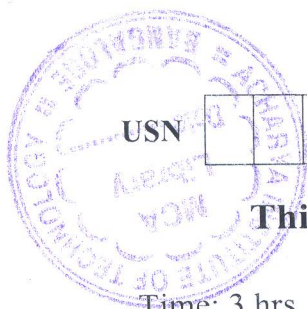


CBCS SCHEME



21EE32

Third Semester B.E. Degree Examination, Dec.2023/Jan.2024 Analog Electronics Circuits and Op-Amps

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. What is stabilization? Derive an expression for stability factor S_{ICO} and S_{VBE} of voltage divider bias circuit. (10 Marks)
- b. For the clipper circuit shown in Fig. Q1 (b), the input is $50\sin\omega t$. Draw the transfer characteristics and I/P and O/P waveforms, assuming ideal diodes. (10 Marks)

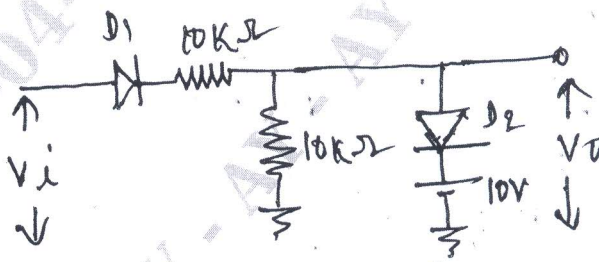


Fig. Q1 (b)
OR

- 2 a. Using Ideal diode, design a suitable clamper circuit to perform the function as shown in Fig. Q2 (a). (08 Marks)

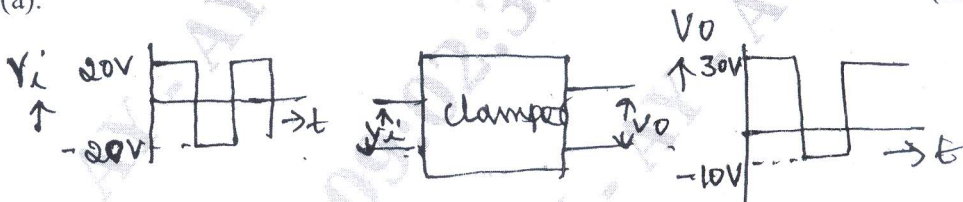


Fig. Q2 (a)

- b. With a neat circuit diagram, explain the working of Double Ended Clipper. (08 Marks)
- c. List the advantages of H parameters. (04 Marks)

Module-2

- 3 a. For the circuit shown in Fig Q3 (a), calculate voltage gain, Z_i and Z_o . (10 Marks)

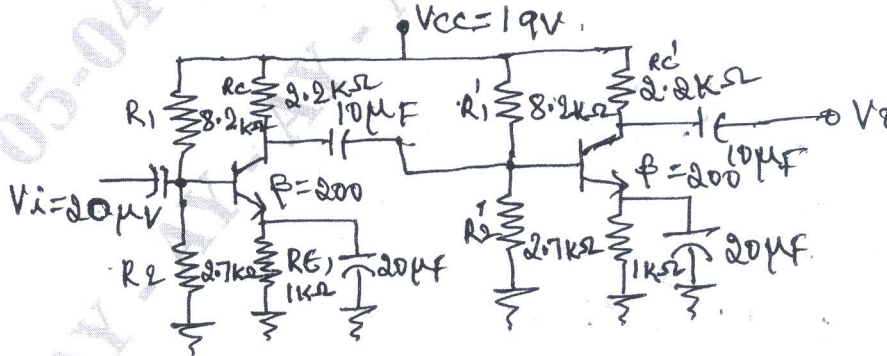


Fig. Q3 (a)

- b. Derive the expression for I/P resistance and O/P resistance of current series feedback amplifier. (10 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

- 4 a. For the amplifier circuit shown in Fig. Q4 (a). Calculate Z_i , Z_o , A_i and A_v . (08 Marks)

