

**Third Semester B.E. Degree Examination, December 2011**  
**Electronic Circuits**

Time: 3 hrs.

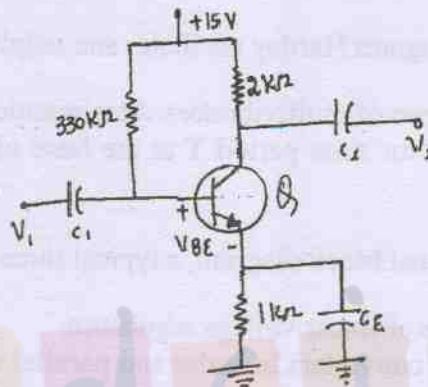
Max. Marks:100

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

**PART - A**

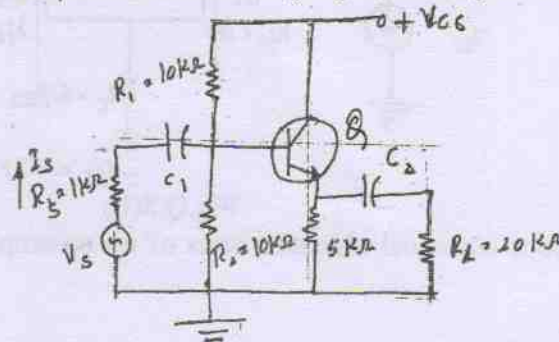
- 1 a. Discuss with neat sketches, the relation of operating point of transistor for following cases :  
 i) Neat saturation region ; ii) Neat cut - off region ; iii) At the centre of active region. (08 Marks)
- b. For the circuit shown in Fig.Q.1(b), calculate  $I_B$ ,  $I_C$ ,  $V_{CE}$ ,  $V_C$ ,  $V_E$ ,  $V_B$  and  $V_{BC}$ . Assume  $\beta = 100$ . (08 Marks)

Fig.Q.1(b)



- c. Explain the basic methods of triggering of SCR. (04 Marks)
- 2 a. Explain with neat sketches, the operation, characteristics and parameters of n - channel depletion type MOSFET. (08 Marks)
- b. Explain with neat sketches, the operation of JFET along with its characteristic curves. (08 Marks)
- c. Discuss merits, demerits and applications of IGBTs. (04 Marks)
- 3 a. Discuss the classification of optoelectronic devices, in detail. (06 Marks)
- b. Explain with neat diagrams, the principle of operation, characteristics, advantages, disadvantages and applications of a photodiode. (08 Marks)
- c. Briefly discuss with necessary diagrams, the basic operation and construction of LED. (06 Marks)
- 4 a. Obtain the expression for current gain, input impedance voltage gain, output impedance power gain of a transistor amplifier using complete h - parameter model. (08 Marks)
- b. In the common collector shown in Fig.Q.4(b), the transistor parameters are  $h_{ic} = 1.2 \text{ k}$ ,  $h_{fc} = -101$ ,  $h_{rc} = 1$  and  $h_{oc} = 25 \mu\text{A/v}$ . Calculate  $R_i$ ,  $A_i$ ,  $A_v$  and  $R_o$  for the circuit. (08 Marks)

Fig.Q.4(b)



- c. Explain common emitter, common collector amplifier along with its a.c. equivalent circuit. (04 Marks)

**PART - B**

- 5 a. Explain the classification of large signal amplifiers as class A, class B, class C and class AB amplifiers. (06 Marks)
- b. An amplifier with openloop voltage gain of 1000, delivers 10W of power output at 10% second harmonic distortion when i/p is 10 mV. A 40 dB negative feedback is applied and output paver is to remain at 10W. Determine required input signal  $V_s$  and second harmonic distortion with feedback. (08 Marks)
- c. Explain the advantages and disadvantages of negative feedback. (06 Marks)
- 6 a. Explain with a neat diagram Hartley oscillater and calpits oscillate as LC oscillator. (06 Marks)
- b. Explain the various types of multivibrators. Also mention the applications. (06 Marks)
- c. Obtain the expression for time period T at the base of transistor, in case of wave shaping circuits. (08 Marks)
- 7 a. Explain with a functional block diagram, a typical three terminal IC voltage regulator. (06 Marks)
- b. Discuss the limitations of linear voltage regulators. (06 Marks)
- c. Briefly discuss power converters in series and parallel connection along with neat diagrams. (08 Marks)
- 8 a. Discuss the requirements of a good instrumentation amplifier. (06 Marks)
- b. Fig.Q.8(b) shows dual input, balanced output and differential amplifier configuration. Assuming silica transistor with  $h_{ie} = 2.8 \text{ K}\Omega$ , calculate : i) Operating point valves ; ii) Differential gain ; iii) Common mode gain ; iv) CMRR ; v) Output if  $V_{S1} = 70 \text{ mV}$  peak to peak at 1 kHz ; vi)  $V_{S2} = 40 \text{ mV}$  peak to peak at 1 kHz. (10 Marks)

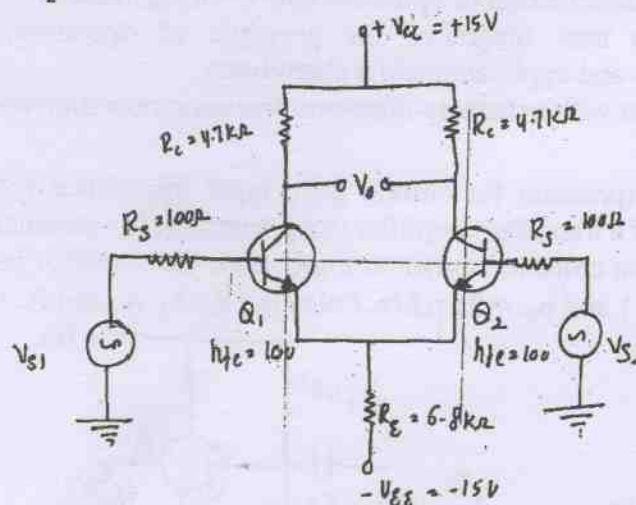


Fig.Q.8(b)

- c. Explain the various electrical characteristics of an op-amp which are generally in the data sheet. (04 Marks)

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