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Question Paper Code : 11238

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

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Third Semester

Electronics and Communication Engineering

EC3353 — ELECTRONIC DEVICES AND CIRCUITS

(Common to : Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Sketch the symbol of the following devices PN diode, UJT and Zener diode.
2. Compare half wave and full wave rectifier.
3. Name the factors that affect stability of Q point of a transistor amplifier.
4. Define current amplification factor.
5. Define CMRR.
6. Mention the connection made for cascade amplifier.
7. What are feedback amplifiers? Mention its types.
8. State Barkhausen criterion for sustained oscillation.
9. Why heat sink is required in power amplifiers.
10. Give the significance of a DC-DC bidirectional converter.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the V-I characteristics of PN junction diode and Zener diode.

Or

- (b) Explain the working of full wave bridge rectifier and derive its average voltage, RMS voltage, peak factor, form factor, ripple factor and rectification efficiency.

12. (a) With neat circuit diagram, perform ac analysis for common source and common drain using equivalent circuit NMOSFET amplifier.

Or

- (b) For a CB amplifier driven by voltage, source of internal resistance $R_s = 1200\Omega$. The load impedance is resistor $R_L = 1000\Omega$. The h parameters are $h_{in} = 22\Omega$, $h_{cb} = 3 \times 10^{-4}$, $h_{fb} = 0.98$ and $h_{oe} = 0.5 \text{ A/V}$. Estimate the current gain A, Input impedance R_i , voltage gain A_v , overall gain A_{is} , overall voltage gain A_{vs} and output impedance Z_o .
13. (a) With neat sketch explain two stage cascaded amplifier and derive its overall A_v , A_i , R_i and R_o .

Or

- (b) The dual input balanced output differential amplifier having $R_s = 100\Omega$, $R_C = 4.7K\Omega$, $R_E = 6.8K\Omega$, $h_{fe} = 100$, $V_{CC} = +15V$, $V_{EE} = -15V$. Find operating point values, differential and common mode gain, CMRR and output if $V_{s1} = 70\text{mV(p-p)}$ at 1 kHz and $V_{s2} = 40\text{mV(p-p)}$.
14. (a) Sketch the circuit diagram of a two-stage capacitor coupled BJT amplifier that uses series voltage negative feedback. Briefly explain how the feedback operates.

Or

- (b) A Hartley oscillator is designed with $L_1 = 2\text{mH}$, $L_2 = 20\mu\text{H}$ and a variable capacitance. Find the range of capacitance value if the frequency of oscillation is varied between 950 to 2050 KHz.
15. (a) Explain, the working of Class A Power amplifier and derive the expression for the power output and efficiency.

Or

- (b) Explain the working of Buck type DC/DC convertor with relevant circuit diagrams.

PART C — (1 × 15 = 15 marks)

16. (a) Design a circuit which requires a constant DC voltage of 6V for its operation. The available supply is $12\text{V} \pm 1\text{V}$. The device can be assumed to be purely resistive of resistance $2K\Omega$. Design a simple shunt regulator using Zener diode.

Or

- (b) Design the circuit of an RC coupled transistor amplifier. Explain the frequency response characteristics curve of RC coupled amplifier. State the reason for the shape of the curve.