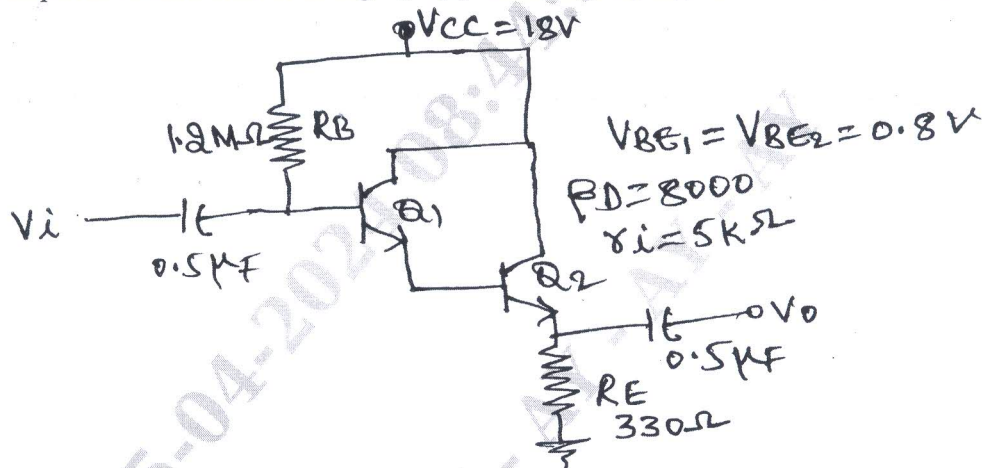


Fig. Q4 (a)

- b. Derive an expression for I/P impedance, O/P impedance, current gain and voltage gain of Darlington emitter follower. (12 Marks)

Module-3

- 5 a. Draw the circuit of class-B pushpull amplifier and derive an expression for its conversion efficiency. (08 Marks)
- b. Explain the basic operation and construction of n-channel depletion type MOSFET. (08 Marks)
- c. State the advantages and disadvantages of transformer coupled class A power amplifier. (04 Marks)

OR

- 6 a. Compare Class A, Class B, Class AB and Class C amplifiers with respect to Q point, efficiency and collector current flow. (06 Marks)
- b. Explain the construction and working of N channel JFET. (08 Marks)
- c. A single transistor amplifier with transformer coupled load produces harmonic amplitudes. In the output as $B_0 = 1.5$ mA, $B_1 = 120$ mA, $B_2 = 10$ mA, $B_3 = 4$ mA, $B_4 = 2$ mA, $B_5 = 1$ mA. Determine the percentage total harmonic distortion. (06 Marks)

Module-4

- 7 a. With a neat circuit diagram, explain the working of instrumentation amplifier and also derive an expression for its O/P voltage. (10 Marks)
- b. What are active filters? With a neat circuit diagram, explain the working of 2nd order active High Pass filter. (10 Marks)

OR

- 8 a. For the non-inverting opamp shown in Fig. Q8 (a), find the O/P voltage. (08 Marks)

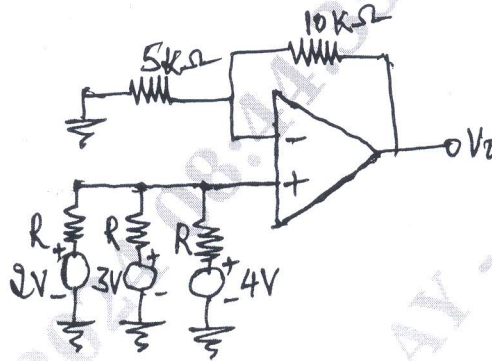


Fig. Q8 (a)

- b. Explain voltage follower regulator using opamp. (06 Marks)
 c. List the advantages of active filters. (06 Marks)

Module-5

- 9 a. State Barkhausen criteria and explain how it is fulfilled in RC phase shift oscillator and explain its operation. (08 Marks)
 b. With a neat diagram, explain how opamp can be used as an integrator. (06 Marks)
 c. Explain the operation of inverting zero crossing detectors. (06 Marks)

OR

- 10 a. Explain voltage to current converter with floating and grounded load. (10 Marks)
 b. Draw the circuit of triangular/rectangular waveform generator with adjustable duty cycle and frequency and also explain its design steps. (10 Marks)

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