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10CS32

### Third Semester B.E. Degree Examination, June/July 2018 Electronic Circuits

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer FIVE full questions, selecting atleast TWO questions from each part.  
2. Missing data, if any, may be suitably assumed.**

#### PART - A

- 1 a. Example the concept of thermal Runaway in bipolar-junction transistors. (05 Marks)
- b. Calculate the values of the resistors  $R_C$  and  $R_E$  for the circuit shown in Fig.Q1(b) given that  $R_1 = 5k\Omega$ ,  $R_2 = 1k\Omega$ ,  $\beta = 200$ ,  $V_{CCQ} = 5V$  and  $I_{CQ} = 2mA$ . (assume silicon transistor and  $I_1 \gg I_B$ ). (08 Marks)

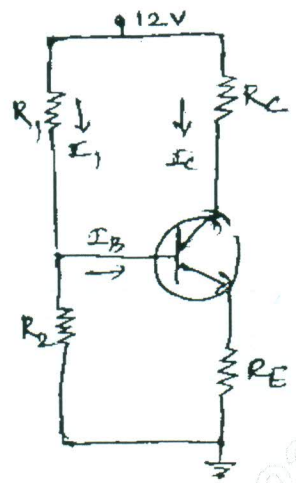


Fig.Q1(b)

- c. Briefly discuss the DC analysis and load line - analyses for the self bias configuration. (07 Marks)
- 2 a. Determine the value of operating point for the circuit shown in Fig.Q2(a) given that threshold voltage for the MOSFET is 2V and  $I_{D(ON)} = 6mA$ , for  $V_{GS(ON)} = 5V$ . (08 Marks)

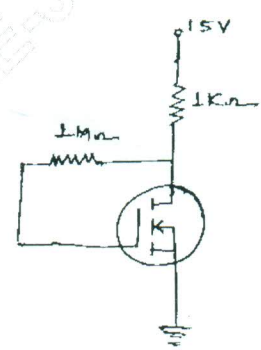


Fig.Q2(a)

- b. Explain with neat sketches the operation and characteristics of CMOS devices. (07 Marks)
- c. Write short note on handling of MOSFETS. (05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

3.
  - a. Explain with neat diagrams the working operation types characteristics and parameters of Liquid Crystal Display Devices [LCD]. (10 Marks)
  - b. Briefly discuss with necessary diagrams the basic operation of opto-couplers. (05 Marks)
  - c. A photodiode has a noise current of 1fA responsivity figure of 0.5A/W calculate its noise equivalent power and detectivity. (05 Marks)
  
4.
  - a. Draw the hybrid equivalent circuit of the transistor in all three configurations given that the hybrid parameters for the transistor are  $h_{ie} = 1.5k\Omega$ ,  $h_{fe} = 150$ ,  $h_{re} = 1 \times 10^{-4}$  and  $h_{oe} = 20 \mu mhos$ . (10 Marks)
  - b. What are cascade amplifiers? What are the advantages on overall frequency response of the amplifier? (05 Marks)
  - c. Explain the effect of coupling and by pass capacitors on the low frequency response of the transistor based amplifier [SMPS]. (05 Marks)

**PART – B**

5.
  - a. What are power amplifiers? How are they classified into different classes depending upon their mode of operation? (06 Marks)
  - b. A class B amplifier provides a 20V peak output signal to  $15\Omega$  load. The system operates on a power supply of 25V. Determine the efficiency of the amplifier (08 Marks)
  - c. The total harmonic distortion of an amplifier reduces from 10% to 1% on introduction of 10% negative feedback. Determine the open loop and closed loop gain values. (06 Marks)
  
6.
  - a. Explain how RC and RL circuit acts as integrator and differentiator. (08 Marks)
  - b. With a neat circuit diagram, explain the working operation of voltage-controlled oscillator. (06 Marks)
  - c. What are multi-vibrators? Discuss briefly the principle of operation of a stable multi-vibrator with respect to IC 555. (06 Marks)
  
7.
  - a. A regulated power supply provides a ripple rejection of  $-80db$ . If the ripple voltage in the unregulated input were 2V. Determine the output ripple (06 Marks)
  - b. Explain with neat diagram and relevant waveforms the working operation of Boost switching voltage regulator. (08 Marks)
  - c. Briefly discuss the important features and parameters of switched mode power supplies. (06 Marks)
  
8.
  - a. Fig.Q8(a) shows a second order low pass filter built around a single Op-Amp. Calculate the values of  $R_1$ ,  $R_2$ ,  $C_1$ ,  $C_2$  and  $R_3$ . If the filter had a cut off frequency of 10KHz Q-factor of 0.707 and input impedance not less than  $10K\Omega$ . (08 Marks)

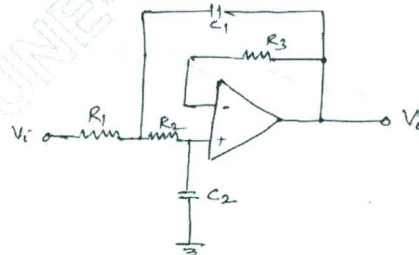


Fig.Q8(a)

- b. What is an absolute value circuit? Draw the circuit schematic of one such circuit configured around Op-Amp and briefly describe its functional principle. (08 Marks)
- c. Discuss briefly the performance parameters and applications of Op-Amps. (04 Marks)