

S 9111

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

Second Semester

Mechatronics Engineering

EC 153 — ELECTRONIC DEVICES AND CIRCUITS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define forbidden energy gap.
2. State two applications of PN diode.
3. State any two characteristics of common base amplifier.
4. Why the operating point of a transistor should be a fixed one?
5. What is the effect of negative feedback on noise?
6. Write an expression for frequency of oscillation of Colpitts oscillator.
7. Define CMRR.
8. Draw the Integrator circuit using op-amp.
9. For what purpose mono-stable multi-vibrator is mainly used?
10. State two applications of IC555 timer in astable mode?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Distinguish between intrinsic and extrinsic semiconductors.
(ii) Discuss the operation of PN junction diode and also explain its V-I characteristics.

Or

- (b) (i) Define diffusion current and Drift current and give their expression. (4)
(ii) Define α, β and γ of transistor and derive the relationship among them. (12)

12. (a) Draw the small signal hybrid model of CE amplifier and derive expressions for its A_I , A_v , R_I and R_o .

Or

- (b) With neat circuit diagrams, explain the different biasing methods of BJT.
13. (a) (i) State and explain Barkhausen's criterion for sustained oscillations.
(ii) Explain the effect of negative feedback on gain and bandwidth of a system.

Or

- (b) Draw the circuit diagram of Wien Bridge oscillator and explain its working.
14. (a) Explain in detail about instrumentation amplifier.

Or

- (b) Explain the operation of current to voltage converter and differentiator circuits using op-amp.
15. (a) Draw the circuit arrangement using 555 IC timer for realizing a monostable multivibrator and explain its operation.

Or

- (b) Construct a square wave generator using op-amp and derive expression for frequency of oscillations.
-