

Third Semester B.E. Degree Examination, Dec.2014/Jan.2015
Electronics Circuits

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.
2. Any missing data may be assumed suitably.

PART - A

- 1 a. Explain how transistor can be used as switch. (05 Marks)
 b. Determine the value of the resistors R_E and R_C for the circuit shown in Fig. Q1 (b) given that $R_1 = 5 \text{ k}\Omega$, $R_2 = 1 \text{ k}\Omega$, $\beta = 200$, $V_{CEQ} = 5 \text{ V}$ and $I_{CEQ} = 2 \text{ mA}$ for the silicon made transistor. (08 Marks)

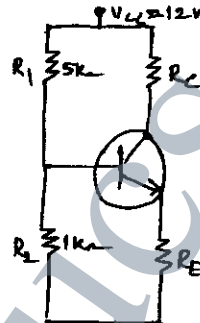


Fig. Q1 (b)

- c. Briefly discuss the working operation of silicon controlled rectifier. (07 Marks)
- 2 a. Explain with neat sketches the operation and characteristics of N-channel DE-MOSFET. (08 Marks)
 b. Calculate the value of operating point for the circuit shown in Fig. Q2 (b) given that threshold voltage for the MOSFET is 2V and $I_{D(ON)} = 6 \text{ mA}$ for $V_{GS(ON)} = 5 \text{ V}$. (07 Marks)

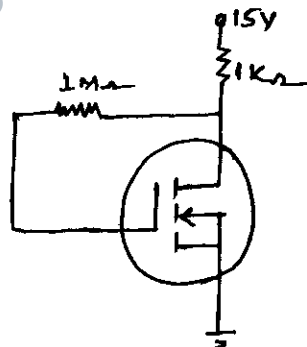


Fig. Q2 (b)

- c. Write the advantages of MOSFET over JFET. (05 Marks)
- 3 a. Briefly discuss with necessary diagrams the working operation, characteristics and parameters of Light Emitting Diode. (10 Marks)
 b. A photo diode has a noise current of 1 fA responsivity figure of 0.5 A/W. Determine its Noise Equivalent Power (NEP) and Detectivity (D). (05 Marks)
 c. Briefly explain the working operation of opto-couplers. (05 Marks)

- 4 a. Explain the effect of Bypass capacitors and coupling on the low frequency response of the transistor based amplifier. (06 Marks)
- b. Draw the hybrid equivalent circuit of the transistor in all three configurations given that the hybrid parameters for the transistor are $h_{ie} = 1.5 \text{ k}\Omega$, $h_{fe} = 150$, $h_{re} = 1 \times 10^{-4}$ and $h_{oe} = 20 \mu\text{mhos}$. (10 Marks)
- c. What are the advantages of cascade amplifiers on overall frequency response of the amplifiers? (04 Marks)

PART - B

- 5 a. A power amplifier in class B operation provides a 20 V peak output signal to 15Ω load the system operates on a power supply of 25 V. Determine the efficiency of the amplifier. (08 Marks)
- b. 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)
- c. Explain the advantages of negative feedback in amplifiers. (06 Marks)
- 6 a. What are sinusoidal oscillators? Explain the Barkhausen criterion for sustained oscillations. (08 Marks)
- b. With a neat circuit diagram, explain the principle of operation of Buffered RC phase shift oscillator. (05 Marks)
- c. Discuss briefly the working operation of Astable Multivibrator using IC555 timer. (07 Marks)
- 7 a. Explain with neat diagram and relevant waveforms, the principle of operation of inverting regulator. (08 Marks)
- b. The regulated power supply provides a ripple rejection of -80 db. If the ripple voltage in the unregulated input is 2V, calculate the output ripple. (06 Marks)
- c. Explain the important features and parameters of switched mode power supplies (SMPS). (06 Marks)
- 8 a. What are active filters using op-amp? Explain first order low pass and high pass filters with gain. (08 Marks)
- b. Explain with circuit the working operation of instrumentation amplifier. (07 Marks)
- c. Calculate the values of R_1 , R_2 , C_1 , C_2 and R_3 . If the filter had a cut off frequency of 10 kHz. Q factor of 0.707 and input impedance not less than $10 \text{ K}\Omega$ for the Fig. Q8 (c) shows a second order low pass filter built around a single operational amplifier. (05 Marks)

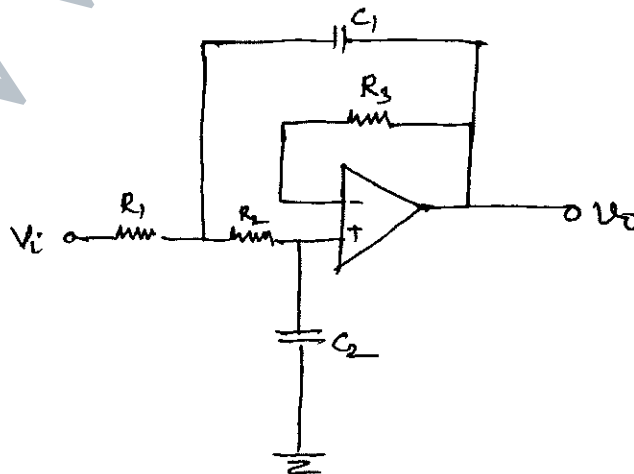


Fig.Q8 (c)
