(Please write your Exam Roll No.) Exam Roll No. 08913280 6

END-TERM EXAMINATION

THIRD SEMESTER [B.TECH.] DECEMBER-2007

Paper Code: ETEC-207 **Subject: Analog Electronics-I**
Paper ID: 28207 **(Batch:2004-2006)**

Time : 3 Hours **Maximum Marks : 75**

Note : Attempt five questions in all.Q.No.1 is compulsory and attempt one question from each unit.

Q.1 (a) Define zener break down and avalanche break down and compare them. **(5)**
(b) Explain the formation of potential barrier in a p-n junction diode. Derive an expression for contact potential. **(5)**
(c) What is early effect? Explain base width modulation. **(5)**
(d) List the four feed back amplifier topologies for each of the four topologies identify A and B. **(5)**
(e) Derive the relation between V_{GS} and V_p of a JFET. **(5)**

UNIT- I

Q.2 (a) A bridge rectifier uses R_L = 2.4 kΩ, each diode is idealized to have R_f = 5Ω and $R_r = \alpha$, V_r = 0. A sinusoidal voltage having and amplitude of 30V is applied. Calculate (a) peak dc and rms values of load current (b) dc and rms output voltages (c) dc output power (d) ac input power (e) rectifications efficiency η and (f) percentage regulation. Derive necessary equation. **(7)**

(b) Obtain the voltage transfer characteristics for the circuit shown in fig.1, assuming that the diodes are identical and have V_r =0.6V and R_f = 0. $V_i(t) = V \sin\omega t$ **(5.5)**

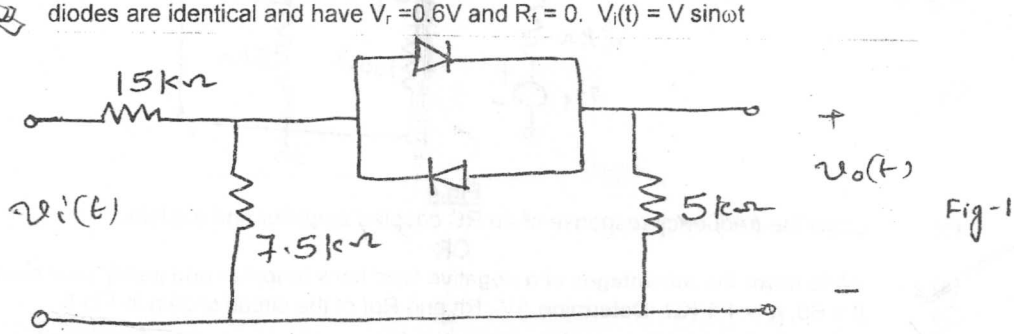

Fig-1

Q.3 (a) An n-type Si bar is 2 cm long and has a cross-section of 2mm X 2mm. When IV battery is connected across it, a current of 8 MA flows. Find (a) doping level and (b) drift velocity. **(4.5)**
(b) Discuss the switching characteristics of a diode. Derive an expressions for diffusions capacitance. **(8)**

UNIT- II

Q.4 (a) If α = 0.98, V_{BE} = 0.7V, find R_1 in the circuit shown in fig. 2, for I_E = -2MA. Neglect reverse saturation current. **(4)**

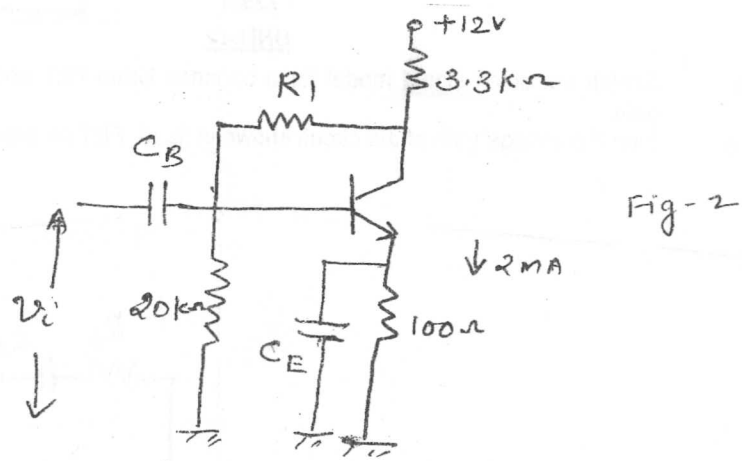

Fig-2

Fig.-2

(b) Write the Ebers-Moll equation for a transistor. Draw the Ebers-Moll for transistor and explain. **(3)**
(c) Define three different stability factors. Explain how stability is improved in a voltage divider bias circuit. **(5.5)**

