Student Exam No._____

GANPAT UNIVERSITY

B. Tech. Sem. III (EC)

Regular Examination November/December-2012

2EC302: Electronic Devices & Circuits

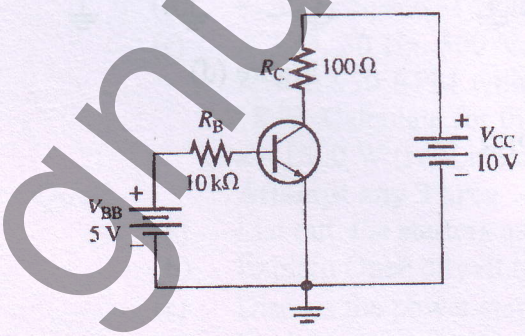
Time: 3 Hours **Total Marks: 70**

Instructions:

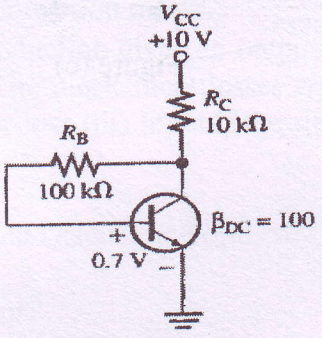
1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

1	(A)	Explain DC load line on collector characteristic of BJT.	2
	(B)	What are the bias conditions of the base-emitter and base-collector junctions for a transistor to operate as an amplifier?	2
	(C)	Define β_{DC} and α_{DC}.	3
	(D)	Explain basic construction and operation of transistor.	5
		OR	
1	(A)	If a transistor has α of 0.95, find the value of β. If β=180, find the value of α.	2
	(B)	Explain transistor as an amplifier and derive the equation of voltage gain.	5
	(C)	Determine V_{BE}, V_{CE}, V_{CB}, I_B, I_C and I_E for figure(a). (β=110)	5
2	(A)	Derive equation of $R_{IN(base)}$, V_{CE} and I_C for voltage divider bias circuit using NPN transistor.	6
	(B)	Determine how much the Q-point for the circuit in figure(b) will change over a temperature range where β_{DC} increases from 75 to 100 and V_{BE} decreases from 0.7V to 0.5V.	5
		OR	
2	(A)	Derive equation of V_{CE} and I_C for Base bias circuit using n-p-n transistor. Also discuss the Q-point stability in it.	6
	(B)	Determine I_B, I_C and V_{CE} in voltage divider biased n-p-n transistor circuit. (V_{CC}=10V, R_1= 10KΩ, R_2= 5.6KΩ, R_E=560Ω, R_C= 1KΩ, β_{DC}=120)	5
3	(A)	Draw and Explain common collector amplifier circuit. Draw its AC equivalent circuit and Derive its voltage gain, input resistance, output resistance, current gain and power gain.	7
	(B)	Explain Darlington pair circuit with its advantage and application with suitable example.	5
		OR	
	(B)	Draw and explain Class B power amplifier.	5



Figure(a)



Figure(b)

SECTION-II

4 (A) What is current Density? Derive equation for current density and relate it with conductivity. 3

(B) Explain the working of Zener diode. 4

(C) Briefly explain the concept of Diffusion with necessary equation.

OR

4 (A) Explain diffusion capacitance and transition capacitance. 5

(B) Explain the working of LED 3

(C) Define 4

(a) Mass action law (c) avalanche effect

(b) Mean life time (d) contact potential

5 (A) Draw and explain the basic operation of n-channel JFET. 5

(B) Derive high frequency input RC circuit for BJT amplifier in figure (c). Also determine the critical frequency. βac=125, Cbe=20pF, Cbc=2.4pF. 6

OR

5 (A) Explain self-bias method and midpoint bias method of JFET. 5

(B) Derive the equation of critical frequency of the bypass RC circuit for the amplifier for figure (d). β_{dc}=225 6

6 (A) Explain total amplifier frequency response. Also explain unity gain frequency (fT). 5

(B) Derive the equation of critical frequency (fc) for 4

(i) Low frequency input RC circuit

(ii) High frequency output RC circuit

(C) For IC fabrication, 3

Explain (i) Photolithography process

(ii) Epitaxial growth

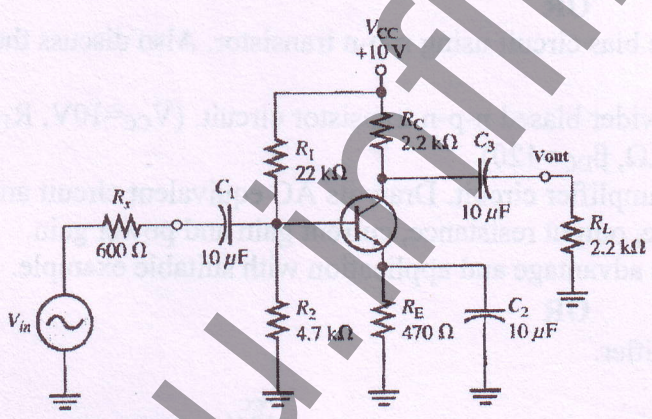


Figure (c)

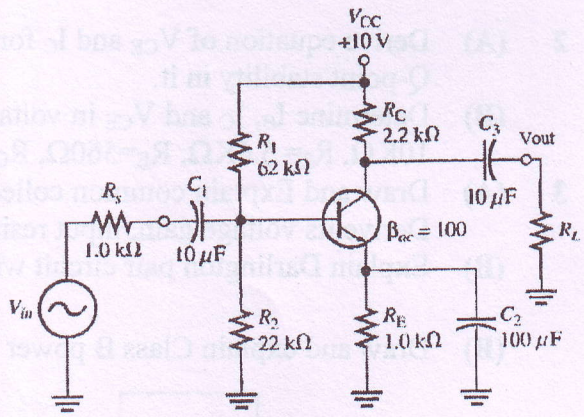


Figure (d)

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