B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Third Semester

Branch : Information Technology

IT 010 303—DISCRETE AND INTEGRATED ELECTRONIC CIRCUITS [IT]

(New Scheme—2010 Admission onwards)

[Supplementary]

Time : Three Hours   Maximum : 100 Marks

Part A

*Answer **all** questions.*

Each question carries 3 marks.

1. Draw a diode half wave rectifier. Explain it.

2. What is the concept of load line and bias stability ? Explain.

3. Draw op amp instrumentation amplifier. Derive its Vo.

4. Calculate the percentage of negative feedback, if a feedback is used to reduce the distortion of an amplifier by 75 %. The voltage gain of the amplifier is 170.

5. Explain the potential applications of Schmitt trigger in detail.

(5 × 3 = 15 marks)

Part B

*Answer **all** questions.*

Each question carries 5 marks.

6. Differentiate transistor series voltage and shunt voltage regulators.

7. Mention the features of biasing methods of BJT in detail.

8. Draw the equivalent circuit of op amp and explain it in detail.

9. A Colpitts Oscillator circuit having two capacitors of 24 nF and 240 nF respectively are connected in parallel with an inductor of 15 mH. Compute the frequency of oscillations of the circuit, the feedback fraction.

10. Define Duty cycle. Compute duty cycle for a perfect saw tooth wave.

(5 × 5 = 25 marks)

Turn over

Part C

*Answer **all** questions.*

Each full question carries 12 marks.

11. (a) Draw a zener voltage regulator and explain its design details.

   (b) Draw a Centre tapped full wave rectifier and explain it. Derive its efficiency.

Or

12. (a) Compare and contrast the parameters of L, C and CLC filters.

   (b) Draw a circuit diagram of a shunt voltage regulator and explain its concept. Bring out its design details.

13. (a) Derive the stability factor for voltage divider bias circuit and give reason why it is advantageous than fixed bias circuit.

   (b) For a BJT with a voltage divider bias circuit, find the change in Q-point with the variation in β when the circuit has an emitter resistor. Let the biasing resistors be $R_{B1} = 52\ K\Omega$, $R_{B2} = 10.2\ K\Omega$, $R_C = 2\ k\Omega$, $R_E = 0.6\ k\Omega$ $V_{CC} = 11V$, $V_{BE(ON)} = 0.7V$ and $\beta = 150$.

Or

14. (a) Show that BJT can be used as an electronic switch.

   (b) Draw CE- BJT amplifier circuit and explain it.

15. Explain the following op amp circuits . Derive their Vo.

   1   Summer.

   2   Scalar.

   3   Subtractor.

   4   Inverting amplifier.

   5   Buffer.

Or

16. Discuss the characteristics of ideal and practical op amps in detail.

17. (a) An amplifier, without feedback, has a voltage gain of 400, lower cut-off frequency $f_1 = 100$ Hz, upper cut-off frequency $f_2 = 240$ KHz and a distortion of 12%. Compute the amplifier voltage gain, lower cut-off frequency and upper cut-off frequency, distortion, sensitivity, De-sensitivity and bandwidth when a negative feedback is applied with feedback ratio of 0.02.

   (b) Discuss the effect of negative feedback on amplifiers.

Or

18. (a) Compare and contrast Hartley and Colpitts oscillator.

   (b) Explain the working of a RC phase shift oscillator with a neat circuit diagram and derive the frequency of oscillation.

19. Obtain the response of step and pulse inputs to low pass RC circuits. Explain the steps.

Or

20. (a) Differentiate Astable from monostable multivibrator. Explain the differences.

   (b) Draw the block schematic of 555 timer and explain it. Mention its applications.

$(5 \times 12 = 60$ marks$)$