OR

(a) Draw the circuit of Darlington pair and derive the equation for input impedance. **(5)**
(b) Determine AV and R_i of the circuit shown in Fig.3. Derive the necessary equations. **(7.5)**

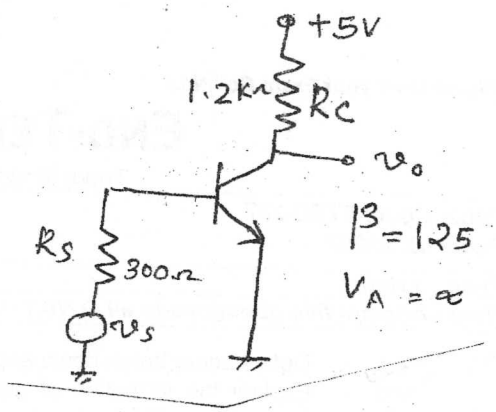

Fig.3

UNIT- III

Q.4 (a) Determine AV_1, AV_2, AV_3 and AV of the circuit shown in fig. 4. I_{CQ} = 2mA β = 125. **(8)**

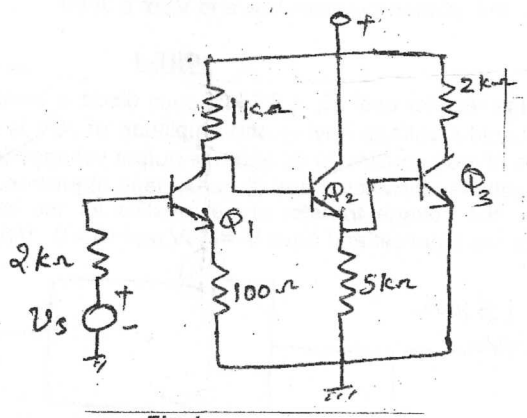

Fig.4

(b) Draw the frequency response of an RC coupled amplifier and explain. **(4.5)**

OR

(a) Write down the advantages of a negative feed back amplifier and justify your answer. **(3)**

(b) β = 60, r_π = 1.1 KΩ. Determine AV_f, Rif and Rof of the circuit shown in Fig.5. **(9.5)**

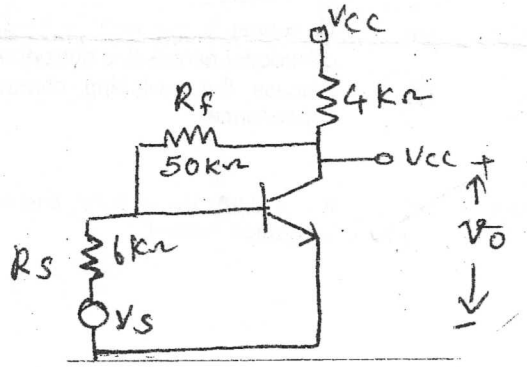

Fig.5

UNIT-IV

Q.5 (a) Sketch the small signal model for a common Drain FET and derive the equation for voltage gain. **(6)**

(b) Find the voltage gain of the circuit shown in fig. 6. FET parameters are μ = 30, rd 5KΩ. **(6.5)**

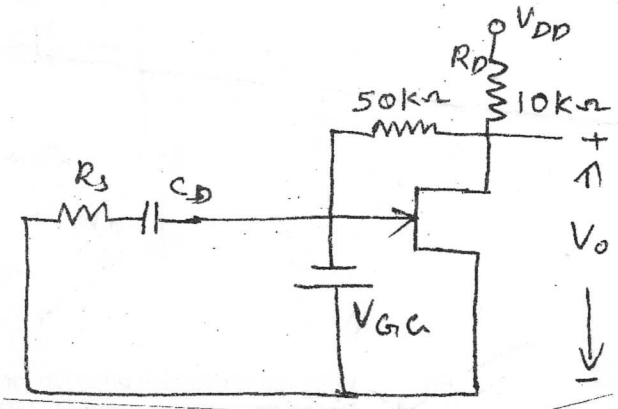

Fig. 6

OR

(a) Draw and explain V-I characteristics of SCR. **(3)**

(b) Draw the diagram giving basic structure of UJT. Explain the working of UJT. **(4)**

(c) For a SCR, the gate-cathode characteristics has a straight line slope of 150. For trigger source voltage of 20V and allowable gate power dissipation of 0.5W, compute the gate source resistance. **(5.5)**

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