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10CS32

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020

Electronic Circuits

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO full questions from each part.***

PART – A

1 a. Explain the operating point consideration in thermal runaway with neat diagram for BJT. **(05 Marks)**

b. Explain with V-I characteristics the operation of SCR. **(05 Marks)**

c. Draw the DC equivalent circuit of the figure given in Q.1(c). Calculate the Quiscent values of IEQ, ICQ, VCEQ using both accurate method and approximate method. What is the percentage error introduced using approximate method if $\beta = 165$. **(10 Marks)**

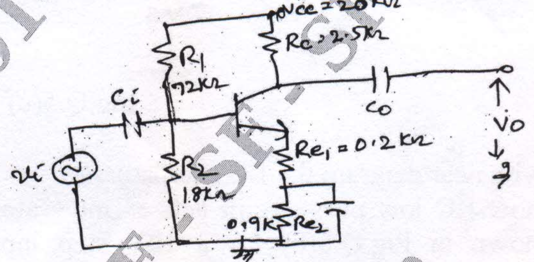


Fig.Q.1(c)

2 a. With the help of a neat diagram, explain the construction and characteristics of n-channel E-MOSFET. **(10 Marks)**

b. Write the constructional and simplified diagram of CMOS inverter and explain its operation. **(06 Marks)**

c. Enumerate the difference between BJT and FET. **(04 Marks)**

3 a. Explain with construction and characteristics PN photodiode has a Avalanche photodiodes. **(10 Marks)**

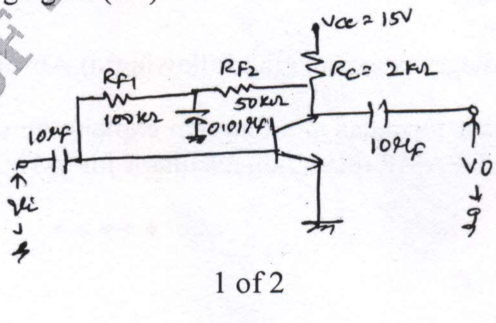
b. A photodiode has a noise current of 1fA, responsivity of 0.5A/W, active area of $1mm^2$ and rise time of 3.5nsec. Determine its NEP, detectivity, Dee star, quantum efficiency at 850nm. **(05 Marks)**

c. Briefly explain the operation and construction of LED with neat diagram. **(05 Marks)**

4 a. Using complete h-parameter model derive the expression for current gain (A_I), input impedance (zi), voltage gain (Av), o/p admittance (y_o) of a transistor amplifier. **(10 Marks)**

b. Determine the following parameters for the amplifier shown in the Fig.Q.4(b). It is given that hie = 1KΩ, hfe = 100, hoe = 40×10^{-6}℧. Find input impedance (zi), o/p impedance (zo) current gain (AI) and voltage gain (Av). **(10 Marks)**

Fig.Q.4(b)



PART – B

5 a. Explain large signal amplifier characteristics with harmonic distortion and total power o/p expression. **(06 Marks)**

b. Derive the expression for the gain, input impedance and o/p impedance of voltage series feedback amplifier with neat diagram. **(08 Marks)**

c. For the opamp based non-inverting amplifier shown in Fig.Q.5(c), determine the voltage gain and the input impedance in the presence of feedback if the open loop gain is 80dB and input impedance without feedback is 1MΩ respectively. **(06 Marks)**

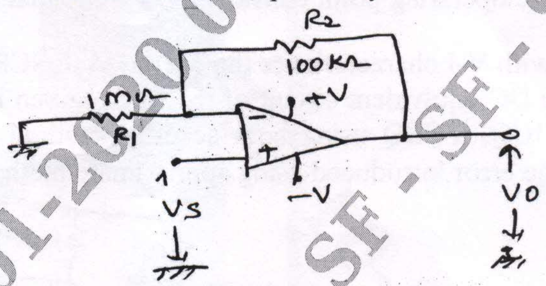


Fig.Q.5(c)

6 a. Explain with neat diagram the LC oscillators. **(06 Marks)**

b. Explain how RC low pass circuit acts as integrator. What is the output wave form of the circuit shown in Fig.Q.6(b) for a 10V step input. In what time will the output rise from 1V to 9V. **(08 Marks)**

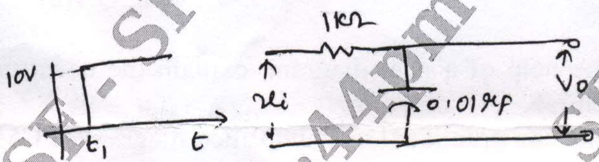


Fig.Q.6(b)

c. Explain the operation of BJT based Bistable multivibrator with neat diagram and waveforms. **(06 Marks)**

7 a. Explain the following parameters; load regulation, line regulation, output impedence ripple rejection factor with respect to regulated power supply. **(08 Marks)**

b. Explain the construction and working of SMPS and mention different types of switching regulators. **(08 Marks)**

c. Discuss the limitations of linear voltage regulator. **(04 Marks)**

8 a. Define the following performance parameters of DPAMP

i) Output offset voltage
ii) Input offset current
iii) Bias current
iv) CMRR
v) PSRR. **(05 Marks)**

b. With neat diagram, explain the following: i) Absolute value circuit ii) Window comparator. **(08 Marks)**

c. With relevant formulas and diagram explain the operation of OPAMP relaxation oscillator. Design the OPAMP relaxation oscillator for 5kHz. **(07 Marks)**

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