4^{TH} SEM./ECE/ETC/2022(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. Define Ripple factor. Mention ripple factor of half wave rectifier and full wave rectifier.
b. Define α and β of a transistor.
c. List different types of power amplifiers.
d. Write the full form of CMOS and draw it's symbol indicating each terminal.
e. Define Barkhausen criterion.
f. Name any two audio frequency oscillators and RF oscillators.
g. Mention the name of components used to design (i) clipper circuit (ii) clamper circuit
h. Define Monostable multivibrator.
i. Define CMRR and Slew rate of an Op-amp.
j. Draw the pin diagram of 555 timer and mention each pin name.

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

a. Explain the current flow mechanism in a p-n junction under:

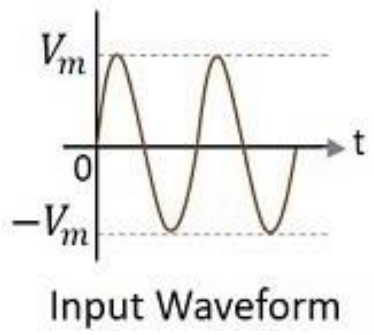
(i) No bias
(ii) Forward bias
(iii) Reverse bias condition

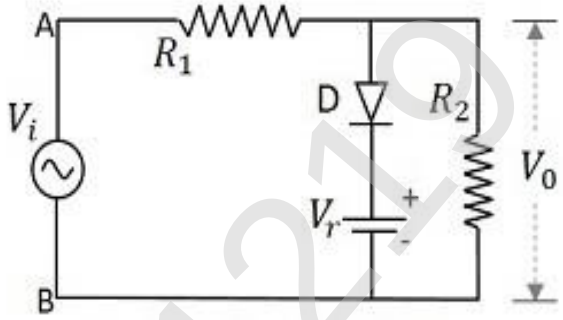
b. Differentiate between voltage and power amplifier.
c. Classify FETs. Draw the symbols showing current direction and name each terminal.
d. (i) Draw block diagram of voltage series feedback amplifier. [2]

(ii) Determine the voltage gain, input, and output impedance with feedback for voltage series feedback having open loop gain (**A) = 100,** input resistance (**R_{in}) = 10 kΩ,** output resistance (**R_o) = 20 kΩ** for feedback fraction of **β = 0.1.** [3]

e. Draw the circuit diagram of inverting and non inverting amplifier using Op-amp. Also, Compute gain of both the circuits if input resistance **(R_{in}) = 1kΩ** and feedback resistance **(R_f) = 10kΩ.**
f. Explain the working of a voltage to current convertor using Op-amp.

g A sinusoidal signal having maximum voltage $\mathbf{V_m = 5V}$ is applied to the clipper circuit having bias voltage $\mathbf{V_r = 1V}$ as given below. Draw the output waveform.





3	With neat diagram describe the working principle of RC coupled amplifier with its frequency response curve.	**10**
4	With neat sketch, explain the working of Class – B push pull amplifier.	**10**
5	Explain the working of wine-bridge oscillator with circuit diagram. Write the expression for frequency of oscillation.	**10**
6	Explain the operation of integrator and differentiator using OP-AMP with neat diagrams.	**10**
7	Explain the operation of Astable multi-vibrator using IC-555 with a neat circuit diagram.	**10**