4TH/ SEM./ ETC & COMM./E &TC/ 2023(S)

TH 4 Analog Electronics and Linear IC

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2

Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

   a. Draw the symbols of a) pn-junction diode and Zener diode b)pnp and npn transistor

   b. Define Q-point.

   c. Draw the circuit diagram of a Class-A power Amplifier.

   d. List any two advantages of FET over BJT.

   e. State Barkhausen criterion.

   f. Write any two differences between amplifier and oscillator.

   g. Draw a positive shunt clipper circuit.

   h. Define Astable multivibrator.

   i. Find the gain of a non-inverting op-amp having input resistance R_{in}=100Ω and feedback resistor R_f=1000 Ω.

   j. Mention any two applications of 555 timer.

2. Answer **Any Six** Questions 6 x 5

   a. With a neat circuit diagram and appropriate waveforms, explain the working a half-wave rectifier circuit.

   b. Define α, β *and* γ and establish the mathematical relationship between them

   c. Differentiate between voltage and power amplifier. (any 5)

   d. (i) Draw block diagram of voltage shunt feedback amplifier. [2]

   (ii) Determine the voltage gain, input, and output impedance with feedback for voltage series feedback having open loop gain (**A) = 150,** input resistance (**R_{in}) = 1kΩ,** output resistance (**R_o) = 2kΩ** for feedback fraction of **β = 0.1.** [3]

e. Draw an inverting op-amp circuit. Derive the expression for gain. If a 1V signal is given as input to it, Determine the output voltage. (Assume R_{in}= 1kΩ and R_f=10kΩ)

f. Define the following parameters (along with units) of an Op-amp.

i) Slew rate(2M)

ii) Input offset voltage(2M)

iii) Voltage gain(1M)

g With a neat circuit diagram, explain the working of a negative clamper circuit. Also, Draw its input and output waveforms.

3	Explain different types for transistor configurations and their input and output characteristics in detail.	**10**
4	With neat sketch diagram, explain the working of Class B push pull amplifier.	**10**
5	Classify MOSFETs and explain their input and output characteristics.	**10**
6	Explain the operation of integrator and differentiator using OP-AMP with neat diagrams.	**10**
7	With a neat block diagram, explain the operation of IC 555 timer.	**10**