GANPAT UNIVERSITY

B. Tech. Sem. III (EC)

Regular Examination November-December 2011

EC302: Electronic Devices & Circuits

Total Marks: 70

Time: 3 Hours

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 collector characteristics curve for BJT with DC load line. 6

(B) Determine whether or not the transistor is saturated for figure (a). Assume $V_{CE(sat)} = 0.3V$. 6

OR

1 (A) Explain in detail transistor as a switch and as an amplifier. 6

(B) Determine I_B, I_C, I_E, V_{CE} and V_{CB} for figure (b). ($\beta_{DC} = 120$) 6

2 (A) Derive equation of I_B, I_E, I_C, V_B, V_E and V_C for Emitter bias circuit and explain Q-point stability for emitter bias circuit. 5

(C) Draw and Explain common emitter amplifier circuit. Draw its AC equivalent circuit and Derive its voltage gain, input resistance, output resistance, current gain and power gain. 6

OR

2 (A) Determine V_{EC} and I_C for the pnp transistor circuit of figure (c). 5

(B) Determine V_{CE} and I_C in the voltage-divider biased transistor circuit of below figure (d). ($\beta_{DC} = 100$) 4

(C) What is the main disadvantage of base bias method? 2

3 (A) Draw and Explain common base amplifier circuit. Draw its AC equivalent circuit and Derive its voltage gain, input resistance, output resistance, current gain and power gain. 4

(B) Explain direct coupled two-stage amplifier. 4

(C) Explain Photolithography process and Ion implantation for IC fabrication, 4

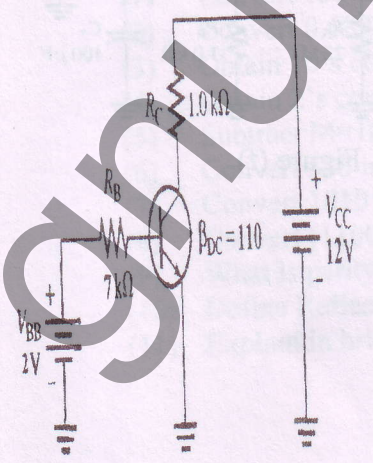

Figure (a)

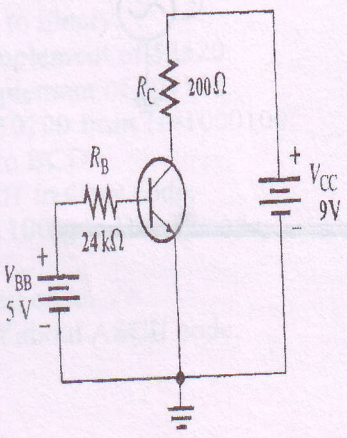

Figure (b)

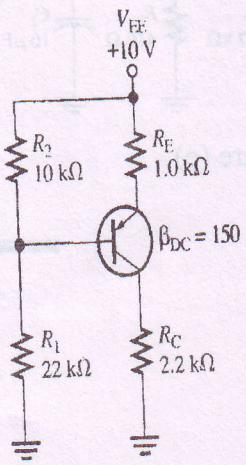

Figure (c)

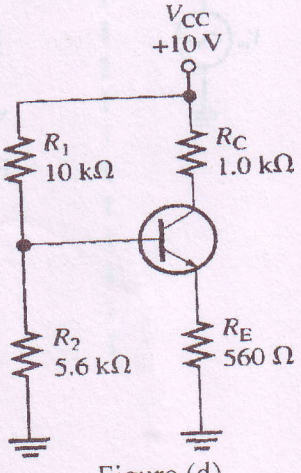

Figure (d)

SECTION-II

4	(A)	Give a brief note on reverse recovery time for P-N junction.	4
	(B)	Explain the working of schottky diode and photo diode.	4
	(C)	Explain space charge region, electric field intensity and electrostatic potential for P-N junction.	4
		OR	
4	(A)	What is current Density? Derive equation for current density and relate it with conductivity.	4
	(B)	Explain diffusion capacitance and transition capacitance.	4
	(C)	Define: (i) Fermi level (ii) Einstein relationship between diffusion and mobility (iii) Contact potential	4
5	(A)	Derive the equation of critical frequency(fc) for (i) Low frequency input RC circuit (ii) Low frequency bypass RC circuit, with necessary circuit diagrams	5
	(B)	Derive high frequency input RC circuit for BJT amplifier in figure (e). Also determine the critical frequency. βac=125, Cbe=20pF, Cbc=2.4pF.	6
		OR	
5	(A)	Explain total amplifier frequency response. Also explain unity gain frequency (fT).	5
	(B)	Derive the equation of critical frequency of the bypass RC circuit for the amplifier for figure (f).	6
6	(A)	Why biasing is required? Explain the self-biasing in detail for a n-channel JFET.	4
	(B)	For a JFET, Explain forward transconductance and voltage divider biasing.	4
	(C)	For a JFET Vp=6v and maximum drain current is 3mA. The value of forward transconductance is 5000μS at V_{GS} = 0. Find out the value of drain current I_D and forward transconductance at V_{GS}= -4V.	4

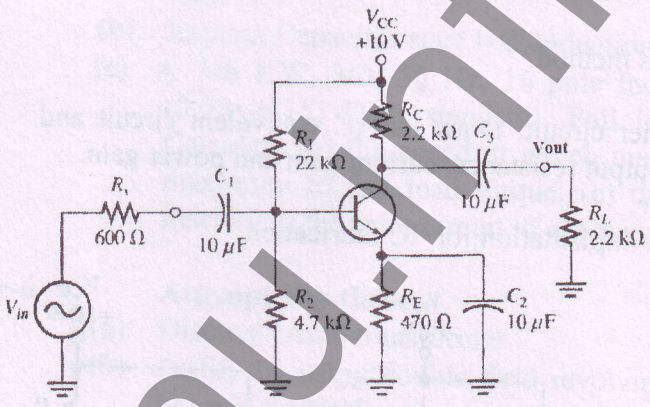

Figure (e)

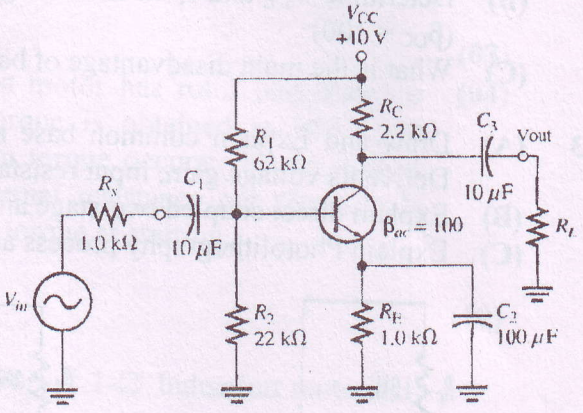

Figure (f)