M**

16. (a) The transistor biasing is needed for the faithful amplification. Mention the condition that needs to be fulfilled to have the proper transistor biasing. Draw the circuit of a BJT in potential divider bias configuration. Derive the expression for Q point voltage and current.

[8M]

(b) An electronic oscillator is an electronic circuit that produces a periodic, oscillating electronic signal, often a sine wave or a square wave or a triangle wave. The most common form of linear oscillator is an electronic amplifier such as a transistor or operational amplifier connected in a feedback loop with its output fed back into its input through a frequency selective electronic filter to provide positive feedback. When the power supply to the amplifier is switched on initially, electronic noise in the circuit provides a non-zero signal to get oscillations started. The noise travels around the loop and is amplified and filtered until very quickly it converges on a sine wave at a single frequency. Draw and explain the operation of RC phase shift oscillator.

[7M]

(CO2,CO5,CO4) [Comprehension]

17. (a). The oscillator will produce sustained oscillations and will generate a sinusoidal signal. The Barkhausen condition is used in electronic circuits to find whether the circuit will oscillate or not. The feedback signal and the input signal are in phase for producing oscillations by giving positive feedback to the amplifier.Explain Barkhausen criterion for oscillation in feedback oscillator.

[3M]

(b).The noise level in the amplifier circuits can be considerably reduced by using negative feedback done by injecting a fraction of output in phase opposition to the input signal.What is the concept of Negative feedback and draw the schematic diagrams of four baisc negative feedback amplifiers **[12M]**

(CO1,CO4,CO3,CO2) [Comprehension]

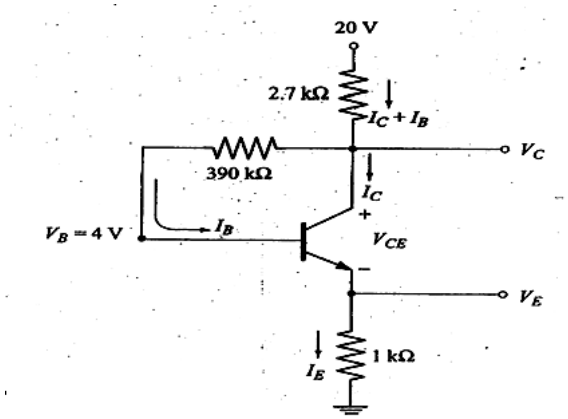
PART C

ANSWER ALL THE TWO QUESTIONS **2 X 20 = 40M**

18. (a) This configuration employs negative feedback to prevent thermal runaway and stabilize the operating point. In this form of biasing, the base resistor RB is connected to the collector instead of connecting it to the DC source Vcc. Explain COLLECTOR TO BASE BIAS circuit and find the Q values. **[10M]**

b.For the circuit shown below determine **[10M]**

i) V_E and I_E
ii) V_C and I_B
iii) I_C, V_{CE} and β



(CO2,CO3,CO4) [Application]

19. The field-effect transistor (FET) is a type of transistor that uses an electric field to control the flow of current in a semiconductor. FETs (JFETs or MOSFETs) are devices with three terminals: source, gate, and drain.

(a) With the help of a neat diagram explain the operation of an n-channel JFET. **[10M]**

(b) A JFET has a drain current of 6mA. If IDSS = 12mA and VP = 4V find:

i)VGS

ii) For an n-channel amplifier FET IDSS=5.8 mA. VP=-3V and VGS=-2V find ID and gm **[10M]**

(CO2,CO1,CO4) [Application]