CBCS SCHEME

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18EE34

Third Semester B.E. Degree Examination, Feb./Mar. 2022
Analog Electronic Circuits

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. For the circuit shown in Fig Q1(a) sketch the output waveforms and transfer characteristics for cut in voltage of diode is 0.7V

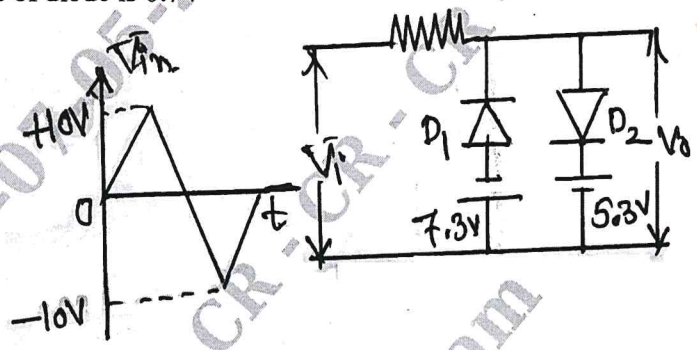

Fig Q1(a) **(08 Marks)**

b. With a neat circuit diagram, explain self bias circuit, write the necessary equations. **(08 Marks)**

c. Define stability factor and derive the expression for stability factor of fixed baise circuit with respect to I_{CO}. **(04 Marks)**

OR

2 a. Derive an expression for E_{Th}, I_B and V_{CE} for voltage divider bias circuit using exact analysis. **(08 Marks)**

b. What is clamping circuit? Explain the negative damping circuit with and without reference voltage with necessary waveforms. **(08 Marks)**

c. List the important applications of clipping and clamping circuits. **(04 Marks)**

Module-2

3 a. With the help of r_e equivalent model, derive an equation for Z_i, Z_0 and A_V for an emitter follower configuration. **(08 Marks)**

b. State and prove Millers theorem. **(08 Marks)**

c. Compare the characteristics of CB, CC and CE configurations. **(04 Marks)**

OR

4 a. Starting from fundamental define h-parameters and obtain an h-parameter equivalent circuit of common emitter configuration. **(08 Marks)**

b. For the circuit shown below, determine : i) r_e ii) Z_i, Z_0, A_V and A_I taking $r_0 = \infty\Omega$

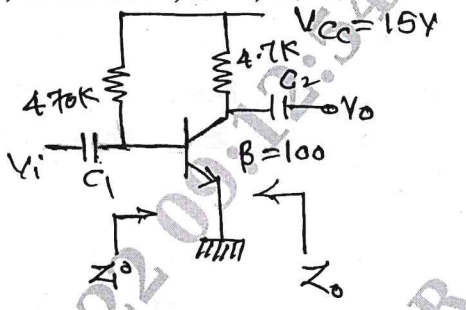

Fig Q4(b) **(08 Marks)**

c. What are the advantages of h-parameters? **(04 Marks)**

Module-3

5 a. Derive expressions for Z_i, Z_0 and A_i for a Darlington emitter follower circuit. **(10 Marks)**

b. Draw and explain the block diagram of multistage cascade amplifier. **(06 Marks)**

c. Write important characteristics of Darlington emitter follower. **(04 Marks)**

OR

6 a. For a current series feedback amplifier, derive an expression for Z_{if} and Z_{of}. **(10 Marks)**

b. Explain the general characteristics of negative feedback amplifier. **(10 Marks)**

Module-4

7 a. Explain the operation of class B push-pull amplifier. Prove that the maximum efficiency of class B configuration is 78.5%. **(08 Marks)**

b. With a neat diagram and waveform, explain the operation of RC phase shift oscillator using BJT. Write the expression for frequency of oscillation. **(08 Marks)**

c. A crystal has following parameters L= 0.3344H, C = 0.065pF, C_M = 1pF and R = 5.5KΩ. Calculate : i) Series resonance frequency ii) Parallel resonance frequency. **(04 Marks)**

OR

8 a. With a neat diagram, explain basic principle of operation of oscillators and write the condition to obtain sustained oscillations. **(08 Marks)**

b. Prove that the maximum conversion efficiency of class A transformer coupled amplifier is 50%. **(08 Marks)**

c. The following readings are available for a power amplifier, calculate the second harmonic distortion in each case.

$V_{CEQ} = 10V$ $V_{CE(max)} = 18V$ $V_{CE(min)} = 1V$

$V_{CEQ} = 10V$ $V_{CE(max)} = 19V$ $V_{CE(min)} = 1V$ **(04 Marks)**

Module-5

9 a. Explain the construction working and characteristics of an n-channel JFET. **(10 Marks)**

b. Define transconductance (g_m) and derive an expression for "g_m". **(06 Marks)**

c. Compare BJT and JFET. **(04 Marks)**

OR

10 a. With neat sketch, explain the basic construction operation and characteristic of n-channel depletion type MOSFET. **(10 Marks)**

b. Derive the expression for A_V, Z_i and Z_0 for a JFET common source amplifier with fixed bias configuration. **(10 Marks)**

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