

**Third Semester B.E. Degree Examination, June / July 08**  
**Electronic Circuits**

Time: 3 hrs.

Max. Marks:100

**Note : Answer any FIVE full questions.**

- 1 a. For the sketch shown in fig.Q1(a) below,  $V_i$  varies from 0 to 150V. Sketch the output voltage  $V_o$  to the same time scale as the input voltage. Assume diodes to be ideal. (08 Marks)

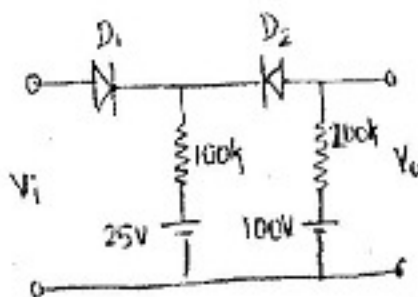


Fig. 1(a)

- b. Explain the operation of full wave voltage doubler circuit. (07 Marks)
- c. A full wave rectifier circuit is fed from a secondary center tapped transformer. The rms voltage from either end of secondary to center tap is 30V if diode resistance  $R_f = 2\Omega$ , half secondary resistance  $R_s = 8\Omega$  and load  $R_L = 1k\Omega$ , calculate efficiency of rectification. (05 Marks)
- 2 a. Discuss the causes for bias instability in a transistor. (05 Marks)
- b. With neat circuit diagram, explain how compensation for  $V_{BE}$  can be obtained using diode in emitter circuit of a transistor. (05 Marks)
- c. A Ge transistor used in self biased circuit has  $V_{CC} = 20V$ ,  $R_C = 2k$ , operating point  $V_{CE} = 10V$  and  $I_C = 4mA$ , and  $\beta = 50$ . Calculate  $R_1$ ,  $R_2$  and  $R_E$  if stability factor  $S = \delta I_C / \delta I_{CO} = 10$  is desired. (10 Marks)
- 3 a. Discuss the biasing techniques used for linear integrated circuits. (08 Marks)
- b. Derive the expression for  $A_v$ ,  $R_{in}$  and  $R_o$  of an emitter follower. (12 Marks)
- 4 a. Derive the expression for transistor transconductance  $g_m$  and input conductance.  $g_{bc}$  in the case of transistor. (12 Marks)
- b. State and prove Miller's theorem. (08 Marks)
- 5 a. Derive an expression for input and output resistance of voltage series feedback amplifier. (12 Marks)
- b. An amplifier with negative feedback has a voltage gain of 120. It is found that without feedback, an input signal of 60mV is required to produce a particular output, where as with feedback the input signal must be 0.5V to get the same output. Find the  $A_v$  and  $\beta$  of the amplifier. (04 Marks)
- c. Mention the advantages of negative feedback. (04 Marks)
- 6 a. Derive an expression for the maximum conversion efficiency of a class B push – pull amplifier. (10 Marks)

- b. Calculate the input power, output power and efficiency of the amplifier in the figure Q6(b) shown for an input voltage in a base current of 10mA peak. Also calculate the power dissipated by the transistor. (10 Marks)

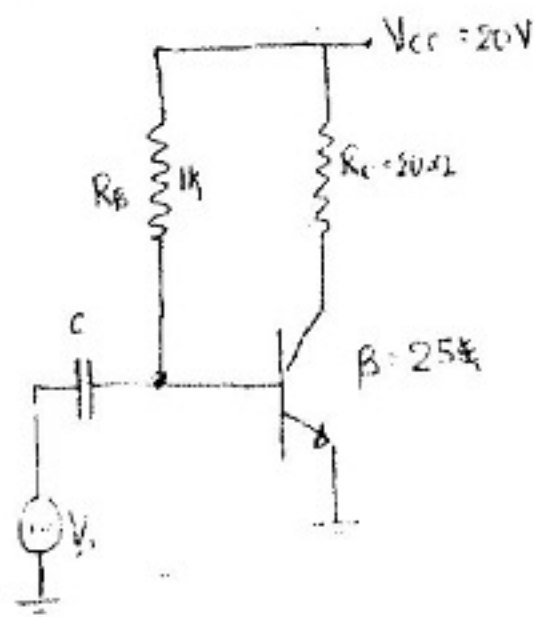


Fig.6(b)

- a. Draw the circuit and explain how to measure the CMRR of an OP-amp. (06 Marks)  
 b. Find output voltage  $V_o$  in terms of  $V_1$  and  $V_2$  for the op-amp circuit shown in fig.7(b). Assume ideal op-amps. (08 Marks)

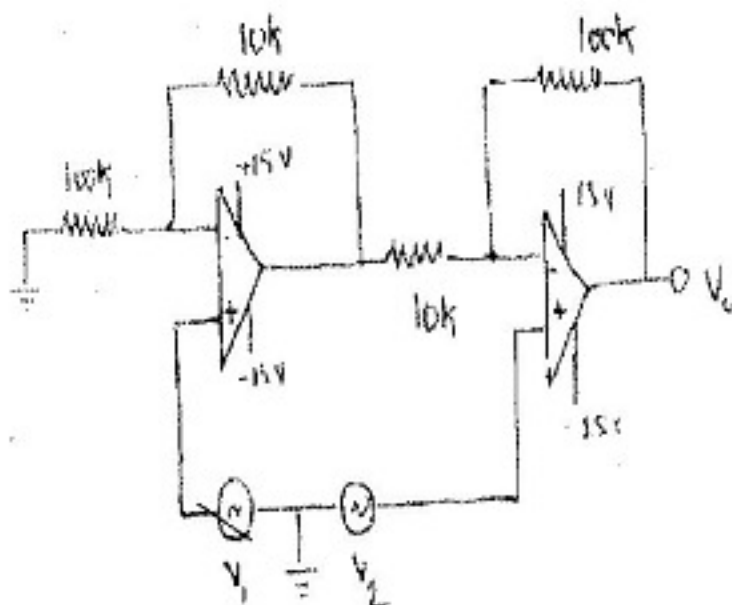


Fig. 7(b)

- c. Design a Schmitt trigger whose  $V_{LT}$  and  $V_{UT}$  are  $\pm 5V$ . Draw waveforms. Take LM741 with  $V_{sat} = \pm 13.5V$  and supply voltage  $\pm 15V$ . (06 Marks)
- a. Draw and explain the working of positive clamper. (06 Marks)  
 b. Explain the working of D/A converter [Binary weighted resistors] with neat sketch. (06 Marks)  
 c. Give the circuit schematic of 555 timer connected as an astable multivibrator. Describe its operation. (08 Marks)