

**B 2169**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Fourth Semester

Computer Science and Engineering

EC 250 — ELECTRONIC CIRCUITS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the capacitive effects in a PN junction diode.
2. Draw the two diode analogy for a transistor.
3. What is the use of DC and AC negative feedback in transistor amplifiers?
4. What are the types of negative feedback in transistor circuits?
5. What are the ideal characteristics of an operational amplifier?
6. Draw the diagram of an inverter.
7. State Barkhausen criterion for oscillation?
8. List the applications of 555 IC timer.
9. What is the need for sample and hold circuit?
10. List the different types of DACs.

PART B — (5 × 16 = 80 marks)

11. (a) Draw the circuit diagram of a basic CE amplifier with NPN transistor. Draw and explain the input and output characteristics of the CE configuration.

Or

(b) (i) What are the different types of FET? What are the advantages and disadvantages of FET? (8)

(ii) Draw the characteristic curves of N-channel FET and explain in detail. (8)

12. (a) (i) Comment on the effect of emitter bypass capacitor on low frequency response of CE amplifier with relevant diagrams. (12)

(ii) Calculate the bypass capacitor  $C_e$  to provide a low frequency 3-dB point of 100 Hz when  $R_c = 1K\Omega$ ,  $h_{fe} = 50$ ,  $h_{ie} = 1K\Omega$  and  $R_s = 600\Omega$ . (4)

Or

(b) (i) Draw the circuit diagram of transistor voltage series feedback amplifier. Derive expressions for input resistance, output resistance, current gain and voltage gain. (10)

(ii) An amplifier with a  $1K\Omega$  input resistance and a  $50 K\Omega$  output resistance has a voltage gain of 40. The amplifier is now modified to provide a 10% negative voltage feedback in series with the input. Calculate voltage gain, input resistance and output resistance with feedback. (6)

13. (a) (i) Draw the circuit diagram of inverting and non-inverting amplifier and derive the voltage gain. (12)

(ii) Obtain the gain of inverting and non-inverting amplifier for input and feedback resistance of  $100K\Omega$  and  $10K\Omega$  respectively. (4)

Or

(b) (i) Explain the application of Operational amplifier as inverting summing amplifier. Draw the circuit diagram for  $V_c = -(0.1V_1 + V_2 + 10V_3)$ . (8)

(ii) Explain the application of operational amplifier as subtractor and adder subtractor. (8)

14. (a) (i) Draw and explain the operation of wein bridge oscillator using transistor. Derive the equation for frequency of oscillation. (8)

(ii) Explain colpitts oscillator using transistor with neat diagram. What is the frequency of operation? (8)

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(b) (i) Draw an Astable multivibrator using transistor and explain its operation. (8)

(ii) Draw and explain the waveforms at base and collector of both the transistor in an Astable multivibrator. (8)

15. (a) Draw the block diagram of electronic analog computer? Explain.

Or

(b) (i) Derive the output equation of operational integrator and differentiator. (8)

(ii) Draw and explain the working of counter-ramp type ADC. (8)