

R18

Code No: 153AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year I Semester Examinations, December - 2019

ANALOG ELECTRONICS  
(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

- 1.a) What is meant by operating point(Q)? [2]
- b) Draw the circuit symbol of N-channel MOSFET and P channel MOSFET. [2]
- c) Define frequency response. [2]
- d) Define sensitivity and De-sensitivity [2]
- e) Define CMRR and SLEW rate [2]
- f) Draw the V-I characteristics of diode? [3]
- g) Define Pinch-off region and ohmic region. [3]
- h) Classify power Amplifiers. [3]
- i) What are the conditions for oscillations? [3]
- j) What is a non-inverting amplifier? And find the output voltage. [3]

PART - B

(50 Marks)

- 2.a) Derive the expressions for voltage gain, current gain, input impedance and output impedance of CB amplifier. [5+5]
- b) Discuss the types of clippers in detail with neat sketches. [5+5]

OR

- 3.a) Obtain the efficient of the half wave rectifiers. [5+5]
- b) Contrast between the CC, CB and CE configurations. [5+5]
- 4.a) Sketch the drain characteristics of MOSFET for different values of  $V_{GS}$  and mark different regions of operation.
- b) A self biased p-channel JFET has a pinch-off voltage of  $V_P = 5$  V and  $I_{DSS} = 12$  mA. The supply voltage is 12 V. Determine the values of  $R_D$  and  $R_S$  so that  $I_D = 5$  mA and  $V_{DS} = 6$  V. [5+5]

OR

- 5.a) Explain the principle of CS amplifier with the help of circuit diagram.
- b) Explain the construction and principle of operation of Depletion type N-channel MOSFET. [5+5]



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6.a) Explain the two stage amplifier with Darlington connection. Discuss the advantages and disadvantages of a Darlington amplifier.

b) For a class B power amplifier driven from a 24V power supply and driving a load  $8\Omega$ , compute i) Input D.C power ii) output power iii) Conversion efficiency, if the peak to peak output voltage across the load resistance is 22V maximum. [5+5]

OR

7. Draw the circuit diagram of Direct coupled class-A power amplifier and explain its operation. Show that the maximum conversion efficiency is 25%. [10]

8.a) Draw the circuit diagram of Wein bridge oscillator using BJT and derive the expression for frequency of oscillations.

b) An amplifier with open loop voltage gain  $A_v = 1000 \pm 100$  is available. It is necessary to have an amplifier where voltage gain varies by not more than  $\pm 0.1\%$ . i) Find the reverse transmission factor  $\beta$  of the feedback network used. ii) Find the gain with feedback. [7+3]

OR

9.a) Derive an expression for frequency oscillation of Colpitts oscillator using BJT transistor.

b) Draw the circuit for Voltage series amplifier and justify the type of feedback [5+5]

10.a) Draw and explain the operation of an op-amp as integrator for sine wave input.

b) With a neat diagram explain about square wave generator. [5+5]

OR

11.a) Draw the block schematic of op-amp and explain each block.

b) Compare the ideal and practical op-amp. [7+3]

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