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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2021

ANALOG CIRCUITS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

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| 1 | a Define the cutoff frequency f_c and write down its expression. | 2M |
| | b Compare the performance of various feedback amplifiers. | 2M |
| | c Compare the various types of power amplifiers. | 2M |
| | d List the characteristics of an ideal op-amp. | 2M |
| | e What is Sallen-Key Filter? | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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|---|--|----|
| 2 | a Draw the Hybrid- π model and explain the significance of each component. | 5M |
| | b Derive the expression for the hybrid- π parameters g_m , $g_{b'e}$. | 5M |

OR

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|---|---|----|
| 3 | a Describe different methods used for coupling of multistage amplifiers with their frequency response. | 5M |
| | b If $I_c = 1\text{mA}$ and $V_{CE} = 10\text{V}$, a certain transistor data shows $C_c = C_{b'c} = 3\text{pF}$, $h_{fe} = 200$ and $\omega_T = -500\text{ M rad/sec}$. Calculate g_m , $r_{b'e}$, $C_e = C_{b'e}$ and ω_β | 5M |

UNIT-II

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|---|---|----|
| 4 | a Determine the input and output resistances of Current Shunt feedback amplifier. | 5M |
| | b An amplifier has a voltage gain of 400, $f_1 = 50\text{ Hz}$, $f_2 = 200\text{kHz}$ and a distortion of 10% without feedback. Determine the amplifier voltage gain, f_{1f} , f_{2f} and D_f when a negative feedback is applied with feedback ratio of 0.01. | 5M |

OR

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| 5 | a Derive the expressions of input and output resistances for Voltage Shunt FBA. | 5M |
| | b Determine the input and output resistances of Current Series feedback amplifier. | 5M |

UNIT-III

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| 6 | a With neat diagram, explain Series fed, Directly coupled Class A Power Amplifier and derive its maximum efficiency. | 5M |
| | b Discuss with diagram, Transformer coupled Class A Power Amplifier and derive its Maximum efficiency. | 5M |

OR

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|---|--|----|
| 7 | a Describe Complementary Symmetry Class B Power Amplifier with neat diagram. | 6M |
| | b A Class B push pull amplifier drives a load of 16Ω , connected to the secondary of ideal transformer. The V_{cc} is 25V. If number of turns on primary is 200 and secondary is 50. Calculate maximum power output, DC power input and efficiency. | 4M |

UNIT-IV

- 8 a Draw a non-inverting amplifier using an op amp and derive the expression for its closed loop voltage gain. 6M
- b Describe the transfer characteristics of a differential amplifier. 4M

OR

- 9 a Write notes on Scale changer with circuit diagram. 5M
- b Derive the expression for output voltage for a non inverting summing amplifier. 5M

UNIT-V

- 10 a Draw a First order low pass active filter and derive the transfer function its frequency response. 5M
- b Design a second order Butterworth low pass filter having upper cutoff frequency of 1KHz. 5M

OR

- 11 a Draw the diagram of a second order high pass active filter; derive the expression for its transfer function. 5M
- b Design a second order Butterworth high pass filter having lower cutoff frequency of 1KHz. 5M

END