

Code No: 183AB**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech II Year I Semester Examinations, February - 2024****ANALOG ELECTRONIC CIRCUITS****(Electrical and Electronics Engineering)****Time: 3 Hours****Max. Marks: 60****Note:** This question paper contains two parts A and B.i) **Part- A** for 10 marks, ii) **Part - B** for 50 marks.

- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of **ten questions** (numbered from 2 to 11) **carrying 10 marks each**. From each unit, there are two questions and the student should answer one of them. Hence, the student should answer five questions from Part-B.

PART - A**(10 Marks)**

- 1.a) Define cut-in voltage of a PN junction diode. [1]
- b) Mention the h-parameters typical values in CE configuration. [1]
- c) Classify MOSFETs. [1]
- d) Mention any 2 advantages of FET over BJT. [1]
- e) Why Direct Coupled multistage amplifiers are not suitable for high frequency of operation? [1]
- f) Why Class C amplifier is not suitable to use as a audio amplifier? [1]
- g) What are the advantages of negative feedback amplifiers? [1]
- h) What are the conditions for oscillation? [1]
- i) What are the drawbacks of basic differentiator? [1]
- j) Draw the pin diagram of IC741. [1]

PART - B**(50 Marks)**

- 2.a) Discuss the operation of clipping circuit with suitable diagram and transfer characteristics.
- b) Draw and explain the small signal equivalent circuit of CE. [6+4]

OR

- 3.a) Explain the Input and Output Characteristics of BJT in CB Configuration.
- b) Draw and explain the operation of half wave rectifier and then derive the value of ripple factor. [5+5]

- 4.a) Define drain resistance r_d , transconductance g_m , amplification factor μ for a JFET. If $r_d=400k \Omega$, $g_m=10mA/V$. Then calculate amplification factor μ .
- b) Describe the operation of Common Drain JFET Amplifier. [4+6]

OR

- 5.a) Define Pinch-off voltage. A JFET has $I_{DSS}=32mA$, $V_{GS(off)} = -8V$, $V_{GS} = -4.5V$. Calculate the Drain current I_D .
- b) Explain the V-I characteristics of n-channel MOSFET in both enhancement and depletion modes. [4+6]

- 6.a) Compare different coupling schemes.
b) What are the advantages and disadvantages of Direct Coupled multistage amplifier?
Also, draw Two-stage direct coupled BJT CE amplifier. [4+6]

OR

- 7.a) Explain the principle of operation of class-A power amplifier with a neat sketch.
b) Define Power amplifier. Classify power amplifiers based on Conduction angle and Q-Point Location. Illustrate. [5+5]

8. Determine the effect of negative feedback on the input and output impedances of a Voltage-Series feedback amplifier. Show the circuit schematic diagram. [10]

OR

- 9.a) Discuss about amplitude stability of oscillator.
b) Explain the Operation of Crystal oscillator and its Applications. [5+5]

- 10.a) List and explain the ideal and practical characteristics of an Op-Amp.
b) Define Slew Rate? A op-amp operates as a unity gain buffer with 3 V (peak to peak) sinusoidal wave input. If op-amp is ideal with slew rate 0.5 V/ μ sec, then calculate the maximum operating frequency of op-Amp. [5+5]

OR

- 11.a) Explain the operation of square wave generator using op-Amp.
b) Define Input bias current. Derive the value of compensation resistor R_{comp} to be used in the op-amp circuit to get zero output voltage, when zero inputs are applied. [5+5]

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