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Third Semester B.E. Degree Examination, Aug./Sept.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 self-biased transistor amplifier and obtain the expressions for its operating point. (08 Marks)
b. Determine the operating point for the following transistor amplifier circuit. (06 Marks)

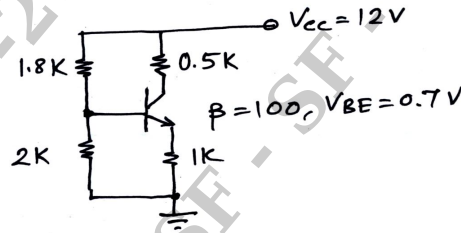


Fig.Q.1(b)

- c. Explain the working of SCR with the help of its equivalent circuit and VI characteristic. (06 Marks)
- 2 a. Explain the construction and working of a n-channel E-MOSFET. (08 Marks)
b. Following Fig.Q.2(b) shows a circuit using E-MOSFET. Given that the threshold voltage of MOSFET is 2V and $I_D(ON) = 6mA$ for $V_{GS}(ON) = 5V$. Determine the operating point. (08 Marks)

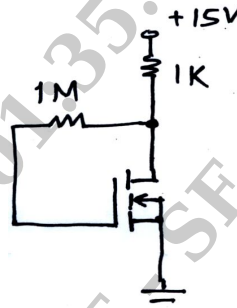


Fig.Q.2(b)

- c. Write any four differences between JFETs and MOSFETs. (04 Marks)
- 3 a. What are photoconductors? Explain their classification, characteristics and applications. (06 Marks)
b. Explain the photodiodes, their types and applications. (08 Marks)
c. Describe the different LED drive circuits. (06 Marks)
- 4 a. Draw a neat sketch of h-parameter model of CE-transistor configuration and explain. (06 Marks)
b. Determine the values of voltage gain, current gain, input impedance and output impedance for the voltage divider biased transistor amplifier shown in Fig.Q.4(b) using simplified h-parameter model. Given $h_{ie} = 1.5K$, $h_{fe} = 100$, $h_{oe} = 25\mu A/V$. (08 Marks)
c. Draw the low frequency model a JFET and explain. (06 Marks)

**PART – B**

- 5 a. With a neat block schematic of a feedback amplifier, explain the effect of negative feedback on the gain. **(06 Marks)**
- b. A voltage amplifier is characterized by an open-loop voltage gain of 100, input resistance of 50K and output resistance of 2K. Negative feedback of 10% of output voltage is introduced in series with the input to bring the distortion below acceptable level. Find the modified values of these parameters. **(06 Marks)**
- c. Derive the expressions for input resistance and output resistance of voltage-series feedback topology of a transistor amplifier. Draw the equivalent circuit. **(08 Marks)**
- 6 a. State the conditions for sustained oscillations. Explain briefly the different types of oscillators. **(06 Marks)**
- b. With a neat diagram, explain the operation of a Voltage Controlled Oscillator (VCO). **(06 Marks)**
- c. Draw the circuit diagram of astable transistor multivibrator and explain its operation with relevant waveforms. **(08 Marks)**
- 7 a. Explain the constituents of a linear power supply with the help of a block diagram. **(05 Marks)**
- b. Explain the 3-pin IC voltage regulators and their use. **(07 Marks)**
- c. Differentiate between buck and boost mode operation of SMPS with the help of neat diagrams. **(08 Marks)**
- 8 a. Explain the following performance parameters of Op-Amps:
i) Bandwidth
ii) Slewrate
iii) CMRR
iv) PSRR. **(08 Marks)**
- b. Draw the circuit diagram of an Instrumentation amplifier using Op-Amp and explain its operation. **(06 Marks)**
- c. Draw the circuit diagram of relaxation oscillator using Op-Amp and explain its operation with appropriate waveforms. **(06 Marks)**

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