4TH 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

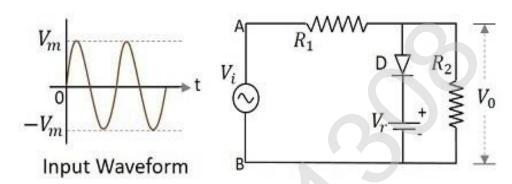
- a. Define Ripple factor. Mention ripple factor of half wave rectifier and full wave rectifier.
- b. Define α and β of a transistor.
- c. List different types of power amplifiers.
- d. Write the full form of CMOS and draw it's symbol indicating each terminal.
- e. Define Barkhausen criterion.
- f. Name 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 $(R_{in}) = 10 \text{ k}\Omega$, output resistance $(R_0) = 20 \text{ k}\Omega$ for feedback fraction of $\beta = 0.1$. [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 $(\mathbf{R_{in}}) = \mathbf{1k\Omega}$ and feedback resistance $(\mathbf{R_f}) = \mathbf{10k\Omega}$.
- f. Explain the working of a voltage to current convertor using Op-amp.

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



With neat diagram describe the working principle of RC coupled amplifier with its frequency response curve.
With neat sketch, explain the working of Class – B push pull amplifier.
Explain the working of wine-bridge oscillator with circuit diagram. Write the expression for frequency of oscillation.

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10

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- Explain the operation of integrator and differentiator using OP-AMP with neat diagrams.
- 7 Explain the operation of Astable multi-vibrator using IC-555 with a neat circuit diagram.