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 $R_1 = 5k\Omega$, $R_2 = 1k\Omega$, $\beta = 200$, $V_{CC_Q} = 5V$ and $I_{C_Q} = 2mA$. (assume silicon transistor and $I_1 \gg I_B$). **(08 Marks)**
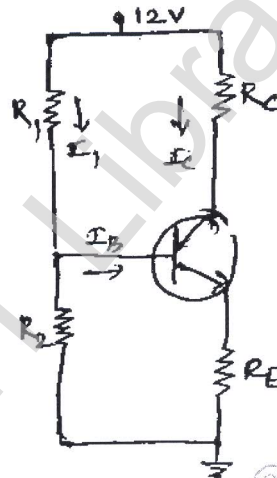

Fig.Q1(b)

   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)**
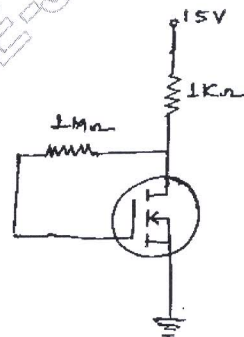

Fig.Q2(a)

   b. Explain with neat sketches the operation and characteristics of CMOS devices. **(07 Marks)**

   c. Write short note on handling of MOSFETS. **(05 Marks)**

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 $h_{oe} = 20$ μmhos. **(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 15Ω 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 10KΩ. **(08 Marks)**
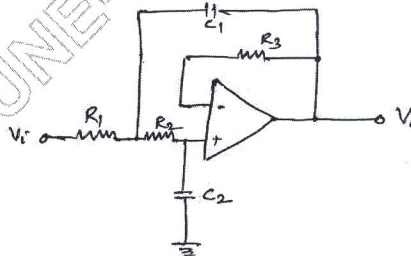

Fig.Q8(a)

   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)**