

A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS) (Grant-in-Aid)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Bachelor of Science (Semester- III) External Examination – OCTOBER 2025.

Subject Code: US03MAPHY02

Subject Name: Basic Solid State Electronics

Date: 07-10-2025, Tuesday

Time: 02:00 PM to 04:30 PM

Total marks: 50

NOTE: Note: (i) The symbols have their usual meaning. (ii) The figures to the right side indicate marks.

Q. 1 Write the most appropriate answer from the following multiple-choice questions. [10]

1. The slope of a dc load of a CE amplifier with collector resistor R_C is equal to _____.
(a) R_C (b) $-1/R_C$ (c) $R_C/2$ (d) $2 R_C$
2. Which of the following sets defines operating point of a CE circuit?
(a) I_B, I_C and V_C (b) I_B, I_C and V_{CE} (c) I_B, I_C and V_B (d) I_B, I_C and I_E
3. Which bias circuit requires one positive and one negative power supply?
(a) collector to base (b) emitter (c) fixed (d) voltage-divider
4. Which h-parameter defines current gain of a CE transistor?
(a) h_{ie} (b) h_{ic} (c) h_{fe} (d) h_{re}
5. For a voltage gain of A, decibel gain is equal to _____.
(a) $20 \log A$ (b) $10 \log A$ (c) $\log A$ (d) $2 \log A$
6. To amplify frequencies above 20 KHz, _____ coupling method is used.
(a) RC (b) transformer (c) direct (d) capacitor
7. Positive feedback increases _____ of an amplifier.
(a) stability of gain (b) bandwidth (c) gain (d) input impedance
8. The voltage gain of a negative feedback amplifier is _____.
(a) $A / (1+A\beta)$ (b) $1 / (1+A\beta)$ (c) $A / A\beta$ (d) $A / (1-A\beta)$
9. Which of the following is a part of JFET ?
(a) base (b) collector (c) emitter (d) gate
10. In ohmic region, a JFET is equivalent to a _____.
(a) capacitor (b) conductor (c) inductor (d) resistor

Answer the following questions in detail.

Q.2 (a) With necessary diagram explain determination of load line of a CE transistor circuit. [05]

(b) Show the effect of position of operating point on the output signal with necessary diagram. [05]

OR

(P.T.O.)

- Q.2 (a)** Explain determination of operating point of voltage divider biasing circuit using accurate analysis method. [06]
(b) Draw fixed bias circuit and obtain its operating point. [04]

- Q.3 (a)** What is a small signal amplifier? Draw its circuit and explain its DC load line. [06]
(b) Explain AC behavior of a small signal amplifier and discuss its AC load line. [04]

OR

- Q.3 (a)** What are h parameters? Define and explain them for CE transistor. Develop h-parameter equivalent circuit of CE transistor using h-parameters. [06]
(b) Write a note on RC coupling method. [04]

- Q.4 (a)** Explain effect of negative feedback on (i) noise and distortion (ii) input impedance. [06]
(b) Explain various types of feedback and their characteristics with block diagram. [04]

OR

- Q.4 (a)** Explain circuit and working principle of Wein Bridge oscillator. [06]
(b) Explain working of Hartley oscillator. [04]

- Q.5 (a)** Draw structure of a n-channel JFET and explain drain and transfer curves. [06]
(b) Write a note on JFET amplifiers. [04]

OR

- Q.5 (a)** What is E-MOSFET? Explain its structure, working and drain curve. [06]
(b) Discuss E-MOSFET as digital switch. [04]

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