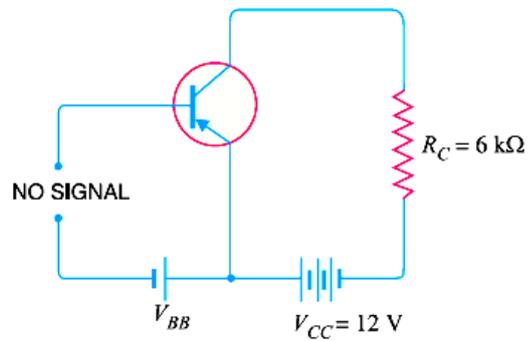


**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-III (NEW) EXAMINATION – WINTER 2023****Subject Code:3134104****Date:25-01-2024****Subject Name:Electronic Devices and Circuits****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

	<b>Marks</b>
<b>Q.1</b> (a) What is doping in semiconductor material?	<b>03</b>
(b) Explain p and n semiconductor formation in detail.	<b>04</b>
(c) Explain Voltage Divider biasing in detail.	<b>07</b>
<b>Q.2</b> (a) Explain tunnel diode with reference to i) symbol, ii) V-I characteristics, iii) Applications.	<b>03</b>
(b) Compare Centre Tapped Full wave rectifier and Bridge Full Wave Rectifier.	<b>04</b>
(c) Explain capacitive filter with Ripple Factor.	<b>07</b>
<b>OR</b>	
(c) Draw and explain series and shunt positive clipper with output waveforms.	<b>07</b>
<b>Q.3</b> (a) Label the three regions of operation on a bipolar junction transistor collector curve.	<b>03</b>
(b) An a.c. voltage of peak value 20 V is connected in series with a silicon diode and load resistance of 500 $\Omega$ . If the forward resistance of diode is 10 $\Omega$ , find: (i) peak current through diode (ii) peak output voltage What will be these values if the diode is assumed to be ideal ?	<b>04</b>
(c) Draw and explain bridge rectifier circuit with Capacitor filter. Draw necessary waveforms.	<b>07</b>
<b>OR</b>	
<b>Q.3</b> (a) Draw the circuit of emitter follower and find its AC emitter resistance.	<b>03</b>
(b) Drive the relation between dc alpha and dc beta for bipolar junction transistor.	<b>04</b>
(c) Explain how the swamped amplifier works and list three of its advantages.	<b>07</b>
<b>Q.4</b> (a) Compare three configuration CB, CC and CE in terms of their input and output resistance.	<b>03</b>
(b) A transistor is connected in common emitter (CE) configuration in which collector supply is 8 V and the voltage drop across resistance $R_C$ connected in the collector circuit is 0.5 V. The value of $R_C = 800 \Omega$ . If $\alpha = 0.96$ , determine: (i) collector-emitter voltage (ii) base current.	<b>04</b>
(c) Draw the circuit of class B push – pull amplifier and explain its working. List the advantages and disadvantages.	<b>07</b>
<b>OR</b>	
<b>Q.4</b> (a) Compare E MOSFET with D MOSFET.	<b>03</b>
(b) Draw and explain regulated power supply system.	<b>04</b>
(c) In the circuit diagram shown in Fig., if $V_{CC} = 12V$ and $R_C = 6 k\Omega$ , draw the d.c. load line. What will be the Q point if zero signal base current is 20 $\mu A$ and $\beta = 50$ ?	<b>07</b>



- Q.5** (a) What is the difference between voltage amplifier and power amplifier? **03**  
 (b) Explain the four types of negative feedback connections. **04**  
 (c) Explain the working of a transformer coupled class A power amplifier and show the efficiency of class A transformer coupled amplifier is 50%. **07**
- OR**
- Q.5** (a) Define positive and negative feedback. Also derive the expression of transfer gain with negative feedback with the use of block diagram. **03**  
 (b) Describe JFET applications as analog switch. **04**  
 (c) Show that the upper limit of the conversion efficiency ( $\eta$ ) for the series fed class A amplifier is 25%. **07**

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