Code No: 183AB **R22**

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 Ω, 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 depleton 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/μsec, 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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