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Question Paper Code : 97057

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Third Semester

Electrical and Electronics Engineering

EC 6202 — ELECTRONIC DEVICES AND CIRCUITS

(Common to Third Semester Electronics and Instrumentation Engineering,
Instrumentation and Control Engineering, Robotics and Automation Engineering
and also Common to Second Semester Biomedical Engineering and
Medical Electronics Engineering)

(Regulation 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is transition capacitance and Diffusion capacitance?

2. What is a rectifier and list its types?

3. What is meant by biasing?

4. Compare BJT and FET.

5. Define the four h-parameters.

6. For an amplifier, midband gain = 100 and lower cut-off frequency is 1 kHz.
   Find the gain of an amplifier at a frequency of 20 Hz.

7. Write down the need of cascading the amplifiers.

8. What is CMRR? List the various methods of improving CMRR.

9. Which is the most commonly used feedback arrangement in cascaded amplifier
   and why?

10. State the Barkhausen criterion for an oscillator.

PART B — (5 × 16 = 80 marks)

11. (a) With neat sketch explain the construction, operation and its characteristics of PN junction diode. Also list its advantages, disadvantages and its applications. (16)

Or

(b) Explain the working of bridge rectifier. Give the expressions for RMS current, PIV, Ripple factor and efficiency. (16)

12. (a) Explain the construction and operation of NPN transistor with neat sketch. Also comment on the characteristics of NPN transistor. (16)

Or

(b) With neat sketch, explain the construction, operation and characteristics of SCR. (16)

13. (a) Draw the 'h' parameter equivalent circuit for a typical common emitter amplifier and derive expression for Ai, Ri, Av and Ro. (16)

Or

(b) (i) Derive the expression for the voltage gain of CS amplifier. (8)

(ii) For CS amplifier, the operating point is defined by $V_{GSQ} = -2.5V$, $V_p = -6V$ and $I_{dQ} = 2.5mA$ with $I_{DSS} = 8mA$. Also $R_G = 1M\Omega$, $R_S = 1K\Omega$, $R_D = 2.2K\Omega$ and $V_{DD} = 15V$. Calculate g_m, r_d, Z_i, Z_o and A_v. (8)

14. (a) With neat sketch explain two stage cascaded amplifier and derive its overall Av, AI, RI and Ro. (16)

Or

(b) Draw a differential amplifier and its ac equivalent circuit. Derive for A_d and A_C. (16)

15. (a) Determine Rif, Rof, Av and Avf for the following : (8 + 8)

(i) Voltage shunt feedback amplifier

(ii) Current series feedback amplifier.

Or

(b) Explain the following with neat diagram. (8 + 8)

(i) RC phase shift oscillator

(ii) Hartley oscillator.

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