Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50956

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Third Semester

Electrical and Electronics Engineering

EC 3301 — ELECTRON DEVICES AND CIRCUITS

(Regulations 2021)

(Common to PTEC 3301 – Electron Devices and Circuits for B.E. (Part – Time) Second Semester — Electrical and Electronics Engineering – Regulations 2023)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Determine V_0 for the network shown in Fig (1).

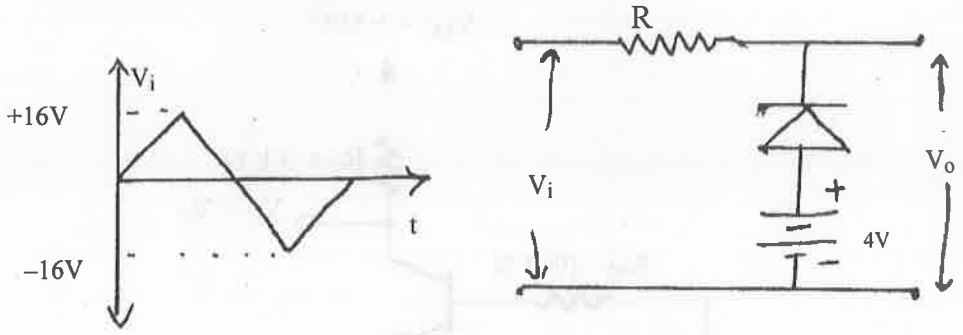

Fig (1)

2. What is the condition for Laser Action?
3. Define α, β and γ of the transistor and mention the relationship of the terms.
4. Differentiate between Enhancement and Depletion MOSFET.
5. Why are bypass and coupling capacitors used in amplifier circuits?
6. Why harmonic distortion occurs in amplifier and how can it be reduced?
7. State two advantages and two disadvantages of single tuned amplifiers.
8. What are the coupling schemes used in multistage amplifiers?

9. State Barkhausen criterion for sustained oscillation. What will happen to the oscillation, if the magnitude of the loop gain is greater than unity?

10. What is meant by positive feedback and negative feedback?

PART B — (5 × 13 = 65 marks)

11. (a) (i) With necessary diagrams explain the structure and operation of PN junction diode. (8)

(ii) Briefly explain about the PN junction capacitances. (5)

Or

(b) (i) Explain the operation of Zener diode and its VI characteristics. (8)

(ii) Explain how Zener diode acts as a voltage regulator. (5)

12. (a) Explain the structure, operation and V-I characteristics of BJT.

Or

(b) With neat diagram explain the structure, operation and V-I characteristics of UJT and IGBT.

13. (a) (i) Explain and derive the voltage and current gain expressions for CB configuration using hybrid models. (9)

(ii) Analyze and determine I_C, I_B and dc voltage at the collector of the transistor amplifier circuit shown in fig. 13. a (ii) (4)

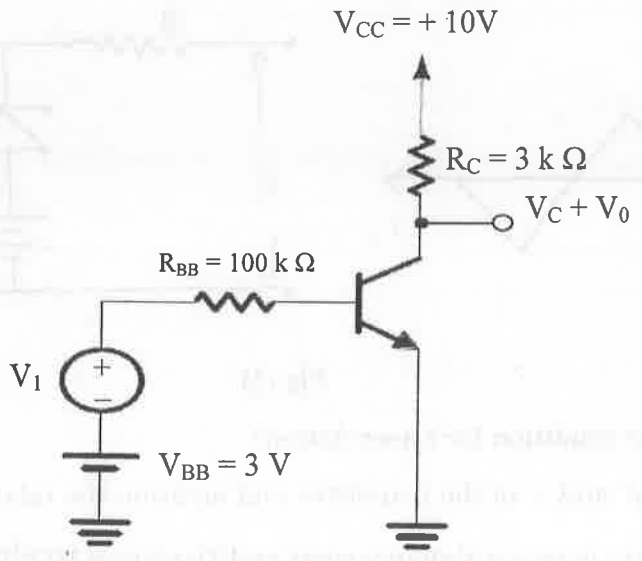

Fig. 13. a (ii)

Or