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Third Semester B.E. Degree Examination, Dec.2016/Jan.2017 Analog Electronic Circuits

Time: 3 hrs.

Max. Marks: 80

Note: Answer FIVE full questions, choosing one full question from each module.

Module-1

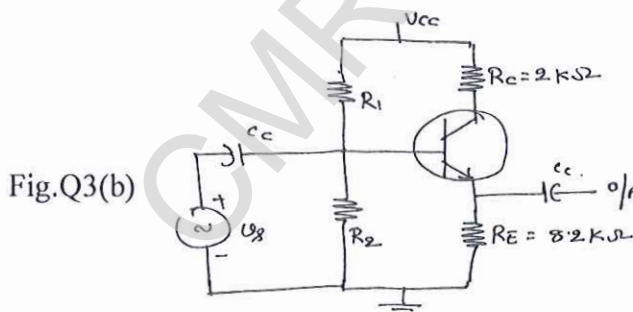
- 1 a. Design a collector to base bias circuit for the following specifications :
 $V_{CC} = 10V$, $V_{CE} = 5V$, $I_C = 1mA$, $\beta = 50$. If β varies from 25 to 75, find the change in collector current. (07 Marks)
- b. What are the different biasing circuits? Find an expression for stability factor 'S' of each biasing circuit. (09 Marks)

OR

- 2 a. Design a voltage divider biasing circuit with a supply voltage of 10V and $V_{CE} = \frac{V_{CC}}{2}$. The load resistance is $2K\Omega$. Take $\beta = 100$. (09 Marks)
- b. Explain the operation of transistor as switch along with suitable circuit and necessary waveforms. Highlight the design procedure. (07 Marks)

Module-2

- 3 a. Draw the circuit of common emitter amplifier with voltage divider biasing. Derive the expression for current gain, voltage gain, input and output impedance using the model. (08 Marks)
- b. For the following circuit, find current gain, voltage gain, input and output impedance. (08 Marks)



OR

- 4 a. Starting from fundamentals, define h parameters and obtain an h – parameter equivalent circuit of common emitter configuration. (08 Marks)
- b. Derive suitable expressions to explain the effect of cascading of amplifiers on lower and upper cut off frequencies. (08 Marks)

Module-3

- 5 a. What is a Cascade amplifier? Draw a practical circuit with cascade connection and derive the expressions for current gain, voltage gain, input and output impedance using r_e model. (10 Marks)
- b. Explain the block diagram of a feedback amplifier. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 6 a. Draw the circuit of Darlington emitter follower with voltage divider bias. Calculate input impedance, voltage gain and output impedance. Take $\beta_1 = \beta_2 = 100$. (08 Marks)
 $R_1 = R_2 = 100K$, $R_E = 5k\Omega$. Take $r_e = 0.1K\Omega$.
- b. Draw the block diagram of voltage series feedback amplifier and find the effect of feedback on input and output impedances. (08 Marks)

Module-4

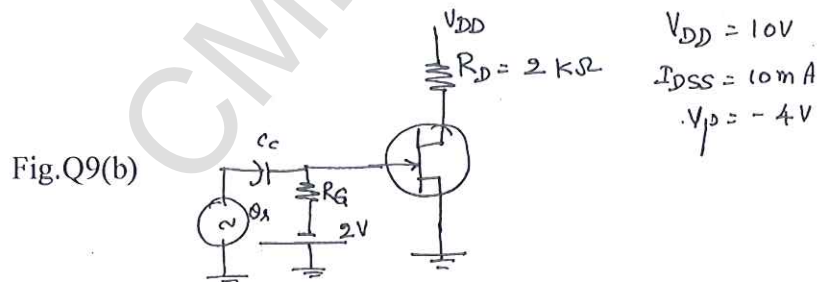
- 7 a. Draw the circuit of class – A transformer coupled power amplifier. Explain the operation of the circuit with the help of neat waveforms. Also derive an expression for maximum efficiency of conversion. (08 Marks)
- b. Draw the circuit of Wien bridge oscillator and derive an expression for frequency of oscillator. (08 Marks)

OR

- 8 a. Explain the classification of power amplifier with neat circuit diagram and waveforms of collector current and collector voltage for each type of power amplifier. (10 Marks)
- b. Explain the principle of operation of oscillator and the effect of loop gain ($A\beta$) on the output of oscillator. (06 Marks)

Module-5

- 9 a. With the help of neat diagrams, explain the construction, working and characteristics of n – channel JFET. (08 Marks)
- b. For the following circuit, find voltage gain and output impedance
 i) If $r_d = 20K\Omega$ ii) If $r_d = \infty$. (08 Marks)



OR

- 10 a. Explain the construction, working and characteristics of n – channel depletion MOSFET. (08 Marks)
- b. Draw the circuit of common source amplifier using JFET, with the help of small signal model derive an expression for current gain, input impedance, voltage gain and output impedance. (08 Marks)

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