2002 SCHEME

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EC32

Third Semester B.E. Degree Examination, June/July 2019
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.

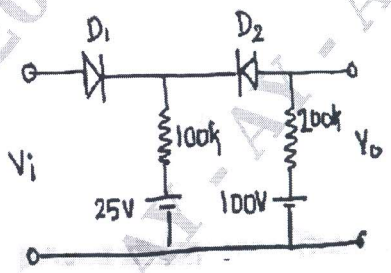

Fig. 1(a) **(08 Marks)**

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. Draw the h-parameter equivalent circuit for CE amplifier. Derive an expression for A_i, R_i, A_v, R_0, A_{vs} and A_{IS}. **(10 Marks)**

b. For the amplifier shown in Fig.Q3(b), calculate R_i, R_i', A_v, A_{vs} and $A_I' = -\frac{I_2}{I_1}$.

The transistor parameters are $h_{ie} = 1100\ \Omega$, $h_{re} = 2.5\times10^{-4}$, $h_{fe} = 50$, $h_{oe} = 25\times10^{-6}$ A/V.

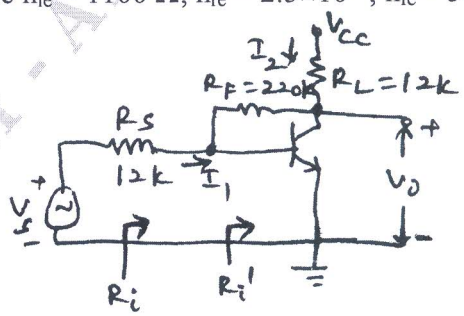

Fig.Q3(b) **(10 Marks)**

4 a. For the SL 100 transistor following data are available: $h_{ie} = 2000\ \Omega$, $h_{fe} = 100$, $h_{re} = 10^{-4}$, $h_{oe} = 25\times10^{-6}$ A/V at $I_C = 2$ mA and $T = 27°C$, $C_{ob} = 5$ pF. Assume $f_T = 50$ mHz. Determine all the hybrid-π parameter. Draw the hybrid-π model and incorporate all the component values. **(08 Marks)**

b. Derive an expression for output conductance g_{ce}. **(06 Marks)**

c. Explain the different types of distortions in an amplifier. **(06 Marks)**

5 a. Discuss general characteristics of negative feedback amplifier. **(08 Marks)**

b. Derive an expression for input resistance of voltage series feedback topology. **(06 Marks)**

c. Draw a block diagram of feedback in amplifier and explain each block. **(06 Marks)**

6 a. Write the features of op-amp. **(06 Marks)**

b. With a neat diagram, explain op-amp as differential amplifier. **(06 Marks)**

c. Define: i) C.M.R.R.; ii) Slew rate; iii) P.S.R.R.; iv) Offset voltage. **(08 Marks)**

7 a. Define the following terms with respect to op-amp:
i) Input bias current ii) Output offset voltage **(04 Marks)**

b. Draw the circuit of a differential instrumentation amplifier using a transducer bridge and explain its features. Also derive the expression for its output voltage. **(10 Marks)**

c. Determine the circuit elements of an op-amp Schmitt trigger with the following specifications: UTP = 2V, LTP = -4V and the output swings between ± 10V. **(06 Marks)**

8 a. Explain the operation of a sample and hold circuit. **(06 Marks)**

b. Explain the operation of a positive peak detector with relevant waveforms. **(06 Marks)**

c. Draw the circuit diagram of a astable multi-vibrator using 555 timer and explain its operation. **(08 Marks)**

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