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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ECE) (2012 to 2017) (Sem.-3)

ANALOG DEVICES & CIRCUITS

Subject Code : BTEC-301

M.Code : 57583

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**1. Write briefly :**

- a) Why is zener diode used as voltage regulator?
- b) Give two advantages and disadvantages of FET over BJT.
- c) What do you understand by terms channel and drain in JFET?
- d) Why is it necessary to stabilize the operating point of a transistor amplifier?
- e) Give reasons why common emitter (CE) configuration is widely used in amplifier circuits.
- f) What is reverse saturation current?
- g) What is tunnelling?
- h) Why is negative feedback employed in high gain amplifiers?
- i) List the two Barkhausen conditions required for sinusoidal oscillations to be sustained.
- j) What is crossover distortion? How can it be minimized?

SECTION-B

2. What is P-N junction diode? How potential barrier is formed in a P-N junction diode?
3. Compare the characteristics of transistor amplifiers in the three possible configurations.
4. A class B push-pull amplifier must deliver 10 W of audio power to the output load :
 - a) If the output transformer is 80% efficient, what is the minimum power drain on the power supply under optimum conditions and
 - b) What is the minimum average power dissipation rating required for each transistor?
5. Discuss the effects of negative feedback on gain, stability, and bandwidth.
6. Draw the hybrid model of a BJT and explain each component.

SECTION-C

7.
 - a) In a CE configuration, the collector supply voltage is 10 V. When a resistor $R_C = 1 \text{ k}\Omega$ is connected in the collector circuit, the voltage drop across it is 0.5 V. For $\alpha = 0.98$, determine the collector-emitter voltage and the base current.
 - b) Explain the operation of a tunnel diode. Draw its V-I characteristics and list the possible applications of the device.
8. Draw the circuit diagram of a Colpitt's oscillator using transistor and explain its working principle. Also derive an expression for its frequency of oscillations.
9.
 - a) The h parameters for a CE amplifier
are $h_{ie} = 2600\Omega$, $h_{fe} = 100$, $h_{re} = 0.02 \times 10^{-2}$ and $h_{oe} = 5 \times 10^{-6}$. Find h parameters for CC configuration.
 - b) What is the significance of stability factor in transistor operation?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.